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Assessment Framework for People-Centred Solutions to Carbon Neutrality

A Comprehensive List of Case Studies and Social Innovation Indicators at Urban Level

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Preface

All cities are facing the urgent need to reach climate neutrality: technological solutions should be complemented with people-centred perspectives to make projects sustainable and scalable. Social innovations are human-centred collaborative solutions that can provide an important lever towards net zero. Cities can design environments that foster the emergence and scaling of innovative social practices for sustainability. Based on the work developed within the EU-funded project NetZeroCities, the book presents a framework for categorization of social innovation solutions for climate neutrality at city level, and a clustered catalogue of indicators, which can be utilized by cities' public administrators to monitor and evaluate social innovation action plans to support people-centred, collaborative or co-designed solutions to lower carbon emissions. The framework is derived by merging top-down academic knowledge with bottom-up pragmatic case studies. It is relevant for scholars in the field of policy-making and design, as well as cities' transition teams, policymakers and consultants.

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Contents

Acronyms

EU POLIS	Integrated NBS-based Urban Planning Methodology for Enhancing the Health and Well-Being of Citizens
NBS	Nature-Based Solutions
NCZ	Net Zero Cities
PH&WB	Physical Health and Well-Being
RESINDEX	Regional Social Innovation Index
SI	Social Innovation
SIAP	Social Innovation Action Plan
SIMRA	Social innovation and its impacts in marginalized rural areas

Chapter 1
Social Innovation and Co-design for Climate Neutrality: The NetZeroCities Project

The complex and urgent challenge of reaching carbon neutrality requires systemic changes of our current systems. Starting from the acknowledgment that technological solutions alone are not enough to reach climate neutrality at the required speed, social innovation becomes a crucial lever for accelerating systemic transformation. Several projects and scientific evidence outline the benefits of a people-centred and co-design approaches to transitions. Yet, public administrators, policy makers and urban transition teams have limited guidance on how to embed social innovations in their cities' action plans, and on how to assess the progresses, outcomes and impacts of social innovation initiatives at urban level. Based on the work developed within the EU-funded project NetZeroCities, the book presents a framework for categorization of social innovation solutions for climate neutrality at city level, and a clustered catalogue of indicators, which can be utilized by cities' public administrators to monitor and evaluate social innovation action plans to support people-centred, collaborative solutions to lower carbon emissions.

1.1 The NetZeroCities Project

The NetZeroCities EU-funded project[1] is the biggest climate neutrality experiment on earth, aiming to support European cities to drastically cut down greenhouse gas emissions through climate action to achieve *climate neutrality*, one of the biggest challenges our societies face today. NetZeroCities (NZC) recognises the need for cities to develop specific strategies that are tailored to suit local and regional contexts, supporting them with coaching and by developing and promoting new and existing tools, resources, and expertise into a One-Stop-Shop platform accessible to all cities through an online portal. Specific objectives of the NetZeroCities project are the

[1] https://netzerocities.eu/

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following: (1) Develop an approach to support climate-neutral transformation in cities; (2) Help cities build capabilities and ways of working to advance systemic change using innovation; (3) Forge a platform for cities to use for all services and expertise critical to climate neutrality; (4) Facilitate a pipeline of cities accelerating towards climate neutrality,

A core element of reaching climate neutrality lies in the elaboration of Climate-neutral City Contracts. To this end, it is crucial to be able to assess the progress made on path to climate neutrality, analyse achievements and enable learning for all local stakeholders as well as for other cities, by mean of monitoring and evaluating performance. Specifically, it is important to design and develop an evaluation framework for the social innovation components of the Climate-neutral City Contracts, and the stemming social innovation initiatives. To provide cities' transition teams' and public administrators with a comprehensive set of social innovation actions and related indicators, in this book we describe a social innovation impact assessment framework at urban level, which is currently utilized by within the NetZeroCities project.

Within the book, the following key questions are discussed:

- What are the foreseen activities and results of social innovation actions of climate city contracts and action plans?
- Which are suitable evaluation criteria to assess the impact of social innovations included in cities' action plans and the stemming social innovation initiatives?
- What indicators are relevant to be measured in order to operationalise the evaluation criteria across cities' intervention logic?

1.2 Methodology

With the purpose to develop an impact assessment framework of social innovation for supporting climate neutrality at city level, a triangulation methodology is deployed, combining bottom-up knowledge derived from case studies of social innovation initiatives and policies that lead to reduce GHG, with a systematic analysis of scientific literature, frameworks and funded-project on the topic of social innovation for decarbonization. The knowledge gained from these complementary approaches is combined to derive categories, and resulted in ten categories, according to which intervention logics for social innovation are derived and presented in Chap. 2. Specific indicators for each of the 10 categories will be presented in Chap. 3. Finally, we provide a core set of indicators based on NZC pilot cities' feedback. These selected indicators are integrated into the NZC comprehensive indicators set,[2] which includes GHG emissions indicators, economic indicators, co-benefits and other levels of change including democracy and participation.

[2] https://netzerocities.eu/results-publications/

1.3 Structure of the Book

The book provides firstly the rationale of deploying social innovation to support urban transitions (Chap. 2), followed by the impact framework (Chap. 3) and related indicators that cities can utilize for monitoring their effort. Implications for theory and practice, and discussion of future developments, conclude the book (Chap. 4). In more details, an overview of the content of each chapter is provided below.

This Chapter The first chapter provides an overview of the purpose of the book, a presentation of the NetZeroCities project, and the explanation of the methodology. Next, it 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 real life examples of the relevance of social innovations for reaching climate neutrality at urban and reginal level Which provide the grounding for the bottom-up categorization of social innovations, from which the evaluation framework is derived.

Chapter 2 This second chapter presents the proposed assessment framework of social innovation for climate neutrality at urban level. The framework is composed of ten categories derived from the analysis of social innovation action plans deployed worldwide, scientific literature, case studies insights and the impact pathways developed in the NetZeroCities project.

The general intervention logic—a first step in setting up an impact assessment framework—is described, followed by the specific intervention logics for each category, which link actions to impact. By defining the project objectives and inputs with respect to the expected results in terms of outputs, outcomes and impacts, the intervention logics form the basis with regards to what the impact assessment methodology aims to measure.

Chapter 3 The third chapter provides a broad list of indicators of social innovation to assess cities' action plans in terms of social innovation for climate neutrality. The general intervention logic of the NetZeroCities social innovation component of action plans and of specific initiatives is implemented in indicators clustered according to the categories of the framework. For each of the ten categories, a specific list of indicators is provided. In total, over one thousand indicators are presented, clustered by category and evaluation criteria (effectiveness, efficiency, relevance, replicability, and scalability).

Chapter 4 In the fourth chapter, implications for practice and for theory development are discussed. Firstly, guidelines for the implementation of the framework in the cities are provided to support city administrators in defining steps they need to follow in order to apply the indicators to their local case. Specifically, it presents the methodologies and tools for the data collection and analysis. Next, the theoretical implications

of the framework and of the indicators are outlined, in particular for supporting evidence-based design. In terms of practical implications, policy makers, designers, politicians, and civil servants can utilize the presented assessment framework and select indicators for the assessment of cities' social innovation action plans for supporting climate neutrality.

1.4 The Relevance of Social Innovation

Social innovation is defined by the European Union as "new ideas (products, services and processes) which simultaneously satisfy social needs more efficiently than existing ones and create new and long-lasting social relationships and collaborations (Rizzo et al., 2020). Not only are these innovations good for society, but they also improve its ability to act." (Hubert et al., 2014). In addition, social innovation is characterized by "prototyping and quick experimentation to produce new products, services or production models that generate both social and economic value, improving community wellbeing and prosperity" (Lumbreras et al., 2022, p. 6). Social innovation practices can become levers of change toward system innovation to generate holistic solutions to societal challenges and create responsive ecosystems for social change (see NetZeroCities Quick Read[3] for a more detailed explanation and examples). Such systemic changes are developed through inclusive and collaborative processes for generating people-centred projects and solutions to lower GHG emissions. Cities that supporting the emergence and strengthening of social innovation initiatives in cities, build citizens' and stakeholder capacity to address decarbonisation challenges, such as through the creation of new business models or novel cross-sector partnerships, creating engagement platforms for multiple actors to co-design and co-produce solutions contributing to decarbonisation, and supporting positive behavioural changes by responding to specific local needs and acting within cultural contexts (Lumbreras et al., 2022).

According to scientific literature there are multiple reasons for considering social innovation a relevant lever for decarbonization, which can be grouped in five progressive categories: from the most basic and necessary levels of (a) acceptance and (b) behaviour change, to (c) the systemic changes of socio-technical systems and (d) empowerment, which (e) influence wellbeing (Bresciani et al., 2023).

At the most basic level, the literature shows that if there is no acceptance by local governments, citizens, organizations and the various actors, energy transitions will fail (Gregg et al., 2020; Nakano et al., 2018). Social innovations can provide a relevant contribution for climate neutrality by initiating and fostering *behavioural change* toward more sustainable practices (Grottera et al., 2020; Loyarte-López et al., 2020; Mukai et al., 2022; Schanes et al., 2016). Schanes et al., (2016, p. 1033) report that "[t]he mitigation report of the Intergovernmental Panel on Climate Change (IPCC) states that behaviour, lifestyle, and culture have a considerable influence on

[3] https://netzerocities.app/QR-Social.

energy use and associated emissions and that stabilizing or lowering consumption, transitioning towards a sharing economy and adopting other behavioural changes have a high mitigation potential" (Edenhofer et al., 2014, p. 20).

Thirdly, a relevant number of scientific articles discussed how socio-technical systems can be disrupted by niche innovations that can reconfigure the system. In fact, "[s]uch transitions not only entail new technologies, but also changes in markets, user practices, policy and cultural discourses, and governing institutions" (Geels et al., 2008, p. 521). In a highly cited paper published on Science, Geels et al. (2017) discuss socio-technical transitions for decarbonization, offering an overall framework which takes into account technical and social aspects, including people behaviour and the relevance of framing the discourse, based on the case reported by Rosenbloom et al. (2016, p. 1275) that discuss and analyse solar electricity in Ontario through a "discursive approach to understanding multi-dimensional interactions within socio-technical transitions" with a new analytic approach that connects discourses and storylines to transitions.

The most discussed reason for paying attention to social innovation when addressing carbon neutrality seems to be found in its ability of supporting actors' *empowerment* to take actions to tackle climate issues. Diepenmaat et al. (2020) published a theoretical paper with the eloquent tile "Why sustainable development requires societal innovation and cannot be achieved without this" in which they describe the business perspective on transitions and discusses societal innovation as a distinctive innovation type, by proposing an "innovation cube" and discussing the "need for broader partnerships for societal innovation based on multiple value creation" (p. 1270). They outline that sustainable development needs collective action for creating new systems, which in turn requires social innovation. Citizens need to take up a new role for finding and sustaining new business models for a circular economy (Diepenmaat et al., 2020). Wuebben et al., (2020, p. 567) conducted a systematic review of "Citizen Science and Citizen Energy Communities" for Sustainable Development Goals (SDGs) and call for citizen science to supplement typical citizen participation formats in energy communities, as it engages citizens in research and increases their literacy regarding energy systems. Proving concrete examples through the case of Scotland's journey to decarbonization, Ostfeld and Reiner (2020) report on the effects of citizens' juries and focus groups. Agarwal et al. (2012), based on an analysis of climate adaptation policies in 47 least developed countries, provide key lessons for adapting such plans to local needs, such as increasing local autonomy, creating "mechanisms for information sharing among decision makers across sectors and levels of decision making; and (4) improve accountability of local decision makers to their constituents" (p. 565).

Finally, three recent papers focus on wellbeing, since it is (or should be) the final goal of all social and technological innovations. Engelbrecht (2018) highlights the need to consider wellbeing when assessing technological and social innovations because we cannot assume that innovations are desirable per se. We should rather keep focused on the final desired societal outcome. Hoppe and De Vries (2019) focus their work on wellbeing, arguing that "[i]n the context of energy transition social innovation can be defined as empowerment and social goals pertaining to the

general wellbeing of communities" (p. 141). Creutzig et al. (2022) demonstrate that demand-side solutions for climate change mitigation are not only useful to support decarbonization but also to increase levels of well-being. Specifically, they propose a classification of three "mitigation potential of demand-side options: avoid, shift, improve" (p. 36) which seem relevant for classifying social innovations, in particular for the context of the circular economy.

A systematic literature review on the topic has been conducted by the authors (Bresciani et al., 2023), in which the reviewed papers are clustered and visualized and into a comprehensive map, utilizing the well-established logic model (Knowlton & Phillips, 2012) as the underpinning structure, with the newest labelling adopted by the European Commission for Horizon projects: results, output and impacts. The systemic literature review on the topic of social innovation for climate neutrality provides a complex and multi-faceted overview of the topic and surfaced the diversity of levels and perspectives adopted by researches in different fields. The framework provides guidance to be aware of the many levels of complexity, and the potential impact of deliberately designing the emergence and scaling of social innovations in cities for the wellbeing of communities (Hoppe & De Vries, 2019) and provides the scientific bases for the assessment framework developed in the next chapters.

1.5 Social Innovation Case Studies

In this section we provide an overview of 37 case studies that show how social innovation projects can foster climate neutrality, developed and analysed within the NetZeroCities project (Deliverable 9.1,[4] Lumbreras et al., 2022). We present a brief explanation of each case and links to the related page on the NetZeroCities platform where further information for each case can be found. These cases provide the grounding for the bottom-up clustering of social innovation categories to build the evaluation framework, presented in the following chapters.

Citizens Engagement

Project:	**SONNET—Mannheim City Lab**
Location:	Mannheim, Germany
Key concept:	City Lab on Social Innovation in Energy Transitions (SONNET) in Mannheim is a living lab for the development of a neighbourhood with migration background.
Abstract:	The city of Mannheim developed and implemented a city lab, following the "living lab" approach, to activate citizens for the development of the neighbourhood Neckarstadt-West. The neighbourhood is characterized by residents with migration background. Language

[4] https://netzerocities.eu/results-publications/

barriers posed a challenge to engage with citizens for energy transition efforts. The city lab includes mobile participation opportunities, specific apps for a gamification approach. It explored measures for the neighbourhood such as energy role model flats and a neighbourhood fund (crowdfunding) for energy efficiency measures.

Link: https://netzerocities.app/resource-2758

Project: **PentaHelix**

Location: Zagreb, Croatia

Key concept: Establishment of regional task forces to empower local and regional authorities to develop and implement actions for energy and climate neutrality.

Abstract: The PentaHelix project aims at empowering 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. The main objective was to develop an innovative *pentahelix*-based method and use this to engage and support authorities on multiple levels together with other key stakeholders in different sectors for increased SECAP development and implementation. PentaHelix stands for integrated development and focuses on five different stakeholder groups: (1) Public authorities, (2) Industry, (3) Academia, (4) NGOs and (5) Citizens.

Link: https://netzerocities.app/resource-2623

Project: **Better Reykjavik**

Location: Reykjavik, Island

Key concept: Innovative online platform to crowdsource solutions of urban challenges; the platform has multiple democratic function and functions as an umbrella for several city programs.

Abstract: Better Reykjavik is an online platform for the crowdsourcing of solutions to urban challenges launched in May 2010. It is a co-creation project of the Citizens Foundation, Reykjavik City and its citizens that connects them and improves trust and policy.

In practice, it is a platform for crowdsourcing solutions to urban challenges. It fullfils multiple democratic functions: agenda setting, participatory budgeting and policymaking. The platform incorporates several innovations: a debating system, a crowd-sourcing function, the submission of multimedia content and extensive use of AI to improve the user experience and submitted content. Better Reykjavik is an umbrella for several programs, including the city's participatory budgeting platform called "My Neighborhood" and the City Council's participatory lawmaking project "Your Voice". The platform is used by over 20% of city population (with over 27,000 registered users, primarily for participatory budgeting).

Link: https://netzerocities.app/resource-3883

Project: **Nappi Naapuri (Nifty Neighbour)**
Location: Finland
Key concept: Social web service to increase the neighbourhood social wellbeing and participation to the city's initiatives.
Abstract: Nifty Neighbour is a non-profit, map and location based social web service. It aims to create contemporary neighbourhood where citizens can meet people living near them, ask and get help, employ each other and create projects together. The Nappi Naapuri project aims at increase social wellbeing and participation in the society.
Link: https://netzerocities.app/resource-4005

Project: **You Decide participatory budgeting**
Location: Braga, Portugal
Key concept: A participatory budgeting initiative for youth and project development support.
Abstract: You Decide [Tu Decides] is a participatory budget for youth. It allows young people to propose, develop and vote for projects they would like to see completed in their city. The young proposers of the winning initiatives are supported for the implementation of the proposed projects under the supervision and support of the municipality.
Link: https://netzerocities.app/resource-2851

Project: **Zagreb renewal of Blok 19**
Location: Zagreb, Croatia
Key concept: A collaborative initiative for the complete renewal of Blok 19 in Zagreb.
Abstract: It is a collaborative city initiative to conduct studies for an inclusive and climate-friendly renovation of the historical centre of the city of Zagreb. The programme for a comprehensive renewal of the historical centre of Zagreb was a pilot project that focused on an area of Zagreb called "Blok 19". The idea came after the devastating earthquake that hit the City of Zagreb: while it was clear that a renovation was necessary and urgent, the City of Zagreb aimed at making the renovation inclusive, including measures for climate change mitigation and adaptation. Twelve sectorial studies were conducted and lead to the opening of a process of public consultation. The mayor invited experts and citizens to participate in the development of the final document.
Link: https://netzerocities.app/resource-2443

Project: **Bologna's Citizen Collaboration Pacts**
Location: Bologna, Italy
Key concept: A participatory approach to policymaking to create a collaborative city, based on a platform to co-design projects for urban development.

Abstract: The participatory budget initiatives in Bologna provides a platform for citizens to co-design community projects through collaborative pacts for urban development. It is the result of a political process that involved bottom-up and top-down measures with the aim of creating a collaborative city. A design for services approach was deployed which provided the context for interaction and relationship-building between different actors and for the gradual adoption by the government of a citizen- centred perspective of public value creation.
Link: https://netzerocities.app/resource-2457

Project: **Brainport Smart District.**
Location: Helmond, the Netherlands.
Key concept: Participatory building of a smart city district with 8 programs lines aimed at improving the quality of life.
Abstract: Brainport Smart District is a smart city district in the city of Helmond, the Netherlands. The mixed-use district, set on 380 acres, makes use of technology to create an environmentally and socially sustainable community. It has eight different program lines: Circular district, Participation, Social and safe district, Healthy district, Digital district, Mobile district, District with Energy and District with water. The district will be developed in response to the needs and habits of its 4,500 future residents and what is learned along the way through a living lab. Data sharing can improve residents' quality of life. For example, energy and food consumption habits can be tracked, leading to adjustments in supply and disposable income savings.
Link: https://netzerocities.app/resource-3887

Project: **City Studio Program in Spanish Cities**
Location: Spain
Key concept: Students are given scholarships to design solutions for sustainable urban transformation as part of their thesis.
Abstract: City Studio is a scientific collaboration programme between cities and universities. The aim is that students (and universities) work together with cities to design solutions that contribute to sustainable urban transformation through final master's and bachelor's degree thesis. Each student receives a scholarship and is assigned a civil servant as a thesis tutor in addition to an academic thesis supervisor.
Link: https://netzerocities.app/resource-3097

Energy

Project: **KLIK (Križevci Climate Innovation Laboratory)**
Location: Križevci, Croatia
Key concept: A cooperative to engage citizens in the energy transition, implementing actions and helping make the city energy sufficient.

Abstract: The energy cooperative KLIK (Križevci Climate Innovation Laboratory), was established in 2020 to help make Križevci an energy self-sufficient city, but above all to engage citizens in energy transition. KLIK works on identifying the needs of the local community, implementing technology in the social environment, empowering the local community through cooperation, joint creation and capacity building.
Link: https://netzerocities.app/resource-2619

Project: **Valencia Local Energy Communities**
Location: Valencia, Spain
Key concept: Valencia promotes Local Energy Communities.
Abstract: The Valencia City Council promotes local energy communities by giving legal advice to citizens and communities and providing different private and public experiments guarantee the inclusive access.

Local energy communities promoted by the City Council guarantee the energy access to the most vulnerable people working together with Social Services of the City. It provides template of legal form and facilitation workshops to create energy communities.
Link: https://netzerocities.app/resource-3110

Project: **Zklaster**
Location: Poland
Key concept: Establishment of energy clusters to build an independent, local energy market and accelerate the energy transition in the region.
Abstract: The cluster is widely regarded as one of Poland's most successful energy clusters. It aims at setting up a regional Renewable Energy System (RES), to replace the brown coal mining in the region. Representatives of local authorities from the area of the Zgorzelec Cluster for the Development of Renewable Energy Sources and Energy Efficiency (ZKlaster) signed an agreement on the basis of which the Committee for the Transformation of the Turoszów Region was established.
Link: https://netzerocities.app/resource-2762

Project: **SONNET—The Bristol City Lab**
Location: Bristol, UK
Key concept: Crowdfunding to collectively raise capital to install energy efficiency measures in local community buildings engaging building managers.
Abstract: Bristol City Council, for the SONNET City Lab, deployed crowdfunding as an investment activity to collectively raise capital to install energy efficiency measures in local community buildings. The Bristol municipality engaged building managers, working with the Bristol Energy Network, to assess the costs and energy-related savings associated with energy efficiency works in community buildings. They

explored the possibility of using a Community Municipal Bond (CMB) mechanism to provide finance for the initiative and conducted a survey to assess interest in this type of investment.
Link: https://netzerocities.app/resource-2627

Project: **Elektrizitätswerke Schönau (EWS)**
Location: Germany
Key concept: Nuclear- and coal-free energy supply belonging to citizens.
Abstract: Originally born out of a group of committed citizens decided to become active together in their community in the Black Forest and create a nuclear- and coal-free energy supply belonging to citizens, Elektrizitätswerke Schönau (EWS) today supplies citizens throughout Germany with green power and eco-gas and conducts multiple initiatives for climate neutrality.
Link: https://netzerocities.app/resource-3907

Project: **Entrepatios—Las Carolinas**
Location: Madrid, Spain
Key concept: Co-design and co-management of a nearly zero energy residential building.
Abstract: Entrepatios—Las Carolinas is a nearly zero energy residential building consists of 17 climate neutral houses. It is a non-profit project with funds from ethical banking, as well as loans and donations from those seeking to promote a new housing model. The cohousing Carbon Footprint is offset by reforestation programmes. It is the first ecological cohousing built in Madrid, owned by a cooperative.
Link: https://netzerocities.app/resource-3101

Behavioral Change

Project: **1.5 degree lifestyles**
Location: Finland
Key concept: App to calculate individuals' carbon footprint and suggest behaviour changes for more sustainable living.
Abstract: Finnish cities have been experimenting with a vision of sustainable living. With the goal was to achieve a significant drop in the participants' carbon footprint, the tool "1.5-degree lifestyles puzzle" was used to make the results and implications of the required changes approachable and understandable to both households and other stakeholders. Individual carbon footprints are calculated at the project start and the development is monitored over time.
Link: https://netzerocities.app/resource-3866

Project: **Climate Meal**
Location: Helsinki, Finland

Key concept: App for restaurants for calculating and communicating carbon footprint of meals, with a label to help consumers identify low carbon meals.

Abstract: Restaurants were invited to join the initiative which provided them with the Climate Meal label, including tools for calculating the carbon footprint of their dishes, and tools for communication about their commitment. The Climate Meal label helps customers identify meals from the menu that have a smaller-than-average carbon footprint. The initiative was run through a project under Forum Virium which is an innovation company owned by the city of Helsinki. The city of Helsinki canteens and several restaurants of the city took part to these initiatives.

Link: https://netzerocities.app/resource-2847

Project: **Play!UC (Playing with Urban Complexity)**

Location: Netherlands, Belgium, Austria

Key concept: An engaging game that raises awareness on urban carbon footprint and helps trigger behavioural change in young adults.

Abstract: Playing with Urban Complexity is a co-located serious games aimed at reducing the urban carbon footprint among young adults. The purpose of the initiative is to foster the understanding of complex urban problems by combining participatory processes with serious games in a co-located setting investigating both existing games and novel game-based approaches.

Link: https://netzerocities.app/resource-3923

Project: **Children ride sharing service**

Location: Helsinki, Finland

Key concept: Ride sharing initiative from school to football training.

Abstract: School children get a minibus transport from school to football training right after school. This saves time and reduces the number of trips. Lower price of early practice hours compensates the transportation costs. This ride sharing service initiated by a local football club started from a pilot project and became a permanent activity in the club.

Link: https://netzerocities.app/resource-3927

Training and Education

Project: **Ecohouse Antwerp**

Location: Antwerp, Belgium

Key concept: An advice and demonstration centre for sustainable building and living run by the city of Antwerp.

Abstract: Ecohouse offers workshops and advice on energy retrofitting, as well as both short- and long-term solutions for saving energy and money. It is a demonstration centre that bringing together climate action and social cohesion. It is open to the general public, with a substantive part of its work focused on more vulnerable groups, energy reduction and using renewable energy.
Link: https://netzerocities.app/resource-2813

Project: **Agroecology**
Location: France
Key concept: Promotion and training on agroecology and its application to support the transition to more sustainable farming practices and change in production model.
Abstract: The association Terre & Humanisme promotes agroecology as an approach and trains people in its application in order to support the transition to more sustainable farming practices. It aims to change production models to achieve higher combined economic, social and environmental production based on the founding principles of Agroecology. The association operates on three fundamental pillars: raising awareness, training modules and internships, network and community support (with a network of ambassadors).
Link: https://netzerocities.app/resource-3871

Project: **EVA—maakt het plantaardig**
Location: Ghent, Belgium
Key concept: Cooking and awareness activities to promote plant-based diets.
Abstract: EVA is a bottom-up initiative aimed at advocating for the adoption of plant-based diets through cooking and awareness. The initiative works on a larger scale with company restaurants, hospitals and schools through guidance at institutional kitchens for large-scale impact. Activities are not only about information but about tasting, discovering and cooking.
Link: https://netzerocities.app/resource-3911

Project: **Real Junk Food Berlin**
Location: Berlin, Germany
Key concept: Workshops and courses to raise awareness on food waste and new sustainable food systems.
Abstract: The international organization The Junk Food Project has the goal to raise awareness around the topic of food waste and new sustainable food systems. Activities include the use of food that would otherwise be wasted and the conduction of workshops and courses sharing ways to avoid food waste.
Link: https://netzerocities.app/resource-3931

Project: **Smart House Training Program**

Location: Tartu, Estonia
Key concept: Training programs to initiate behavioural change for smart house and smart city living.
Abstract: The core premise of the project is the acknowledgement that smart solutions alone are not enough but need cultivating smart citizens. The training program aims at encouraging citizens in the pilot project areas to learn from each other by training *ambassadors* in every pilot area. Ambassadors are citizens that are able to help and support their neighbours in various aspects of smart house and smart city living.
Link: https://netzerocities.app/resource-4009

Project: **Applause**
Location: Ljubljana, Slovenia
Key concept: Collaborative, educational and awareness-raising project to find solutions to invasive alien plant species in cities with circular economy principles.
Abstract: Applause is a project led by the city of Ljubljana (Slovenia) to tackle the issue of invasive harmful alien plant species, applying a zero-waste and circular economy principle. Ljubljana is moving from a linear model for managing invasive harmful alien plant species to a circular one that is valuable for the entire ecosystem. This process involves six steps: plant identification, biomass harvest, processing and storage, value recovery, final production, and new products and services to market. Through a variety of educational and awareness-raising actions, citizens are encouraged to participate in different stages of the model.
Link: https://netzerocities.app/resource-3875

Platforms

Project: **El Día Después (EDD)**
Location: Spain
Key concept: A multistakeholder platform for action toward climate neutrality—creating collectives who develop ideas and plans (workshops, co-lab) to address the SDGs,
Abstract: El día después is a multi-stakeholder platform for creating networks to address the sustainable development goals, specifically SDG 17 (partnership for the goals). Four main communities take part to this project: environment and health, cooperation and global governance, city transformation, and inequality and new economic model. Within these communities, experts and professionals from the field collaborate to create different services that they believe will create useful change. Through these collectives, lessons can be drawn that can catalyse and accelerate the transition towards models and systems that support cities, the environment, and global governance.

Link: https://netzerocities.app/resource-3899

Project: **Just transition listening platform.**
Location: Lada and Velilla, Spain.
Key concept: An open innovation platform to visualize the impact of municipalities in a mining region, map initiatives of green economy transformation, and co-design a portfolio of actions.
Abstract: The goal of the Just Transition listening platform is to transform the process of closing the coal-fired power plants into new green economy opportunities. This open innovation platform fosters territorial transformation in the mining region of northern Spain (Lada and Velilla towns) into green economy and just transition European strategy. The elements of the platform include the ecosystem based on social innovation approach (new forms of diagnosis, co-creation, sense-making, prototypes), and an interconnected portfolio of initiatives.
Link: https://netzerocities.app/resource-3106

Project: **SynAthina platform**
Location: Athens, Greece
Key concept: City social innovation platform to collect and support execution of citizen ideas and projects for better city life.
Abstract: The synAthina platform is the social innovation platform of the city of Athens for engaging citizens in problem-solving and reform. Citizens and community groups can submit innovative ideas on how to improve life in the city and are then connected to the relevant government representatives, non-governmental organisations, and private businesses that can support their efforts.
Link: https://netzerocities.app/resource-2856

Scaling

Project: **Clean Cities ClimAccelerator**
Location: Vienna, Austria and Madrid, Spain
Key concept: An accelerator program for high impact and high growth cleantech startups that help cities achieve climate neutrality through system-level innovations.
Abstract: Clean Cities ClimAcclerator is a 9-month accelerator program that targets startups that help cities achieve climate neutrality, through 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. The accelerator is run by Impact Hub Vienna and Universidad Politécnica de Madrid. It has three stages: (1) explore, (2) validate and collaborate, and (3) scale.
Link: https://netzerocities.app/resource-2726

Project: **Viable Cities**
Location: Sweden
Key concept: A massive innovation program building infrastructure to support new forms of governance, citizen engagement, cooperation and policy development to accelerate the climate transition.
Abstract: 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 programme attempts to fulfil the vision that Sweden has a leading role in the energy and climate transition through climate-neutral and sustainable cities, through co-creation and learning with cities and actors in other countries and at international level.
Link: https://netzerocities.app/resource-4013

Project: **City Experiment Fund**
Location: Europe and Central Asia
Key concept: City councils applying systems thinking to explore new approaches for urban transformation.
Abstract: Five cities from across the South-Eastern European and Central Asian region jointly explored new approach to problem solving through the methodology of systems thinking. The respective city councils began designing systems thinking portfolios for urban transformation with the support of UNDP Europe and Central Asia.
Link: https://netzerocities.app/resource-3891

Project: **Oslo public procurement**
Location: Oslo, Norway
Key concept: Using procurement as a strategic tool to drive a transition to more sustainable production and consumption.
Abstract: Oslo's commitment to a sustainable procurement strategy is integrated at the top management level in all fifty agencies of the city, and it is reflected in their local action plans for the procurement activities. They city of Oslo spends approximately around 5% of the national public procurement budget and aims to use this market power to generate innovation and create markets for more sustainable products and services. Responsible public procurement is one of the six sub-goals of the procurement strategy of the city.
Link: https://netzerocities.app/resource-25

Systemic Urban Planning Approaches

Project: **Cloughjordan Ecovillage**
Location: Ireland

Key concept: Co-building of an ecovillage for ecological, economic and social sustainability.
Abstract: The Cloughjordan Ecovillage started as a plan to create a community of dedicated environmentalists. A present, the ecovillage is demonstrating different ways to achieve ecological, economic, and social sustainability, being Ireland's lowest ecological footprint district. It has 55 low-carbon homes, a carbon–neutral district heating system, a community farm, a green enterprise centre, a planned reed-bed treatment plant, and a photovoltaic power plant.
Link: https://netzerocities.app/resource-2522

Project: **Paris: 15-minute city**
Location: Paris, France
Key concept: Daily necessities can be accomplished in 15 mins walking/cycling
Abstract: A popular urban planning concept (developed by the city administration) in which most daily necessities can be accomplished by either walking or cycling from residents' homes in 15 minutes maximum.
Link: https://netzerocities.app/resource-3919

Project: **Climate Quarter Project**
Location: Krakow, Poland
Key concept: Co-creation of a residential quarter where essential services are within 15-min reach for low-carbon mobility.
Abstract: The purpose of the project is to create a residential quarter that prevents the necessity to travel more than 15 min to get the most essential goods and services, and therefore reduces the amount of carbon emissions related to transport. The planning and implementation involves citizens and the active cooperation of all parties (city units) to discuss issues and vision for the quarter and its future developments.
Link: https://netzerocities.app/resource-3895

Project: **Superblocks (Vitoria-Gasteiz)**
Location: Vitoria-Gasteiz, Spain
Key concept: Participatory approach to reorganize the city into superblocks, car-free areas that maximise public space for new social uses.
Abstract: 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 city is reorganised into superblocks, car-free areas that maximise public space for new social uses and keep road traffic outside the neighbourhoods, redesigning the inner streets for use by pedestrians.
Link: https://netzerocities.app/resource-2766

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Chapter 2
Impact Logic: Social Innovation Categories for Cities' Action Plans

How can cities' public administrators, policy makers or transition teams be supported in selecting and monitoring social innovation actions that support people-centred systemic solutions to reduce carbon emissions? Including social innovation in cities' climate city contracts and action plans, requires decision makers to consider the impact logic and impact pathways: which social innovation initiatives could lead to expected outcomes? In order to develop such impact logic, it is necessary to define categories of social innovations that can be implemented in urban or reginal action plans, for then identifying indicators for each category.

To develop such social innovation categories for the cities' action plan, we analysed existing social innovation action plans developed worldwide, and complemented this knowledge with theory of change theoretical models (Cooksy et al., 2001; Knowlton & Phillips, 2012; McLaughlin & Jordan, 2015; Shove, 2010; Treasury, 2007) and the overall theory of change and impact pathways of the NetZeroCities project (Chaudary et al., 2022) and related indicators' framework. Insight from case studies and scientific literature presented in the previous chapter, are mapped to the intervention categories for their further refinements from this bottom-up and top-down knowledge.

2.1 Exemplary Cases of Social Innovation Action Plans

Very few social innovation action plans have been developed and implemented by cities or regions worldwide. The following examples have been identified and analysed: Taiwan (Fig. 2.1), Montreal (Figs. 2.2 and 2.3) and British Columbia (Fig. 2.4).

S. Bresciani et al., *Assessment Framework for People-Centred Solutions to Carbon Neutrality*, PoliMI SpringerBriefs, https://doi.org/10.1007/978-3-031-53111-8_2

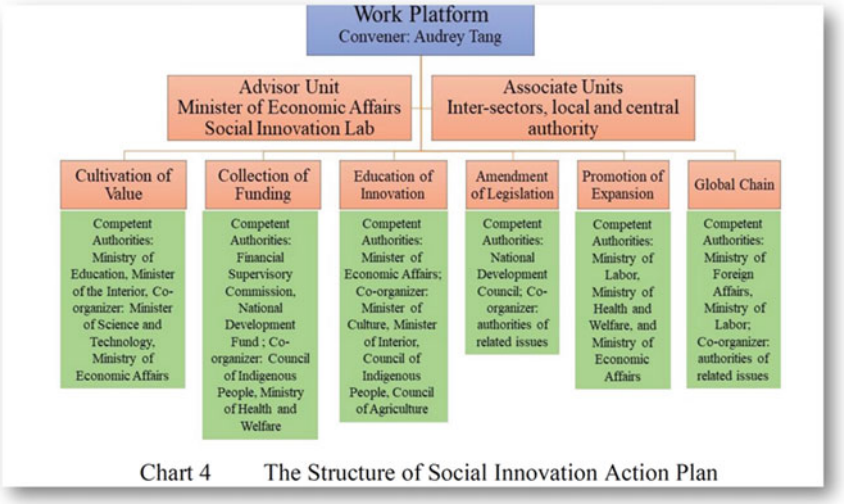

Fig. 2.1 Taiwan social innovation action plan[1]

2.2 NetZeroCities Theory of Change and Impact Pathways

In order to evaluate initiatives of cities' action plans related to social innovation for climate neutrality, the intervention categories have to be aligned not only with social innovation typical categories, but also with climate city contracts and action plans' categories aimed at reducing emissions. The NetZeroCities project's theory of change (Chaudary et al., 2022), provides the grounding of the intervention logic adopted in this book. In more details, the Theory of change of urban's transition toward climate neutrality (developed within the project) depicted in Fig. 2.5, identifies six emission domains (energy systems, mobility and transport, circular economy, nature-based solutions, green industry and built environment) and 6 levers of systemic change, which include (1) social innovation in addition to (2) technology and infrastructure, (3) governance and policy, (4) democracy and participation, (5) finance and funding, and (6) learning and capability. Tackling emission domains through the systemic levers of change, will create changes that can be measured with indicators (to assess specific outcomes), which will lead to long term impacts both in terms of direct GHG emission reductions, as well as co-benefits in terms of health and wellbeing, social impact, resource efficiency, economic impact, biodiversity and climate change adaptation (Fig. 2.6 based on Neuman et al., 2022).

[1] *Source* https://english.ey.gov.tw/News3/9E5540D592A5FECD/0b040d2e-170f-4dc8-9cc9-44ad9d9f3ba6.

Fig. 2.2 Montreal action plan/1[2]

Within the NetZeroCities' Theory of Change work (Chaudary et al., 2022), impact pathways specific to social innovation are co-developed as presented in Fig. 2.7 and described in detail in Fig. 2.8 (for an extended explanation see: Chaudary et al., 2022).

[2] *Source* https://montreal.ca/en/articles/action-plan-social-innovation-13851.

Strategies	Actions	Performance Indicators
Strengthen the social-innovation support ecosystem in Montréal	• Back support/guidance organizations specialized in social innovation in the emergence and formalization of social-innovation projects	• Number of support/guidance organizations
Facilitate conversations around socio-economic challenges that bring about social innovation	• Support social-innovation processes so as to generate novel solutions to key challenges of Montréal's development	• Number of socio-economic challenges identified and subjected to a social-innovation process
Support social-innovation zones as fertile ground for novel solutions	• Identify social-innovation zones and support community projects for enhancement of living environments	• Number of zones supported

Fig. 2.3 Montreal action plan/2

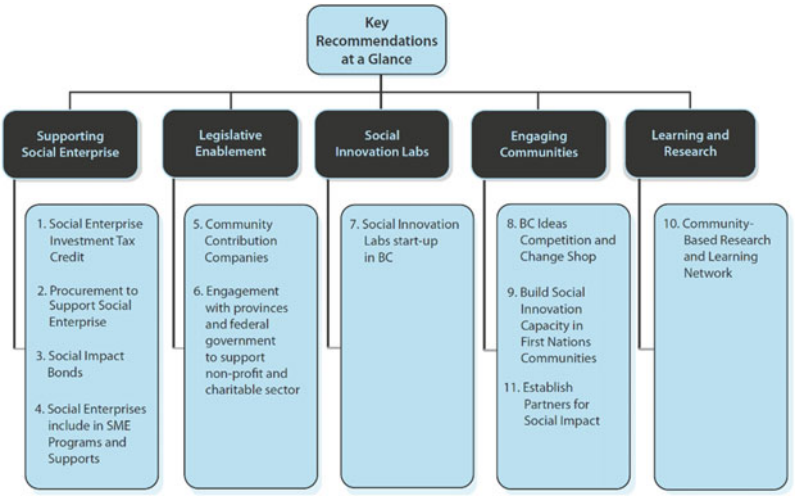

Fig. 2.4 British Columbia Social Innovation Action Plan[3]

[3] *Source* https://lillooet.bc.libraries.coop/files/2020/01/BC-Soical-Innovation-Council.pdf.

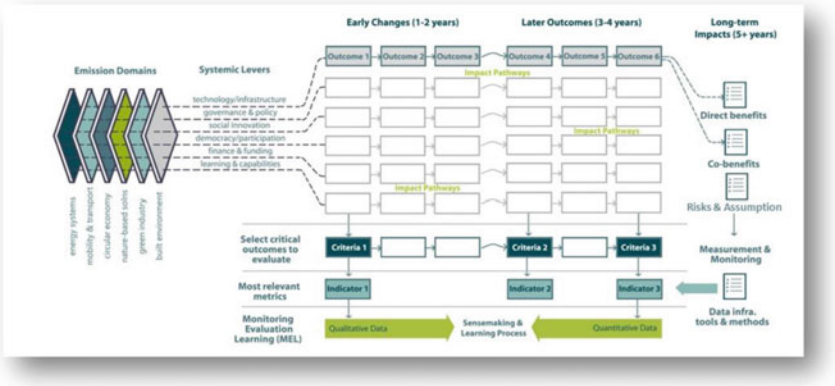

Fig. 2.5 NZC theory of change—overall structure and its essential elements (developed in: Chaudary et al., 2022)

Fig. 2.6 WP2 overall framework (developed in Neuman et al., 2022)

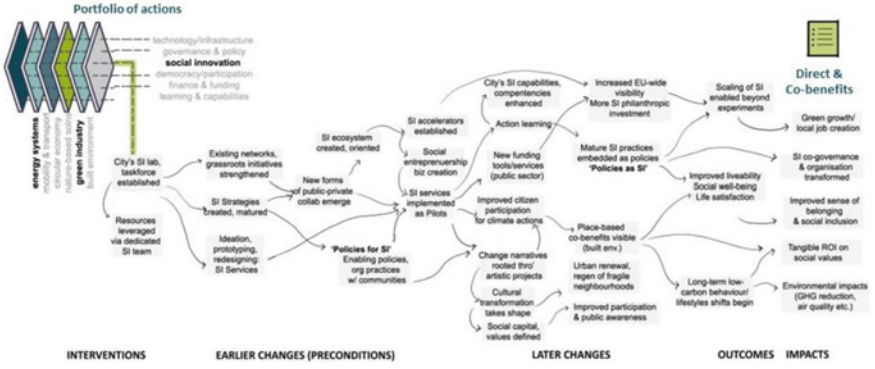

Fig. 2.7 NZC social innovation impact pathways (developed in: Chaudary et al., 2022)

Entry Points (EP)	Early Changes (EC)		Later Outcomes (LO)		Impacts (I)
2022-23	1 to 2 Years		3 to 4 Years		5 Years (and up to 2030)
EP3.1 Establish a SI-focussed city-led Lab or Taskforce	EC3.1 Existing grassroots initiatives & networks identified & strengthened	EC3.5 New SI Accelerators established; existing ones aligned	LO3.1 City's action-learning, capabilities, competencies enhanced by capacity bldg. & implementation	LO3.6 Implementation attracts EU-wide visibility & results in philanthropic investments	I3.1 Improved sense of belonging, social wellbeing, and social inclusion
EP3.2 Establish & leverage essential resources through a dedicated SI team	EC3.2 Effective Co-creation leads to formulation & maturity of city's SI strategies	EC3.6 Social entrepreneurship seeded through social enterprises	LO3.2 New public-sector funding tools & services deployed	LO3.7 Scaling up of SI solutions beyond experiments initiated	I3.2 Local job-creation and green growth with increased investments/ capital
	EC3.3 Novel forms of public-private collaborations initiated	EC3.7 Enabling policies & organisational practices deployed with communities	LO3.3 Artistic interventions create and disseminate transformation narratives	LO3.8 Learning from solutions leads to mature SI practices as policies	I3.3 Deployment of co-governance models leads to organisational transformation
	EC3.4 Redesign and prototyping deployed to embed long-term, continuous, and experimental approach to SI policies	EC3.8 SI Services/ Solutions, supported through NZC and city's SI taskforce are implemented	LO3.4 Citizen participation in climate action improved in targeted communities	LO3.9 Long-term & low-carbon shifts in behaviour and lifestyles become visible & measurable	I3.4 Tangible economic returns on social values and life satisfaction
			LO3.5 Stronger definition of civic values and social capital in city's SI processes	LO3.10 Emergence of place-based, urban renewal, built-environment co-benefits	I3.5 Environmental impacts (GHG reduction, air quality, urban greening etc.)

Fig. 2.8 NZC theory of change for interventions in social innovation (developed in: Chaudary et al., 2022)

2.3 Social Innovation Categories of a City's Action Plan

Based on the aforementioned work, specifically the insights from social innovation action plans, the NetZeroCities' theory of change, cases studies and scientific literature, a set of ten social innovation categories of action plan are derived:

1. SI capacity building of public officials, citizens and urban stakeholders.
2. SI skills of citizens and urban stakeholders.
3. Co-design of policies with social innovators and urban stakeholders.
4. Co-creation of social innovation initiatives with citizens and urban stakeholders.
5. Funding/supporting community-led initiatives and small-scale pilots/ experimentations.

6. Enabling/supporting social innovation initiatives scale-up beyond pilots.
7. Testing and prototyping new funding mechanisms.
8. Public procurement of social innovation services for sustainability.
9. Urban planning for social innovation.
10. Resource circularity.

A detailed description of each category is provided in Table 2.1.

The case studies presented in this chapter are mapped to the Social Innovation Categories of the action plan in order to refine the categories and to ensure that they cover all the most relevant facets (Table 2.2).

2.4 Relation to NetZeroCities Climate Transition Map

In order to ensure consistency with the NetZeroCities project activities, the devised categories are mapped with respect to the NZC climate transition maps elaborated by the partners Dark Matters Lab and ICLEI Europe (Fig. 2.9) and available on the project platform as a guiding framework for the entire project.[4]

2.5 Social Innovation Intervention Logic

For each category of the (social innovation component of the) action plan, the definition of the intervention logics needs to be outlined. The intervention logic defines the project objectives and inputs with respect to the expected results in terms of outputs, outcomes, and impacts (Knowlton & Phillips, 2012; Treasury, 2007).

It is typically depicted in form of a process diagram. Establishing the intervention logic is the first step in setting up an impact assessment framework (Fig. 2.10).

The general intervention logic is based on NZC's aim to put in place a set of initiatives at city level aimed to drastically reduce greenhouse gas emissions, all the while ensuring decarbonisation efforts are equitable and contribute to the well-being of European communities. It contains five evaluation stages, as defined below:

- **Context/needs:** defining and considering the existing situation the project is being implemented into and the needs of the stakeholders involved.
- **Intervention:** evaluating what the project contributes in order to address the problem.
- **Output/uptake:** evaluating what the project provides.
- **Outcomes:** evaluating the immediate result/s of the project.
- **Impact:** evaluating the long-term result/s of the project.

In that regard, the general intervention logic for the initiatives of the action plan related to social innovation is as follows (Fig. 2.11).

[4] https://netzerocities.app/ClimateTransitionMap.

Table 2.1 Social innovation categories of the action plan

Theme	Category	Description
Skills and capacity building *What is the level of skills and knowledge of citizens and public officials about social innovation for sustainability?*	1. SI capacity building of public officials, citizens and urban stakeholders	Public official, citizens and urban stakeholders need to work collaboratively to reach climate neutrality. Training public officials and policy-makers regarding human centric approaches is very important, for instance through a pilot city demonstrator carried out at inter-departmental city group (involving the administration as well as private and third sector organisations and citizen) to co-create and co-deliver new solutions (e.g.: public–private-social urban regeneration program involving mobility, NBS and retrofit buildings actions). The final result could be a dedicated team or a SI task force established within the municipality, leading to the embedding of social and behavioural factors throughout the ideation, design and development of public interventions, as well as to new service delivery models. An example is given by the internal competencies created within the city of Helsinki (e.g., design-skills—human-centred perspective for public service design)
	2. SI skills of citizens and urban stakeholders	The implementation of social innovation can support citizens and urban stakeholders (including for-profit and non-for-profit organizations) in learning new practices for collaborating among themselves or with the municipality for proposing and implementing new ideas toward sustainability. This can also contribute to raising awareness on the long-term impacts of individual behaviours. Further, individuals can become proficient in developing green and sustainable initiatives. Examples of this stemming from social innovation might encompass initiatives directed at regenerating fragile neighbourhoods, mobility and urban renewal (through infra-interventions and services, like urban farms, food coops, others), initiatives linked to social entrepreneurship, new startups and business propositions that master and adopt new sustainability paradigms and tools, initiatives for energy savings heat island reduction. This category aims also at facilitating conversations around socio-economic challenges that leveraging social innovation as a lever for novel solutions

(continued)

Table 2.1 (continued)

Theme	Category	Description
Empowerment and inclusion *What is the level of involvement of citizens and urban stakeholders in the formulation and implementation of initiatives and policies for social innovation for climate neutrality?*	3. Co-design of policies with social innovators and urban stakeholders	Several studies show that involving citizens and urban stakeholders in governmental processes and empowering them through active engagement boosts the acceptance of policy decisions and new regulations, reinforces the awareness of citizens' needs in public administrations, and increases the citizens' sense of belonging and inclusion. This can be done by improving the engagement strategies of urban stakeholders and citizens in policy making processes and strengthening the link with public-sector bodies. Examples of this might include co-designing policies, public funding decision-making with citizens, institutionalising organisational practices that enable working with and for communities. This kind of interventions also entail the need to implement in the administration a continuous experimental approach (i.e., policy prototyping) for policy formulation and implementation
	4. Co-creation of social innovation initiatives with citizens and urban stakeholders	Establishment of SI hubs, living labs, SI transfer centres to support the development of social innovation initiatives aimed to increase awareness and to change behaviour towards lifestyles with lower environmental impact. This can entail consuming locally or using shared transport. This category is focused on cultural transformation
Regulation and support *How does the city mobilise resources to support community-led initiatives of social innovation for sustainability?*	5. Funding/ supporting community-led initiatives and small-scale pilots/ experimentations	Support and emphasize initiatives that provide innovative responses to the needs and challenges of the society, focusing for instance on strengthening social entrepreneurship locally or other grassroots initiatives for climate neutrality (i.e., shared mobility)
	6. Enabling/ supporting social innovation initiatives scale-up beyond pilots	This intervention considers the possibility to implement actions enabling scaling, replication or adaptation, acceleration and socially relevant business seeding
	7. Testing and prototyping new funding mechanisms	This area entails the development of new funding tools trailed and shared with citizens (i.e., civic crowdfunding). Further, it entails increasing direct aid to the wider social economy and reinforcing its local ecosystem

(continued)

Table 2.1 (continued)

Theme	Category	Description
	8. Public procurement of social innovation services for sustainability	New procurement plans are very important to support the development of sustainability solutions that involve citizens. A possibility in this area is to establish 'Public Procurement Pathfinders' to connect government agencies with social innovation actors (including civic start-ups, civic-tech initiatives, social innovation-focused SMEs or other social economy players). The area entails also the follow up on diversification of contract awarding methods, promotion of the social economy to purchasers, promotion of value purchaser-supplier best practices, conduction of periodic evaluations of practices established with stakeholders
Systemic innovations—Top-down systemic approaches *Are top-down systemic solutions for climate neutrality that involve social innovation implemented?*	9. Urban planning for social innovation	Top-down systemic solutions for climate neutrality that involve social innovation implemented at the level of Urban planning (as for example the 15-min city in Paris which re-configures social practices and leads to more sustainable behaviours)
	10. Resource circularity	Top-down systemic solutions for climate neutrality that involve social innovation implemented at the level of circularity of resources (i.e., waste)

After the definition of the general intervention logic, an intervention logic for each of the ten aforementioned categories, based on exemplary social innovation cases, is provided.

Category 1 Intervention Logic: SI Capacity Building of Public Officials and Policy Makers

The specific intervention logic for the category "Social innovation capacity building of public officials, and policy makers" is depicted (Fig. 2.12). An exemplary case for this category is the PentaHelix project described in Chap. 1.

Category 2 Intervention Logic: Social Innovation Skills of Citizens and Urban Stakeholders

The specific intervention logic for the category "SI skills of citizens and urban stakeholders" is depicted in Fig. 2.13. Exemplary cases for this category are the projects Play!UC and Ecohouse Antwerp.

Table 2.2 Mapping of case studies

Theme	Category	Exemplary cases
I. Skills and capacity building	01. SI capacity building of public officials and policy makers	City Experiment Fund: applying systems thinking to urban transformation
		PentaHelix
	02. SI skills of citizens and urban stakeholders	Climate Meal
		Agroecology
		EVA—maakt het plantaardig
		City Studio Program
		Smart House Training Program
		1.5 degree lifestyles
		Ecohouse Antwerp—Bringing together climate action and social cohesion
		Real Junk Food Berlin
		Applause
		Play!UC—Playing with Urban Complexity
II. Empowerment and inclusion	03. Co-design of policies with social innovators and urban stakeholders	PentaHelix
		Bologna's Citizen Collaboration Pacts
	04. Co-creation of social innovation initiatives with citizens and stakeholders	Bologna's Citizen Collaboration Pacts
		SONNET Mannheim City Lab
		SynAthina
		El Día Después (EDD)
		Smart House Training Program
		Green Squares: Improving air quality through community collaboration
		Blok 19 Renewal Program in Zagreb
		KLIK (Križevci Climate Innovation Laboratory)
		Brainport Smart District
		Entrepatios—Las Carolinas
		Just transition Listening platform
		Applause

(continued)

Table 2.2 (continued)

Theme	Category	Exemplary cases
		Agroecology
		Climate Quarter Project (15 min)
		Better Reykjavik
		A ride sharing service: from school to practice and back
		Cloughjordan Ecovillage
		Nappi Naapuri (Nifty Neighbor)
		Elektrizitätswerke Schönau (EWS)
III. Regulation and support	05. Funding/supporting community-led initiatives and small-scale pilots/ experimentations	You Decide participatory budgeting
		Clean Cities ClimAccelerator
	06. Enabling social innovation/ entrepreneurship initiatives scale-up beyond pilots	Clean Cities ClimAccelerator
		Elektrizitätswerke Schönau (EWS)
	07. Testing and prototyping new funding mechanisms	SONNET The Bristol City Lab
		SONNET City Lab
		Brainport Smart District
		Nappi Naapuri (Nifty Neighbor)
		Viable Cities
	08. Public procurement of social innovation services for sustainability	Oslo public procurement
IV. Systemic innovations	09. Urban planning for social innovation	Superblocks
		Brainport Smart District
		Paris 15-min city
		Climate Quarter Project
	10. Resource circularity	Applause
		Zklaster

Category 3 Intervention Logic: Co-design of Policies with Social Innovators and Urban Stakeholders

Here is depicted the specific intervention logic for the category "Co-design of policies with social innovators and urban stakeholders" (Fig. 2.14). An exemplary case for this category is Bologna's Citizen Collaboration Pacts.

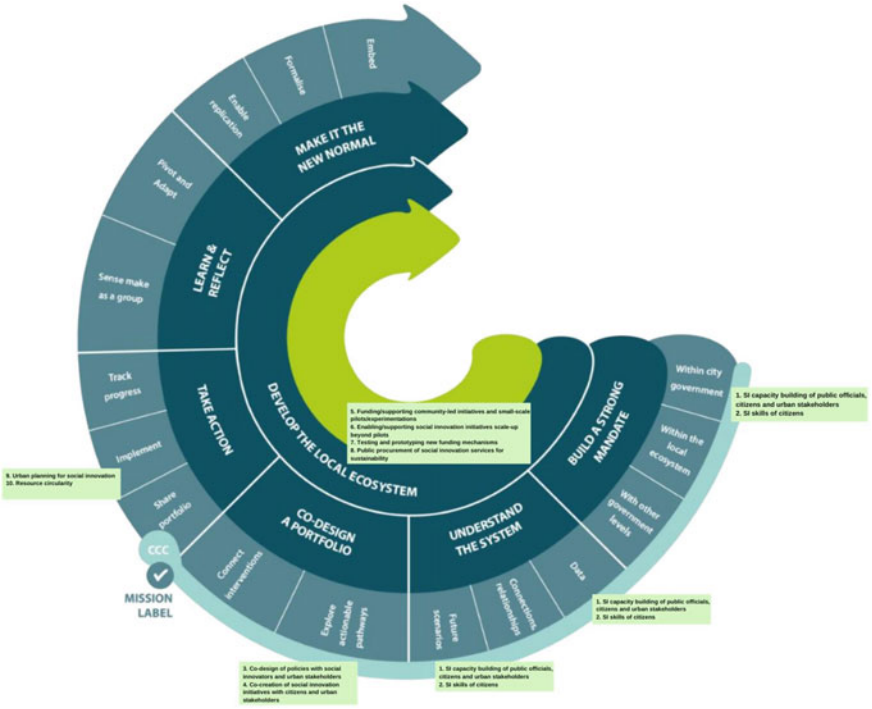

Fig. 2.9 The ten social innovation categories mapped on the NZC Climate Transition Map. Adapted from https://netzerocities.app/ClimateTransitionMap

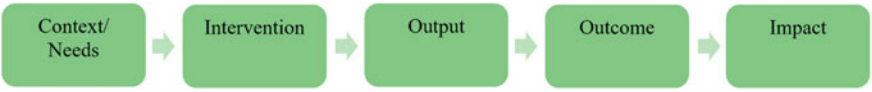

Fig. 2.10 Basic intervention logic

Category 4 Intervention Logic: Co-creation of Social Innovation Initiatives with Citizens and Urban Stakeholders

The specific intervention logic for the category "Co-creation of social innovation initiatives with citizens and urban stakeholders" is depicted in Fig. 2.15. Exemplary cases for this category are SONNET Mannheim City Lab and Bologna's Citizen Collaboration Pacts.

Category 5 Intervention Logic: Funding/Supporting Community-Led Initiatives and Small-Scale Pilots/Experimentations

Here is depicted the specific intervention logic for the category "Funding/supporting community-led initiatives and small-scale pilots/experimentations" (Fig. 2.16). An exemplary case for this category is You Decide.

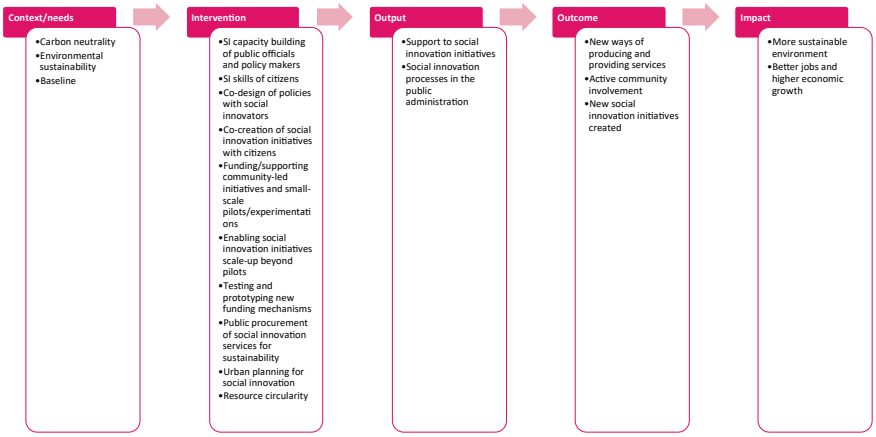

Fig. 2.11 General intervention logic

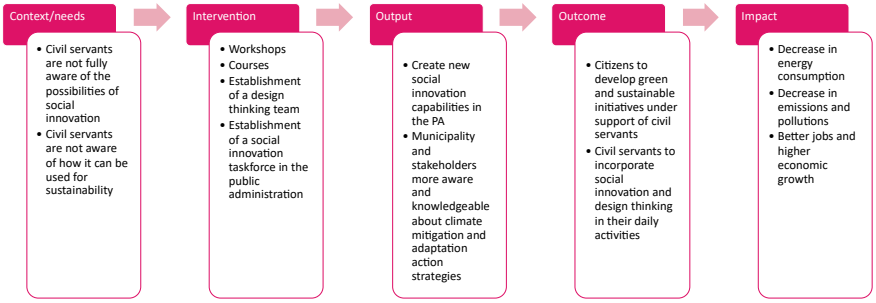

Fig. 2.12 Intervention logic for the category "Social innovation capacity building of public officials and policy makers"

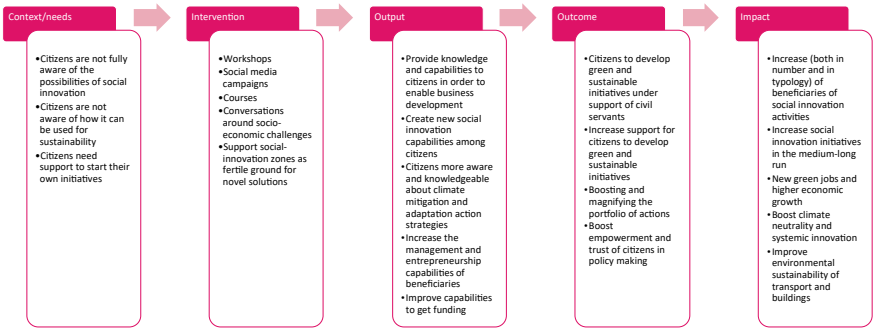

Fig. 2.13 Intervention logic for the category "Social innovation skills of citizens and urban stakeholders"

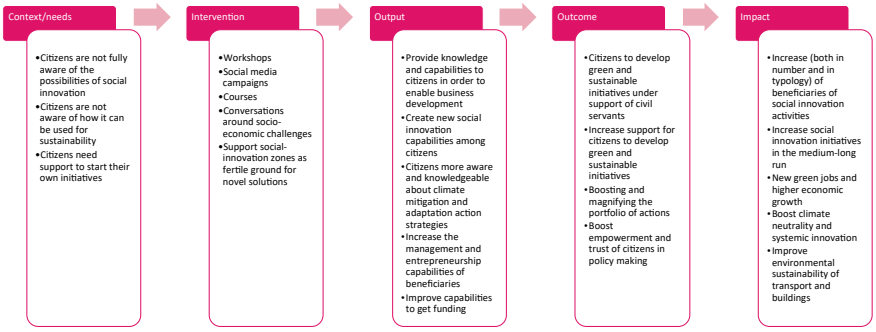

Fig. 2.14 Intervention logic for the category "Co-design of policies with social innovators and urban stakeholders"

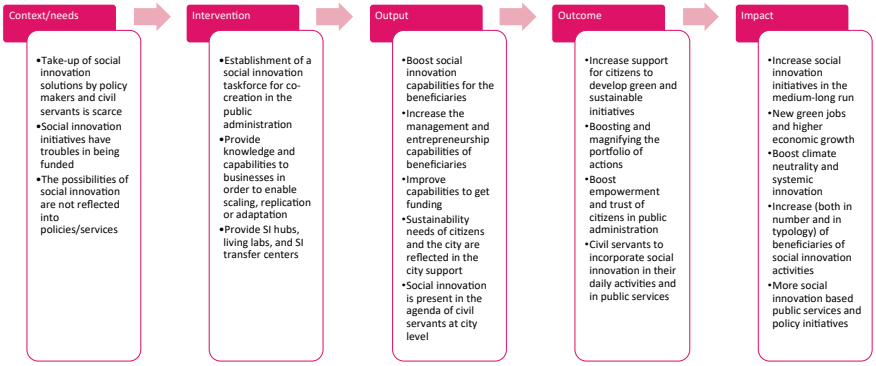

Fig. 2.15 Intervention logic for the category "Co-creation of social innovation initiatives with citizens and urban stakeholders"

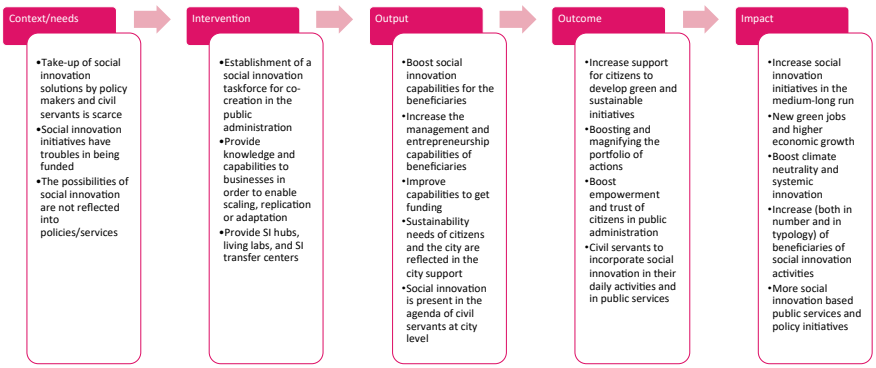

Fig. 2.16 Intervention logic for the category "Funding/supporting community-led initiatives and small-scale pilots/experimentations"

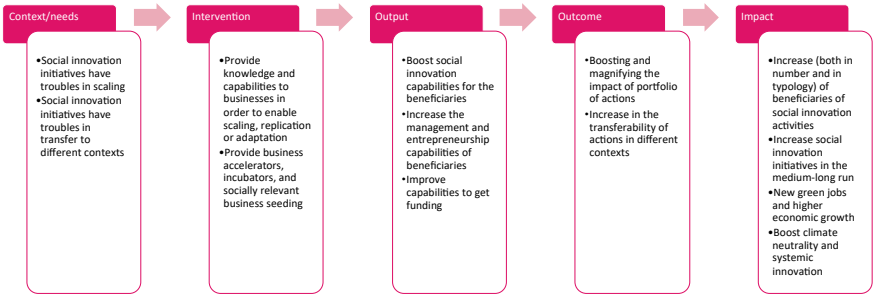

Fig. 2.17 Intervention logic for the category "Enabling/supporting social innovation initiatives scale-up beyond pilots"

Category 6 Intervention Logic: Enabling/Supporting Social Innovation Initiatives Scale-Up Beyond Pilots

The specific intervention logic for the category "Enabling/supporting social innovation initiatives scale-up beyond pilots" is outlined in Fig. 2.17. An exemplary case for this category is Clean Cities ClimAccelerator.

Category 7 Intervention Logic: Testing and Prototyping New Funding Mechanisms

The specific intervention logic for the category "Testing and prototyping new funding mechanisms" is provided in Fig. 2.18. An exemplary case for this category is SONNET—The Bristol City Lab.

Category 8 Intervention Logic: Public Procurement of Social Innovation Services for Sustainability

The specific intervention logic for the category "Public procurement of social innovation services for sustainability" is depicted in Fig. 2.19. An exemplary case for this category is Oslo public procurement.

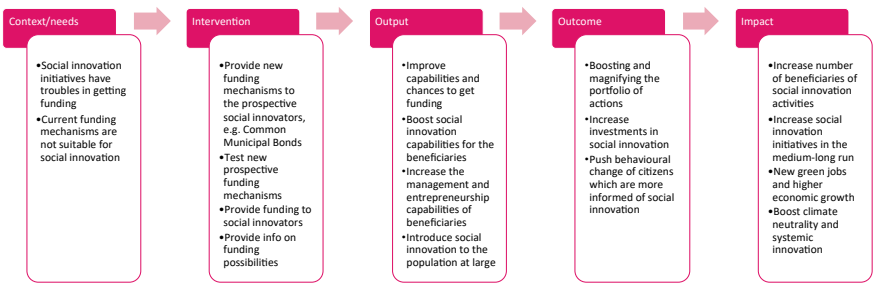

Fig. 2.18 Intervention logic for the category "Testing and prototyping new funding mechanisms"

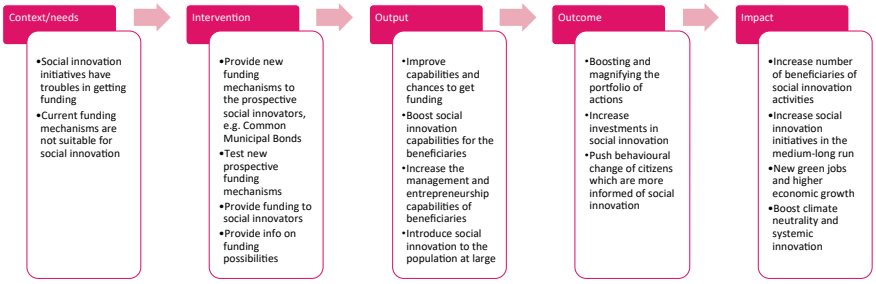

Fig. 2.19 Intervention logic for the category "Public procurement of social innovation services for sustainability"

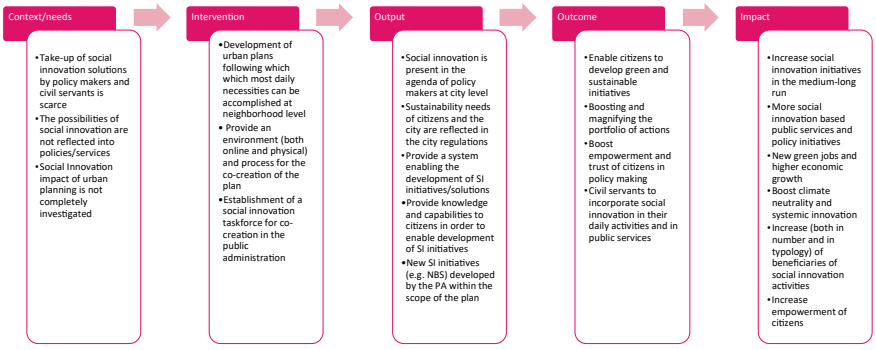

Fig. 2.20 Intervention logic for the category "Urban planning for systemic social innovation"

Category 9 Intervention Logic: Urban Planning for Systemic Social Innovation

The specific intervention logic for the category "Urban planning for systemic social innovation" is outlined in Fig. 2.20. Exemplary cases are Paris: 15-min city, Superblocks and Climate Quarter Project.

Category 10 Intervention Logic: Systemic Resource Circularity

The specific intervention logic for the category "Systemic resource circularity" is provided in Fig. 2.21. An exemplary case for this category is the project Applause.

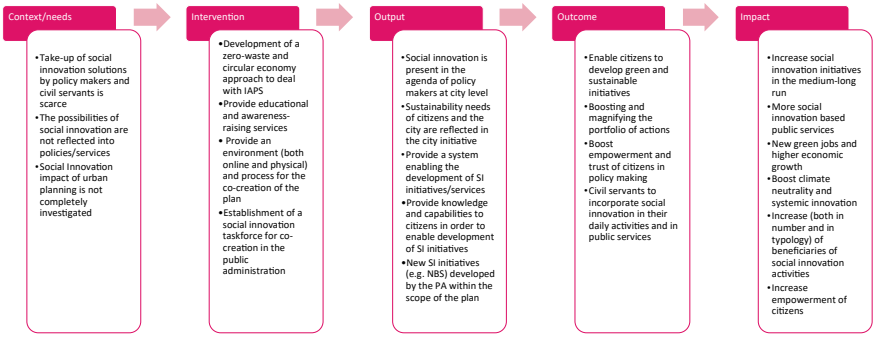

Fig. 2.21 Intervention logic for the category "Systemic resource circularity"

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Chapter 3
Indicators of Social Innovation for Cities' Action Plans Evaluation

For each of the ten categories of the social innovation component of an action plan (SIAP), a set of indicators is developed which can be utilized by the public administration to monitor implementation and outcome of social innovation actions at urban level.

In this chapter, a comprehensive catalogue of over one thousand indicators is provided, according to the ten social innovation categories described in this chapter and cluster according to the five criteria of effectiveness, efficiency, sustainability, replicability, scalability explained in the next section. Indicators are derived from scientific literature, existing projects or, when not available from existing sources, developed by the authors.

3.1 Impact Measurement and Evaluation Approach

In general terms the evaluation will take place at the level of the cities' action plan, and at the level of initiatives stemming from the single categories of the action plan. The evaluation approach is based on indicators, which build on the intervention logics in Chap. 2 and are integrated with indicators extracted from existing frameworks. The evaluation criteria for the plan are effectiveness, efficiency, relevance, replicability, and scalability (European Union, 2021). These criteria are applied to each city but tailored according to the respective objectives of each city.

- The **effectiveness** criterion refers to the capability of the plan to reach its intermediate and strategic objectives. The evaluation considers the quality of the plan proposed solutions, its community engagement, how the technical solution interacts within existing technical and dataset ecosystems, as well as how effectively it has improved urban sustainability;

S. Bresciani et al., *Assessment Framework for People-Centred Solutions to Carbon Neutrality*, PoliMI SpringerBriefs, https://doi.org/10.1007/978-3-031-53111-8_3

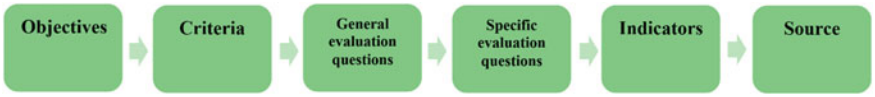

Fig. 3.1 Impact assessment metric development process

- The **efficiency** criterion aims to evaluate whether the plan outputs and outcomes were achieved at a reasonable cost. The evaluation considers the efforts, time and budget provided by stakeholders as well as the capability of the project to obtain the same results with lower expenditure;
- The **relevance** criterion aims to evaluate if the objective of the plan intervention is adequate to respond to the needs of the stakeholders. The evaluation considers the profiles of the stakeholders in terms of needs, perceived benefits, and participation, as well as the methodological and technical design of the project;
- The **replicability** criterion refers to the ability of the plan to be reproduced in similar policy contexts. The evaluation considers technical, financial, skills and governance requirements to reuse the NCZ social innovation plan;
- The **scalability** criterion refers to the potential of the plan to be extended to other policy contexts.

Figure 3.1 outlines the impact assessment metric development process. Firstly, overall project objectives and plan-specific objectives are defined and then evaluation criteria are established. Next, general evaluation questions are created, followed by specific evaluation questions. These questions are translated into indicators that will measure the project's and plan's achievements and success. Finally, the process includes consideration of the necessary sources where the indicator data is gathered from.

At the overall level of the city's action plan, all the evaluation criteria are considered. For each of the ten categories, the focus is on the criteria of effectiveness and efficiency. Finally, input, output and outcome indicators are developed, which will serve as a basis for the elaboration of the indicators related to the evaluation criteria:

- Input indicators: resources available within cities' budget, programming, and accounting documents, relate to resources allocated to each specific intervention.
- Output indicators: represent the immediate result of interventions and data about their progresses and are reported in monitoring documents of each intervention.
- Intermediate outcomes: distinguished between direct and indirect benefits that citizens or target groups can gain from the interventions. They are structured according to the dimensions of specific impact that have been identified as relevant.
- Long term outcomes: allow the estimation of the contribution that those interventions have in terms of systemic broader impact in a time horizon of 5 years.

The evaluation of the plan excludes the use of the Social return on investment (SROI): although SROI is an internationally recognized performance management

Table 3.1 Sources of indicators

Project	Brief description	References
RESINDEX	Regional Social Innovation Index	Sinnergiak (2013)
SIMRA	Innovative methods to assess social innovation and its impacts in marginalised rural areas	Secco et al. (2019b)
EU POLIS	Integrated NBS-based urban planning methodology for enhancing the health and well-being of citizens	Bozovic et al. (2021)
Evaluating the impact of nature-based solutions	Evaluating the Impact of Nature-based Solutions—Appendix of Methods	Dumitru and Wendling (2021)

method, utilized by social enterprises to demonstrate the social, economic and environmental value they create, the method is not free of challenges for social enterprises and social innovation initiatives (Arvidson et al., 2010; Millar & Hall, 2013) and it is focused on assessing impact in economic terms, shifting the focus from the necessary systemic changes aimed for in the NZC project. While knowledge of the SROI performance measurement tool can be useful for social innovators and public officials, this performance assessment method is suggested only as an optional tool in evaluating the single initiatives stemming from the plan.

3.2 Existing Indicators

Indicators are sourced from extant publications and catalogues of indicators related to social innovation from scientific literature and research projects (Table 3.1):

RESINDEX

The Regional Social Innovation Index (RESINDEX) Model (Unceta et al., 2016), is the result of a research project funded by Innobasque, the Basque Innovation Agency and comparing the potential capacity to the realized social innovation capacity. It comprises a series of indicators grouped in three indexes: (1) capacity for potential innovation—composed of (1a) capacity for knowledge, (1b) capacity for earning, (1c) capacity for socialization, (1d) capacity for development, (1e) capacity for Association; (2) realized capacity of social orientation index—composed of (2a) knowledge acquisition, (2b) development of social projects, (2c) impact of social projects, (2d) governance, and (3) realized capacity of social innovation index—composed of (3a) knowledge acquisition, (3b) development of innovative social projects, (3c) impact of innovative social projects and (3d) governance.

SIMRA

A comprehensive evaluation framework for evaluating social innovation has been developed by Secco et al. (2019a) and applied to a variety of contexts, from forest-dependent rural communities (Secco et al., 2019a), to social farming, community energy, food cooperatives. The framework is the backbone of the EU-funded project SIMRA (Social Innovation for Marginalized Rural Areas) and has been utilized for the assessment of social innovations across Europe. It was developed based on a literature review of over hundreds of existing frameworks (Secco et al., 2019a) with the aim of developing a method and categories for evaluating social innovations. The resulting SIMRA framework builds in particular on the approach of the Theory of Change, detailing the causal mechanisms that led to changes, which is the base of any evaluation approach. The comprehensive SIMRA framework (Secco et al., 2017) includes an analysis of the context, and this takes into account 9 main elements: (1) the trigger (that is, individual and collective needs), (2) the perceived context at international, national, regional and local level, (3) the agents (ideas, values, willingness, reflexivity, capacity for change) which influence the context and the (4) preparatory actions for collective benefit, which in turns affect the (5a) reconfiguring of the system. The (5b) reconfigured systems (new networks, new government arrangements and new attitudes), lead to (6) project activities with specific procedures and practices. Such social innovation activities produce (7) outputs in the form of identifiable products and service, which in turns produce (8) outcomes and impacts (positive or negative) on economic, social, environmental and governance/institutional aspects. Finally, (9) the learning processes provide feedback loops and multiplier effects, to inform the context and the social innovation activities. In practical terms these nine key aspects are assessed with a mixed quantitative–qualitative methodology (Secco et al., 2017) and a combination of expert and participatory-based evaluations (Secco et al., 2019a).

EU POLIS

The project EU POLIS is an EU-funded project aimed at developing an "Integrated NBS-based Urban Planning Methodology for Enhancing the Health and Well-Being of Citizens" (Zafeiropoulos et al., 2021). As part of the project, indicators are defined to assess the baseline status/challenges of the demonstration cities in five living categories: urban, social, environmental, economic, health and wellbeing (Bozovic et al., 2021).

Evaluating the Impact of Nature-Based Solutions

Finally, the Evaluating the Impact of Nature-based Solutions—Appendix of Methods (Dumitru & Wendling, 2021) published by the EU Directorate-General for Research and Innovation, is a 1077 page long catalogue of indicators related to Nature-Based Solutions, democratic participation, health and other outcome and impact measures, mostly based on EU-funded projects and scientific literature.

Table 3.2 Input/output/outcome indicators (own elaboration) in the general cases

Input	Output	Intermediate Outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. # of beneficiaries of the interventions that completed the training (both within PA and in the population, including organizations) 2. # of capacity building activities for citizens and innovators 3. # of capacity building activities for civil servants 4. # of sessions of policy co-design 5. # of platforms for co-creation 6. # of small-scale experiments funded 7. # of new funding mechanisms experimented 8. # of public procurement procedures implemented 9. # of scale up activities 10. # of systemic activities implemented	1. # of citizens with increased knowledge of SI 2. # of civil servants with increased knowledge of SI 3. # of policy co-design sessions involving SI actors 4. # of policy co-design sessions focussed on SI 5. # of SI initiatives co-created 6. # of platforms for co-creation of SI initiatives 7. # of small-scale experiments funded in SI 8. # of new SI funding mechanisms experimented 9. # of SI public procurement procedures implemented 10. # of scale up activities related to SI 11. # of implementations of systemic activities leading to SI

3.3 Evaluation Questions and Indicators in the General Case

Firstly, the evaluation questions and indicators for the general case are produced by the research team and mapped from existing frameworks, for all the five criteria (effectiveness, efficiency, sustainability, replicability, scalability). Table 3.2 shows the input/output/outcome indicators elaborated by the research team.

Table 3.3 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.4 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.5 depicts the evaluation questions and indicators of Relevance (own elaboration).

Table 3.6 depicts the evaluation questions and indicators of Replicability (own elaboration).

Table 3.7 depicts the evaluation questions and indicators of Scalability (own elaboration).

Table 3.3 Evaluation questions and indicators of Effectiveness (own elaboration) in the general cases

General evaluation questions	Specific evaluation questions	Indicators
What kind of support to social innovation was provided? Was it successful? What is the extent of learning from the evaluation?	1. To what extent the SIAP triggers an increase in knowledge related to social innovation of citizens? 2. To what extent the SIAP triggers an increase in capacity related to social innovation of civil servants? 3. To what extent the SIAP triggers behavioural change related to SI? 4. To what extent the SIAP triggers an increase in empowerment of citizens? 5. To what extent the SIAP triggers an increase in funding and public procurement of SI services? 6. To what extent the SIAP triggers the elaboration of SI policies/programmes? 7. To what extent the SIAP triggers systemic interventions stemming social innovations? 8. To what extent the results of the evaluation can be used to boost learning and improving the plan?	1. # of citizens with increased knowledge of SI/# of participants completing the training 2. # of civil servants with increased knowledge of SI/# of participants completing the training 3. # of citizens willing to change their behaviour/# of participants to behavioural changes activities 4. # of citizens with increased perception of empowerment/# of participants to co-creation activities 5. # of citizens with increased knowledge of SI/# of participants completing the training 6. # of civil servants with increased knowledge of SI/# of participants completing the training 7. # of policy co-design sessions focussed on SI/# of sessions of policy co-design 8. # of SI initiatives co-created/# of sessions of policy co-design 9. # of policy co-design sessions involving SI actors/# of sessions of policy co-design 10. # of platforms for co-creation of SI initiatives/# of platforms for co-creation 11. # of small-scale experiments funded in SI/# of small-scale experiments funded 12. # of new SI funding mechanisms experimented/# of new funding mechanisms experimented 13. # of SI public procurement procedures implemented/# of public procurement procedures implemented 14. # of scale up activities related to SI/# of scale up activities 15. # of implementation of systemic activities leading to SI/# of implementation of systemic activities 16. Elaboration of recommendations and lessons learnt stemming from the evaluation 17. Extent of adoption of recommendations in the action plan iteration (i.e. how many other PAs have adopted the plan)

Table 3.4 Evaluation questions and indicators of Efficiency (own elaboration) in the general cases

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the plan?	1. Was the plan result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the SIAP be achieved more efficiently and at lower costs?	1. # of participants (both citizens and civil servants) in capacity building activities who completed the training/initial # of participants 2. # of participants (both citizens and civil servants) in capacity building activities who completed the training/human resources allocated 3. # of participants (both citizens and civil servants) in capacity building activities who completed the training/material resources allocated 4. cost-effectiveness of the implementation against the needs of involved stakeholders 5. # of sessions of policy co-design/material and human resources allocated 6. # of platforms for co-creation/material and human resources allocated 7. # of small-scale experiments funded/ material and human resources allocated 8. # of new funding mechanisms experimented/ material and human resources allocated 9. # of public procurement procedures implemented/ material and human resources allocated 10. # of scale up activities/ material and human resources allocated 11. Implementation of systemic activities/material and human resources allocated

Table 3.5 Evaluation questions and indicators of Relevance (own elaboration) in the general cases

General evaluation questions	Specific evaluation questions	Indicators
Does the SIAP responds to the necessities of the city?	1. Is the plan really in line with the carbon neutrality objective? 2. Is the plan coherent with other interventions at city level? 3. Does the city have the necessary resources/ capabilities to carry it out? 4. How useful are the interventions depicted in the plan? 5. To what extent do the policy, practical and material outcomes match the real needs and requirements of the city SI scenario? 6. Does the original design of the SIAP interventions meet the actual scenario requirements, independently from the (subjective) perception of stakeholders and policy-makers?	1. Extent to which the plan is deemed to be in line with the carbon neutrality objectives 2. Extent to which the plan is deemed to be coherent with other interventions at city level 3. Extent to which the city have the necessary resources/capabilities to carry it out 4. Level of fulfilment of expectations of policy makers 5. Level of fulfilment of expectations of local businesses 6. Level of fulfilment of expectations of citizens 7. Definition of the SI scenario characteristics 8. Matching with static and evolving scenario of SI and sustainability

3.4 Evaluation Questions and Indicators for Category 1: Social Innovation Capacity Building of Public Officials and Policy Makers

Table 3.8 shows the input/output/outcome indicators elaborated by the research team.

Table 3.9 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.10 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.11 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 3.6 Evaluation questions and indicators of Replicability (own elaboration) in the general cases

General evaluation questions	Specific evaluation questions	Indicators
Is the plan replicable?	1. Under what conditions can the SIAP methods and services be reused in other city management settings and vice versa? 2. How can the SIAP model be replicated in comparable scenarios and settings and along which customisation paths, i.e. which elements of the model can be reused directly and which require extensive customisation in the new scenario?	1. Key characteristics of replicability scenarios 2. Perceived usefulness of replicability scenarios in terms of technical, financial, skills and governance requirements 3. # and definition of characterising elements of the SIAP 4. # Map of characteristics of the solution and assessment of the approaches to replication in different scenario 5. # of replication guidelines containing also results of the evaluation and lessons learned 6. Adoption of replication guidelines in other cities

Table 3.7 Evaluation questions and indicators of Scalability (own elaboration) in the general cases

General evaluation questions	Specific evaluation questions	Indicators
Is the plan scalable?	1. To what extent can the SIAP be applied on a bigger scale? 2. To what extent and under what circumstances it can trigger	1. # and definition of scalability of variables and parameters 2. # actors, actions and transactions 3. Project platform functionalities to be extended 4. # of replication guidelines containing also results of the evaluation and lessons learned 5. Adoption of replication guidelines in other public administrations

Table 3.8 Input/output/outcome indicators (own elaboration) for category 1: Social Innovation capacity building of public officials

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. # of civil servants beneficiaries of the interventions that completed the training 2. # of training and workshops 3. # of task forces and design thinking teams established 4. # of civil servants taking part to the task forces and design thinking teams	1. # of civil servants with increased knowledge of SI 2. # of civil servants feeling empowered regarding SI topics 3. # of task forces and design thinking teams focused on innovation established 4. # of sustainable energy and climate action plans (SECAP) established 5. # of citizens with increased knowledge of SI 6. # of SI initiatives carried out by citizens 7. # of SI initiatives carried out by the PA

3.5 Evaluation Questions and Indicators for Category 2: Social Innovation Skills of Citizens and Urban Stakeholders

Table 3.12 shows the input/output/outcome indicators elaborated by the research team.

Table 3.13 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.14 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.15 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

3.6 Evaluation Questions and Indicators for Category 3: Co-design of Policies with Social Innovators and Urban Stakeholders

Table 3.16 shows the input/output/outcome indicators elaborated by the research team.

Table 3.17 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.9 Evaluation questions and indicators of Effectiveness (own elaboration) for category 1: Social Innovation capacity building of public officials

General evaluation questions	Specific evaluation questions	Indicators
What kind of support to the creation of social innovation by citizens was provided? Was it successful? To what extent the establishment of task forces and design thinking teams been successful in boosting social innovation?	1. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens? 2. To what extent the intervention triggers an increase in capacity related to social innovation of citizens? 3. To what extent the intervention triggers behavioural change in citizens? 4. To what extent the intervention triggers behavioural change in civil servants? 5. To what extent the intervention triggers an increase in empowerment of citizens? 6. To what extent the intervention triggers an increase in empowerment of civil servants? 7. To what extent the intervention triggers an increase in social innovation initiatives by citizens? 8. What is the impact of the latter?	1. # of civil servants with increased knowledge of SI/# of participants to the initiatives 2. # of civil servants feeling empowered regarding SI thematic/# of participants to the initiatives 3. # of task forces and design thinking teams focused on innovation established by the initiatives 4. # of citizens with increased knowledge of SI due to interaction with civil servants, beneficiaries of the project 5. # of citizens with behavioural change due to interaction with civil servants, beneficiaries of the project 6. # of sustainable energy and climate action plans (SECAP) established within the scope of the initiative and by civil servants trained in the initiative 7. # of social innovation initiatives created by citizens supported by the trained civil servants 8. # of social innovation initiatives created by citizens supported by the SI task force created 9. # of social innovation initiatives inspired and/or supported by SECAPs 10. # of social innovation initiatives created by civil servants trained in the initiative 11. # of social innovation initiatives/public services created by design thinking team established 12. Energy Savings from SI initiatives supported by trained civil servants and/or by the SI task force and/or by the design thinking team 13. t/CO_2 savings from SI initiatives supported by trained civil servants and/or by the SI task force and/or by the design thinking team 14. Renewable energy produced from SI initiatives supported by trained civil servants and/or by the SI task force and/or by the design thinking team 15. Elaboration of recommendations and lessons learnt stemming from the evaluation of the initiative (Y/N) 16. Extent of adoption of recommendations in the initiative iteration (# of policy makers adopting the recommendations)

Table 3.10 Evaluation questions and indicators of Efficiency (own elaboration) for category 1: Social Innovation capacity building of public officials

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of civil servants as participants in capacity building activities who completed the training/initial # of civil servants 2. # of civil servants as participants in capacity building activities who completed the training/material resources allocated 3. Cost-effectiveness of the implementation against the needs of involved stakeholders 4. # of social innovation initiatives created by citizens supported by the trained civil servants/material and human resources allocated 5. # of social innovation initiatives created by citizens supported by the SI task force created/material and human resources allocated 6. # of social innovation initiatives created by civil servants trained in the initiative/material and human resources allocated 7. # of social innovation initiatives/public services created by design thinking team established/material and human resources allocated 8. Energy Savings from SI initiatives supported by trained civil servants and/or by the SI task force and/or by the design thinking team/material and human resources allocated 9. t/CO_2 savings from SI initiatives supported by trained civil servants and/or by the SI task force and/or by the design thinking team/material and human resources allocated 10. Renewable energy produced from SI initiatives supported by trained civil servants and/or by the SI task force and/or by the design thinking team/material and human resources allocated

Table 3.11 Indicators from existing frameworks for category 1: Social Innovation capacity building of public officials

Indicator	Typology	Framework
1. Proportion of contracted personnel dedicated to research activities	Input	RESINDEX
1. Degree of achievement in competency training at an organizational level	Effectiveness	RESINDEX
1. Degree of diversity in the improvement within organisations as a result of carrying out social projects	Effectiveness	RESINDEX
Composite indicator X7.2 "Leadership" (Cb1, Cb2) 1. Indicator Cb1. "Attractiveness of the leadership" 2. Indicator Cb2. "Innovators and Followers' contribution to the results of the Social Innovation initiative"	Effectiveness	SIMRA

Table 3.12 Input/output/outcome indicators (own elaboration) for category 2: Social Innovation skills of citizens and urban stakeholders

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 3. Number of potential beneficiaries of the intervention	1. # of training and workshops 2. # of beneficiaries of interventions that completed the training 3. # of training/workshops/ consultancies to social innovators in order to enable them to start businesses 4. # of civil servants taking part to the initiatives 5. # of task forces established to provide training	1. # of task forces focused on social innovation training established 2. # of citizens with increased knowledge of SI 3. # of SI initiatives carried out by citizens 4. # of beneficiaries of the interventions that receive external funding 5. # of citizens feeling empowered regarding SI topics 6. # of beneficiaries with increased businesses knowledge and able to start their initiative 7. # of beneficiaries with increased capability to attract funding 8. # of civil servants with increased knowledge of social innovation 9. # of civil servants incorporating social innovation in their daily activity

Table 3.13 Evaluation questions and indicators of Effectiveness (own elaboration) for category 2: Social Innovation skills of citizens and urban stakeholders

General evaluation questions	Specific evaluation questions	Indicators
What kind of support to the creation of social innovation by citizens was provided? Was it successful? To what extent the establishment of task forces and design thinking teams been successful in boosting social innovation?	1. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens? 2. To what extent the intervention triggers an increase in capacity related to social innovation of citizens? 3. To what extent the intervention triggers an increase in social innovation initiatives by citizens? 4. To what extent the intervention triggers behavioural change in citizens? 5. To what extent the intervention triggers an increase in empowerment of citizens? 6. To what extent the intervention triggers an increase in empowerment of beneficiaries? 7. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business? 8. To what extent the newly created initiative were relevant to the needs of citizens? 9. To what extent the intervention triggers the ability of beneficiaries to get funding? 10. To what extent the intervention triggers investments in social innovation initiatives? 11. To what extent the intervention triggers investments in systemic innovation? 12. What is the impact of the latter? 13. To what extent the intervention boosts the trust of citizens in public administration?	1. # of beneficiaries with increased knowledge of SI/participants to the initiatives 2. # of beneficiaries with increased businesses knowledge and able to start their initiative/participants to the initiatives 3. # of SI initiatives created and sustainable/initiatives beneficiaries 4. % of beneficiaries with a favourable evaluation of the support (Likert scale) 5. % of expert with a favourable evaluation of the support (Likert scale, benchmarking with other funding mechanisms—especially traditional) 6. # of beneficiaries with increased capability to attract funding/participants to the initiatives 7. # of citizens more sensitive to SI themes (including changing their behaviour)/ citizens having had training 8. # of citizens that feel more empowered from the initiative 9. Quantity of external funding accruing to the beneficiary of the initiative that start their own 10. Quantity of investment carried out by the beneficiaries of the initiative that start their own 11. General increase in social innovation investment in the city 12. Quantity of new patents developed by the beneficiaries of the initiative that start their own 13. # of employees hired by the beneficiaries of the initiative that start their own 14. General increase in social innovation investment in the city 15. Quantity of new patents developed by the beneficiaries of initiatives 16. Energy Savings from SI initiatives on recovering of city buildings stemming from the training acquired from citizens 17. t/CO_2 savings from SI initiatives on mobility stemming from the training acquired from citizens 18. Renewable energy from SI initiatives on recovering of city buildings stemming from the training acquired from citizens 19. Improvement and recovering of city buildings produced from SI initiatives supported by the service 20. Elaboration of recommendations and lessons learnt on training from the evaluation of the initiative 21. Extent of adoption of recommendations on training in the initiative iteration

Table 3.14 Evaluation questions and indicators of Efficiency (own elaboration) for category 2: Social Innovation skills of citizens and urban stakeholders

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries who completed the programme/initial # of beneficiaries 2. # of beneficiaries who completed the programme/material and human resources allocated 3. # of beneficiaries with increased knowledge of SI after participating to the initiative/material and human resources allocated 4. # of beneficiaries with increased businesses knowledge and able to start their SI business, after participating to the initiative/material and human resources allocated 5. # of beneficiaries able to use the business seeding to start their SI initiative, after participating to the initiative/material and human resources allocated 6. # of beneficiaries with increased capability to attract funding after participating to the initiative/material and human resources allocated 7. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated 8. % of beneficiaries with a favourable evaluation of the support (Likert scale)/material and human resources allocated 9. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated 10. # of citizens that feel more empowered from the initiative/material and human resources allocated 11. % of expert with a favourable evaluation of the support in terms of efficiency (Likert scale, benchmarking with other funding mechanisms—especially traditional) 12. Quantity of external funding accruing to the beneficiary of the initiative that start their own/material and human resources allocated 13. Quantity of investment carried out by the beneficiaries of the initiative that start their own/material and human resources allocated 14. General increase in social innovation investment in the city/material and human resources allocated 15. Quantity of new patents developed by the beneficiaries of the initiative that start their own/material and human resources allocated 16. # of employees hired by the beneficiaries of the initiative that start their own/material and human resources allocated 17. General increase in social innovation investment in the city/material and human resources allocated 18. Energy Savings from SI initiatives on recovering of city buildings stemming from the training acquired from citizens/material and human resources allocated 19. t/CO_2 savings from SI initiatives on mobility stemming from the training acquired from citizens/material and human resources allocated 20. Renewable energy from SI initiatives on recovering of city buildings stemming from the training acquired from citizens/material and human resources allocated

Table 3.15 Indicators from existing frameworks for category 2: Social Innovation skills of citizens and urban stakeholders

Indicator	Framework
Degree of participation of the target population in the project	RESINDEX
Degree of diversity in the types of cooperating partners in social projects	RESINDEX
Composite indicator X7.4 "Capabilities • Indicator Cd1. Innovators and Followers capabilities to develop the Social Innovation initiative" • Indicator Cd2. Previous experience of actors who contributed to the Social Innovation process • Indicator Cd3. Technical capabilities of actors to develop the Social Innovation idea"	SIMRA
Knowledge and Social Capacity Building for Sustainable Urban Transformation • 15.1 Citizen involvement in environmental education activities • 15.2 Social learning regarding ecosystems and their functions • 15.3 Pro-environmental identity • 15.4 Pro-environmental behaviour • 16.1 Children involved in educational activities • 16.2 Engagement with NBS sites and projects • 16.3 Mindfulness Number • 16.4 Proportion of schoolchildren involved in gardening • 16.5 Citizens' awareness regarding urban nature and ecosystem services • 16.6 Green intelligence awareness • 16.7 Positive environmental attitudes motivated by contact with NBS • 16.8 Urban farming educational and/or participatory activities	NBS

Table 3.18 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.19 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

3.7 Evaluation Questions and Indicators for Category 4: Co-creation of Social Innovation Initiatives with Citizens and Stakeholders

Table 3.20 shows the input/output/outcome indicators elaborated by the research team.

Table 3.21 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.22 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.23 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 3.16 Input/output/outcome indicators (own elaboration) for category 3: Co-design of policies with social innovators and urban stakeholders

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. # of online co-creation sessions 2. # of live co-creation workshops 3. # of co-creation task forces teams established 4. # of civil servants taking part to the task forces 5. # of civil servants taking part to the task forces 6. # of citizens taking part to the online activities 7. # of citizens taking part to the offline activities 8. # of co-creation environments set-up (e.g. living labs) 9. # of new approaches for policy formulation developed	1. # of co-created policies concerning social innovation 2. # of co-creation environments set-up (e.g. living labs) devoted to social innovation 3. # policy makers with increased knowledge of SI/ co-creation 4. # of co-creation task forces and design thinking teams focused on innovation established 5. # of SI initiatives carried out by citizens and supported by the city 6. # of public services/ policies introducing social innovation paradigms 7. # participants with increased knowledge of SI/ co-creation 8. # of new approaches for policy formulation related to SI developed 9. # of citizens feeling empowered

3.8 Evaluation Questions and Indicators for Category 5: Funding/Supporting Community-Led Initiatives and Small-Scale Pilots/Experimentations

Table 3.24 shows the input/output/outcome indicators elaborated by the research team.

Table 3.25 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.26 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.27 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 3.17 Evaluation questions and indicators of Effectiveness (own elaboration) for category 3: Co-design of policies with social innovators and urban stakeholders

General evaluation questions	Specific evaluation questions	Indicators
What kind of support to the co-creation of social innovation by citizens was provided? Was it successful? To what extent the establishment of co-creation task forces have been successful in boosting social innovation?	1. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens? 2. To what extent the intervention triggers behavioural change in citizens? 3. To what extent the intervention triggers behavioural change in policy makers? 4. To what extent the intervention triggers an increase in empowerment of citizens? 5. To what extent the intervention boosts the acceptance of policy decisions and new regulations by citizens? 6. To what extent the intervention increases the adherence of policy decisions and new regulations to the needs of the citizens? 7. To what extent the intervention boosts the trust of citizens in policy makers? 8. To what extent the intervention boosts the co-design of SI policy? 9. To what extent the co-designed policies are adopted by the city? 10. To what extent the intervention boosts the development of new approaches for policy formulation related to SI? 11. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens? 12. What is the impact of the latter? 13. To what extent co-created SI policies are more effective? 14. To what extent co-created policies are more effective embody more social innovation elements?	1. # of citizens with increased knowledge of SI/participants to the initiatives 2. # of citizens feeling empowered/participants to the initiatives 3. # of citizens with behavioural change towards SI/participants to the initiatives 4. # of policy makers with behavioural change towards SI/participants to the initiatives 5. # of co-created policies boosting social innovation/# of co-created policies 6. # of co-created policies boosting social innovation/total # of policies 7. # of co-created policies boosting social innovation/total # of SI policies 8. # of co-created SI policies with a high level of acceptance/total # of co-created policies 9. # of co-created SI policies with a high level of acceptance/total # of policies 10. # of co-created SI policies with a high level of acceptance/total # of SI policies 11. # of public services stemming from co-creation sessions related to SI/# of public services stemming from co-creation sessions 12. # of public services stemming from co-creation sessions related to SI/total # of public services 13. # of public services stemming from co-creation sessions related to SI/total # of SI public services 14. # of co-created policies in line with citizens' needs/total # of policies elaborated 15. # of co-created SI policies adopted by the city/# of total SI policies 16. # of new approaches for policy formulation related to SI/total # of new approaches for policy formulation 17. # of co-creation environments devoted to SI/total # of co-creation environments 18. # of social innovations developed from policy initiatives co-created/# of social innovations developed from policy initiatives non-co-created 19. Quantity of funding stemming from co-created policies accruing to social innovation initiatives/Quantity of funding stemming from non-co-created policies accruing to social innovation initiatives 20. Energy Savings from SI initiatives and public services supported by co-created policies 21. t/CO_2 savings from SI initiatives and public services supported by co-created policies 22. Renewable energy produced from SI initiatives and public services supported by co-created policies 23. Elaboration of recommendations and lessons learnt on co-creation stemming from the evaluation of the initiative 24. Extent of adoption of recommendations on policy co-creation in the initiative iteration

Table 3.18 Evaluation questions and indicators of Efficiency (own elaboration) for category 3: Co-design of policies with social innovators and urban stakeholders

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of citizens who completed the programme/initial # of citizens 2. # of citizens who completed the programme/material and human resources allocated 3. # of citizens with increased knowledge of SI after participating to the initiative/material and human resources allocated 4. # of citizens with increased empowerment after participating to the initiative/material and human resources allocated 5. # of citizens with increased with behavioural change after participating to the initiative/material and human resources allocated 6. # of policy makers with increased with behavioural change after participating to the initiative/material and human resources allocated 7. # of co-created policies boosting social innovation/material and human resources allocated 8. # of co-created SI policies with a high level of acceptance/material and human resources allocated 9. # of co-created SI policies in line with citizens' needs/material and human resources allocated 10. # of public services stemming from co-creation sessions related to SI/material and human resources allocated 11. # of public services stemming from co-creation sessions related to SI/material and human resources allocated 12. # of co-created SI policies adopted by the city/material and human resources allocated 13. # of new approaches for policy formulation related to SI/material and human resources allocated 14. # of co-creation environments devoted to SI/material and human resources allocated 15. # of social innovations developed from policy initiatives co-created/material and human resources allocated 16. Quantity of funding stemming from co-created policies accruing to social innovation initiatives/material and human resources allocated 17. Cost-effectiveness of the implementation against the needs of involved stakeholders 18. Quantity of funding accruing to social innovation initiatives/material and human resources allocated 19. Energy Savings from SI initiatives and public services supported by co-created policies/material and human resources allocated 20. t/CO_2 savings from SI initiatives and public services supported by co-created policies/material and human resources allocated 21. Renewable energy produced from SI initiatives and public services supported by co-created policies/material and human resources allocated

Table 3.19 Indicators from existing frameworks for category 3: Co-design of policies with social innovators and urban stakeholders

Indicator	Framework
Degree of implantation of regular mechanisms for the exchange of ideas, knowledge and relevant information for the organisation's activities	RESINDEX
Degree of implantation of regular mechanisms for the exchange of ideas, knowledge and relevant information for the organisation's activities	RESINDEX
Composite indicator X8.3 "New governance arrangements" (Ec1, Ec2, Ec3, Ec4) • Indicator Ec1. Level of involvement in decision-making of the actors in the Social Innovation process • Indicator Ec2. Level to which formal and informal norms have been agreed all together • Indicator Ec3. Level of awareness of the adoption of formal sanctioning mechanisms • Indicator Ec4. Level of trust in public institutions of the actors of the Social Innovation process	SIMRA
Participatory Planning and Governance • 17.1 Openness of participatory processes • 17.1.1 Proportion of citizens involved in participatory processes • 17.2 Sense of empowerment: perceived control and influence over decision-making • 17.3 Adoption of new forms of participatory governance: PPPs activated • 17.4 Policy learning for mainstreaming NBS: Number of new policies instituted • 17.5 Trust in decision making procedure and decision-makers • 18.1 Community involvement in planning • 18.1.1 Citizen involvement in co-creation/codesign of NBS • 18.1.2 Stakeholder involvement in cocreation/co-design of NBS • 18.2 Community involvement in implementation • 18.3 Involvement of citizens from traditionally underrepresented groups • 18.4 Active engagement of citizens in decision-making • 18.5 Consciousness of citizenship • 18.6 Number of governance innovations adopted • 18.7 Adoption of new forms of NBS (co-)financing • 18.8 Development of a climate resilience strategy (extent) • 18.9 Alignment of climate resilience strategy with UNISDR defined elements • 18.10 Adaptation of local plans and regulations to include NBS • 18.11 Perceived ease of governance of NBS • 18.12 Diversity of stakeholders involved • 18.13 Transparency of coproduction • 18.14 Activation of public–private collaboration • 18.15 Reflexivity: identified learning outcomes • 18.16 Facilitation skills for co-production • 18.17 Procedural fairness Number • 18.18 Strategic alignment Number • 18.19.1 Reflexivity: time for reflection	NBS

(continued)

Table 3.19 (continued)

Indicator	Framework
Goal 4—Enhancement of social cohesion and cultural particularity through ensuring sense of security and inclusion for all: • 4.1 Increased use of public spaces—(Introduce: Increased and comfortable public places—enlarge existing or introduce new) • 4.2 Higher ethnic and gender diversity—(Introduce: Introduce missing facilities for different gender and people groups –utilize BGS gender planning criteria) • 4.3 Strong participatory process (target > 200)—(Introduce: Introduce systemic, comprehensive collaborative planning process)	EU POLIS
Goal 5—Sense of place and place attachment among users: • 5.1 Create local conditions conducive to citizens participation process • 5.2 Enhance emotional attachment—(Site and method—Apply planning system where citizens proposals become visible) • 5.3 introduce/enhance feeling of responsibility and ownership—(Citizens regular inclusion into whole planning and implementation process) • 5.4 Increased sense of pride—(Public announcement of results from planning process stressing citizens direct impact with their proposed solutions)	EU POLIS
Goal 6—Density and strength of local community ties: Higher trust in local community members; New forms of neighborly exchange, neighborhood engagement and cooperation; Emergence of local leaders and social entrepreneurs; Increased feeling of community efficacy; • 6.1 Higher trust in local community members—(Introduce: Level and quality of communication in defining site requirements) • 6.2 New forms of neighbourly exchange—neighbourhood engagement and cooperation—(Introduce- joint work on urban farms- cultural events) • 6.3 Emergence of local leaders and social entrepreneurs • 6.4 Increased feeling of community efficacy—(results from joint activities: planning, farming, cultural events)	EU POLIS

3.9 Evaluation Questions and Indicators for Category 6: Enabling Social Innovation/Entrepreneurship Initiatives Scale-Up Beyond Pilot Projects

Table 3.28 shows the input/output/outcome indicators elaborated by the research team.

Table 3.29 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.30 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.31 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 3.20 Input/output/outcome indicators (own elaboration) for category 4: Co-creation of Social Innovation initiatives with citizens and stakeholders

Input	Output	Intermediate Outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material resources allocated (e.g., cost of venues, equipment, training material, marketing, cost for legal assistance, etc.) 4. Number of potential beneficiaries of the intervention	1. # of SI hubs set/up 2. # of living labs set up 3. # of SI transfer centres set up 4. Funding provided for business seeding 5. # of beneficiaries of the interventions that participated to online co-creation sessions 6. # of beneficiaries of the interventions that participated to offline co-creation sessions 7. # of beneficiaries of the interventions that receive funding 8. # of co-creation training and workshops 9. # of co-creation task forces teams established 10. # of civil servants taking part to the task forces 11. # of online co-creation sessions 12. # of live co-creation workshops	1. # of beneficiaries with increased knowledge of SI/co-creation 2. # of beneficiaries with increased businesses knowledge and able to start their initiative 3. # of SI initiatives carried out by citizens and co-created with the city 4. # of beneficiaries with increased capability to attract funding 5. # of citizens feeling empowered 6. # of co-creation environments set-up (e.g. living labs) devoted to social innovation 7. # of co-creation task forces and design thinking teams focused on innovation established 8. Funding provided for social innovation 9. # of civil servants with increased knowledge of social innovation 10. # of civil servants incorporating social innovation in their daily activity

3.10 Evaluation Questions and Indicators for Category 7: Testing and Prototyping New Funding Mechanisms

Table 3.32 shows the input/output/outcome indicators elaborated by the research team.

Table 3.33 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.34 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.35 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 3.21 Evaluation questions and indicators of Effectiveness (own elaboration) for category 4: Co-creation of Social Innovation initiatives with citizens and stakeholders

General evaluation questions	Specific evaluation questions	Indicators
What kind of support to the co-creation of social innovation by citizens was provided? Was it successful? To what extent the establishment of co-creation task forces have been successful in boosting social innovation? To what extent the establishment of SI hubs, living labs, and SI transfer centres has been successful in boosting social innovation?	1. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries? 2. To what extent the intervention triggers an increase in empowerment of beneficiaries? 3. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business? 4. To what extent the intervention triggers the ability of beneficiaries to get funding? 5. How many beneficiaries join the SI hubs, living labs, and SI transfer centres 6. To what extent the intervention triggers investments in social innovation initiatives? 7. To what extent the intervention triggers investments in systemic innovation? 8. To what extent the intervention triggers an increase in empowerment of citizens? 9. To what extent the new supported initiative were relevant to the needs of citizens? 10. To what extent the intervention boosts the trust of citizens in public administration? 11. To what extent co-created initiatives are more effective? 12. To what extent co-created initiatives embody more social innovation elements? 13. To what extent the intervention triggers behavioural change in citizens? 14. To what extent the intervention triggers behavioural change in policy makers? 15. To what extent the intervention boost the acceptance of Si initiatives by citizens? 16. To what extent the intervention boost the trust of citizens in public administration?	1. # of beneficiaries with increased knowledge of SI/participants to the initiatives 2. # of beneficiaries with increased businesses knowledge and able to start their initiative/participants to the initiatives 3. % of beneficiaries with a favourable evaluation of the support (Likert scale) 4. % of expert with a favourable evaluation of the support (Likert scale, benchmarking with other funding mechanisms – especially traditional) 5. % of citizens who feel that their needs are fulfilled by the initiative 6. # of citizens more sensitive to SI themes (including changing their behaviour)/citizens having had contact with the initiative and the new initiatives 7. # of citizens that feel more empowered knowing that their tax-payers money is used for the initiative 8. # of beneficiaries with increased capability to attract funding/participants to the initiatives 9. # of citizens with behavioural change towards SI/participants to the initiatives 10. # of policy makers with behavioural change towards SI/participants to the initiatives 11. # of co-created initiatives in line with citizens' needs/total # of policies elaborated 12. # of co-creation environments devoted to SI/total # of co-creation environments 13. # of co-created initiatives boosting social innovation/# of co-created initiatives 14. # of co-created initiatives boosting social innovation/total # of initiatives 15. # of co-created initiatives boosting social innovation/total # of SI initiatives 16. Quantity of funding stemming from co-created social innovation initiatives/Quantity of funding stemming from non-co-created social innovation initiatives 17. Quantity of external funding accruing to the beneficiary initiatives 18. Quantity of investment carried out by the beneficiaries of initiatives 19. Quantity of business seeding funding collected by the beneficiary initiatives 20. General increase in social innovation investment in the city 21. Quantity of new patents developed by the beneficiaries of initiatives 22. Energy savings from SI initiatives and supported by co-creation 23. t/CO_2 savings from SI initiatives supported by co-creation 24. Renewable energy produced from SI initiatives supported by co-creation 25. Elaboration of recommendations and lessons learnt on co-creation stemming from the evaluation of the initiative 26. Extent of adoption of recommendations on policy co-creation in the initiative iteration

Table 3.22 Evaluation questions and indicators of Efficiency (own elaboration) for category 4: Co-creation of Social Innovation initiatives with citizens and stakeholders

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries who completed the programme/initial # of beneficiaries 2. # of beneficiaries who completed the programme/material and human resources allocated 3. # of beneficiaries with increased knowledge of SI after participating to the initiative/material and human resources allocated 4. # of beneficiaries with increased businesses knowledge and able to start their SI business, after participating to the initiative/material and human resources allocated 5. # of beneficiaries with increased capability to attract funding after participating to the initiative/material and human resources allocated 6. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated 7. % of beneficiaries with a favourable evaluation of the support (Likert scale)/material and human resources allocated 8. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated 9. # of citizens that feel more empowered knowing that their taxpayer's money is used for the initiative/material and human resources allocated 10. % of expert with a favourable evaluation of the support in terms of efficiency (Likert scale, benchmarking with other funding mechanisms—especially traditional) 11. # of co-created initiatives boosting social innovation/material and human resources allocated 12. # of co-created SI initiatives with a high level of acceptance/material and human resources allocated 13. # of co-created SI initiatives in line with citizens' needs/material and human resources allocated 14. # of co-creation environments devoted to SI/material and human resources allocated 15. General increase in social innovation investment in the city/material and human resources allocated 16. Quantity of new patents developed by the beneficiaries of initiatives/material and human resources allocated 17. Quantity of external funding accruing to the beneficiary initiatives/material and human resources allocated 18. Quantity of investment carried out by the beneficiaries of initiatives/material and human resources allocated 19. Cost-effectiveness of the implementation against the needs of involved stakeholders 20. Energy Savings from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated 21. t/CO_2 savings from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated 22. Renewable energy produced from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated

Table 3.23 Indicators from existing frameworks for category 4: Co-creation of Social Innovation initiatives with citizens and stakeholders

Indicator	Framework
Existence of individuals or units intended to identify needs/social demands	RESINDEX
Degree of diversity of the sources of ideas for social projects	RESINDEX
Degree of diversity in cooperating partners for the development of social projects	RESINDEX
Index X4 "Engagement of civil society" (SIE1, SIE2, SIE3, SIE4) • Indicator SIE1. Contribution of the local community to the results of the Social Innovation initiative • Indicator SIE2. Motivation of actors for engaging in the Social Innovation initiative • Indicator SIE3. Participation of actors in network meetings • Indicator SIE4. Civic society engagement in the Social Innovation network	SIMRA
Composite indicator X8.2 "New attitudes" (Eb1, Eb2) • Indicator Eb1. "Level of pro-action of Transformers during the Social Innovation process" • Indicator Eb2. "Perception of the actors of their level of empowerment during the Social Innovation process"	SIMRA
Composite indicator X8.1 "New networks" (Ea1, Ea2, Ea3, Ea4, Ea5, Ea6, Ea7, Ea8, Ea9, Ea10, Ea11, Ea12, Ea13)152 • Indicator Ea1. "Attendance level at meetings in the Social Innovation process" • Indicator Ea2. Balance between public and private sector of the members of the Social Innovation network" • Indicator Ea3. "Contribution of the members of the Social Innovation network to the results of the Social Innovation initiative • Indicator Ea4. "Reputational power in the core group of the Social Innovation network" • Indicator Ea5. "Female inclusion in the Social Innovation network" • Indicator Ea6. "Young people's participation in the Social Innovation network" • Indicator Ea7. "Education level within the Social Innovation network" • Indicator Ea8. "Balance across economic sectors of the members of the Social Innovation process" • Indicator Ea9. "Balance across different geographic levels of the members of the Social Innovation process" • Indicator Ea10. "New relationships within the Social Innovation network" • Indicator Ea11. "Balance across different social, institutional and economic categories of the members of the Social Innovation process • Indicator Ea12. "Level of internal trust in the Social Innovation network" • Indicator Ea13. "Level of representativeness of the actors involved in the Social Innovation network in relation to the categories of the organisations	SIMRA
Goal 4—Enhancement of social cohesion and cultural particularity through ensuring sense of security and inclusion for all: • 4.1 Increased use of public spaces—(Introduce: Increased and comfortable public places—enlarge existing or introduce new) • 4.2 Higher ethnic and gender diversity—(Introduce: Introduce missing facilities for different gender and people groups—utilize BGS gender planning criteria) • 4.3 Strong participatory process (target > 200)—(Introduce: Introduce systemic, comprehensive collaborative planning process)	EU POLIS

(continued)

Table 3.23 (continued)

Indicator	Framework
Goal 5—Sense of place and place attachment among users: • 5.1 Create local conditions conducive to citizens participation process • 5.2 Enhance emotional attachment—(Site and method—Apply planning system where citizens proposals become visible) • 5.3 Introduce/enhance feeling of responsibility and ownership—(Citizens regular inclusion into whole planning and implementation process) • 5.4 Increased sense of pride—(Public announcement of results from planning process stressing citizens direct impact with their proposed solutions)	EU POLIS
Goal 6—Density and strength of local community ties: Higher trust in local community members; New forms of neighbourly exchange, neighbourhood engagement and cooperation; Emergence of local leaders and social entrepreneurs; Increased feeling of community efficacy; • 6.1 Higher trust in local community members—(Introduce: Level and quality of communication in defining site requirements) • 6.2 New forms of unneighbourly exchange—neighbourhood engagement and cooperation—(Introduce- joint work on urban farms- cultural events) • 6.3 Emergence of local leaders and social entrepreneurs • 6.4 Increased feeling of community efficacy—(results from joint activities: planning, farming, cultural events)	EU POLIS

Table 3.24 Input/output/outcome indicators (own elaboration) for category 5: Funding/supporting community-led initiatives and small-scale pilots/experimentations

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. Number of incubators set up 2. Number of business seeding set up 3. Funding provided for business seeding 4. # of beneficiaries of the interventions that completed the training 5. # of beneficiaries of the interventions that receive funding 6. # number of training/ workshops/consultancies to social innovators in order to enable them to start businesses 7. # of civil servants taking part to the initiatives	1. # of beneficiaries with increased knowledge of SI 2. # of beneficiaries with increased businesses knowledge and able to start their initiative 3. # of SI initiatives scaled 4. # of beneficiaries able to use the business seeding to start their initiative 5. # of beneficiaries with increased capability to attract funding 6. Funding provided for social innovation business seeding 7. # of civil servants with increased knowledge of social innovation 8. # of civil servants incorporating social innovation in their daily activity

Table 3.25 Evaluation Questions and Indicators of Effectiveness (own elaboration) for category 5: Funding/supporting community-led initiatives and small-scale pilots/experimentations

General evaluation questions	Specific evaluation questions	Indicators
What kind of support to the creation of social innovation by citizens was provided? Was it successful? To what extent the establishment of task forces carrying out the intervention has been successful in boosting social innovation?	1. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries? 2. To what extent the intervention triggers an increase in empowerment of beneficiaries? 3. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business? 4. How many beneficiaries join the business seeding round? 5. How much do they collect? 6. To what extent the intervention triggers the ability of beneficiaries to get funding? 7. To what extent the intervention triggers investments in social innovation initiatives? 8. To what extent the intervention triggers investments in systemic innovation? 9. To what extent the intervention triggers behavioural change in civil servants? 10. To what extent the intervention triggers an increase in empowerment of citizens? 11. To what extent the new supported initiative were relevant to the needs of social innovators? 12. To what extent the new supported initiative were relevant to the needs of citizens? 13. To what extent the intervention triggers investments in social innovation initiatives? 14. To what extent the intervention boosts the trust of citizens in public administration?	1. # of beneficiaries with increased knowledge of SI/participants to the initiatives 2. # of beneficiaries with increased businesses knowledge and able to start their initiative/participants to the initiatives 3. # of beneficiaries able to use the business seeding to start their initiative/participants to the initiatives 4. % of beneficiaries with a favourable evaluation of the support (Likert scale) 5. % of expert with a favourable evaluation of the support (Likert scale, benchmarking with other funding mechanisms – especially traditional) 6. % of citizens who feel that their needs 7. # of citizens more sensitive to SI themes (including changing their behaviour)/citizens having had contact with the initiative and the new initiatives 8. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative 9. Quantity of external funding accruing to the beneficiary initiatives 10. Quantity of investment carried out by the beneficiaries of initiatives 11. Quantity of business seeding funding collected by the beneficiary initiatives 12. General increase in social innovation investment in the city 13. Quantity of new patents developed by the beneficiaries of initiatives 14. Energy Savings from SI initiatives supported by the service 15. t/CO_2 savings from SI initiatives supported by the service 16. Renewable energy produced from SI initiatives supported by the service 17. Elaboration of recommendations and lessons learnt on business seeding stemming from the evaluation of the initiative 18. Extent of adoption of recommendations on business seeding in the initiative iteration

Table 3.26 Evaluation questions and indicators of Efficiency (own elaboration) for category 5: Funding/supporting community-led initiatives and small-scale pilots/experimentations

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries who completed the programme/initial # of beneficiaries 2. # of beneficiaries who completed the programme/material and human resources allocated 3. # of beneficiaries with increased knowledge of SI after participating to the initiative/material and human resources allocated 4. # of beneficiaries with increased businesses knowledge and able to start their SI business, after participating to the initiative/material and human resources allocated 5. # of beneficiaries able to use the business seeding to start their SI initiative, after participating to the initiative/material and human resources allocated 6. # of beneficiaries with increased capability to attract funding after participating to the initiative/material and human resources allocated 7. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated 8. % of beneficiaries with a favourable evaluation of the support (Likert scale)/material and human resources allocated 9. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated 10. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative/material and human resources allocated 11. % of expert with a favourable evaluation of the support in terms of efficiency (Likert scale, benchmarking with other funding mechanisms—especially traditional) 12. Quantity of external funding accruing to the beneficiary initiatives/material and human resources allocated 13. Quantity of investment carried out by the beneficiaries of initiatives/material and human resources allocated 14. General increase in social innovation investment in the city/material and human resources allocated 15. Quantity of new patents developed by the beneficiaries of initiatives/material and human resources allocated 16. Cost-effectiveness of the implementation against the needs of involved stakeholders 17. Energy savings from SI initiatives supported by the service/material and human resources allocated 18. t/CO_2 savings from SI initiatives supported by the service/material and human resources allocated 19. Renewable energy produced from SI initiatives supported by the service/material and human resources allocated

Table 3.27 Indicators from existing frameworks for category 5: Funding/supporting community-led initiatives and small-scale pilots/experimentations

Indicator	Framework
Degree of diversity in the sectors impacted by social projects	RESINDEX
Index X2 "Response to societal challenges" (SIS1, SIS2) • Indicator SIS1. Capability of the Social Innovation idea to deal with multiple European societal challenges • Indicator SIS2. Perception of actors of the European societal challenges being improved in the territory due to the Social Innovation initiative	SIMRA

Table 3.28 Input/output/outcome Indicators (own elaboration) for category 6: Enabling Social Innovation/entrepreneurship initiatives scale-up beyond pilot projects

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, marketing, cost for legal assistance, etc.) 4. Number of potential beneficiaries of the intervention	1. Number of accelerators set/up 2. Number of incubators set up 3. Number of business seeding set up 4. Funding provided for business seeding 5. # of beneficiaries of the interventions that completed the training 6. # of beneficiaries of the interventions that receive funding 7. # number of acceleration training and workshops 8. # number of training/workshops/consultancies to businesses in order to enable scaling, replication or adaptation 9. # of matching activities	1. # of beneficiaries with increased knowledge of SI 2. # of beneficiaries with increased businesses knowledge and able to scale, replicate or adapt their initiative 3. # of SI initiatives scaled 4. # of SI initiatives transferred in other contexts 5. # of beneficiaries able to use the business seeding scale their initiative 6. # of beneficiaries with increased capability to attract funding 7. # of beneficiaries matched with challenge-owners

3.11 Evaluation Questions and Indicators for Category 8: Public Procurement of Social Innovation Services for Sustainability

Table 3.36 shows the input/output/outcome indicators elaborated by the research team.

Table 3.37 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.38 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.29 Evaluation questions and indicators of effectiveness (own elaboration) for category 6: Enabling Social Innovation/entrepreneurship initiatives scale-up beyond pilot projects

General evaluation questions	Specific evaluation questions	Indicators
What kind of support to the scaling, replication or adaptation of social innovation was provided? Was it successful? To what extent the establishment of accelerators, incubators, and socially relevant business seeding has been successful in boosting social innovation?	1. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries? 2. To what extent the intervention triggers an increase in empowerment of beneficiaries? 3. To what extent the intervention triggers an increase of the ability beneficiaries to scale, replicate and adapt their initiative? 4. How many beneficiaries join the accelerators and incubators? 5. How many beneficiaries successfully finish the accelerators and incubators cycle? 6. How many beneficiaries join the business seeding round? 7. How much do they collect? 8. To what extent the intervention triggers the ability of beneficiaries to get funding? 9. To what extent the intervention triggers the ability of beneficiaries to match with challenge-owners? 10. To what extent the intervention triggers investments in social innovation initiatives? 11. To what extent the intervention triggers investments in systemic innovation?	1. # of beneficiaries with increased knowledge of SI/participants to the initiatives 2. # of beneficiaries with increased businesses knowledge and able to scale, replicate or adapt their initiative/participants to the initiatives 3. # of SI initiatives scaled/initiatives beneficiaries 4. # of SI initiatives transferred in other context/initiatives beneficiaries 5. # of beneficiaries able to use the business seeding scale their initiative/participants to the initiatives 6. # of beneficiaries with increased capability to attract funding/participants to the initiatives 7. # of beneficiaries matched with challenge-owners/participants to the initiatives 8. Quantity of external funding accruing to the beneficiary initiatives 9. Quantity of investment carried out by the beneficiaries of initiatives 10. Quantity of business seeding funding collected by the beneficiary initiatives 11. General increase in social innovation investment in the city 12. Quantity of new patents developed by the beneficiaries of initiatives 13. Energy Savings from SI initiatives supported by the service (and related increase after scaling) 14. t/CO_2 savings from SI initiatives supported by the service (and related increase after scaling) 15. Renewable energy produced from SI initiatives supported by the service (and related increase after scaling) 16. Elaboration of recommendations and lessons learnt on scalability and transferability stemming from the evaluation of the initiative 17. Extent of adoption of recommendations on scalability and transferability in the initiative iteration 18. Elaboration of recommendations and lessons learnt on acceleration/incubation stemming from the evaluation of the initiative 19. Extent of adoption of recommendations on acceleration/incubation in the initiative iteration

Table 3.30 Evaluation questions and indicators of efficiency (own elaboration) for category 6: Enabling Social Innovation/entrepreneurship initiatives scale-up beyond pilot projects

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries who completed the programme/initial # of beneficiaries 2. # of beneficiaries who completed the programme/material and human resources allocated 3. # of beneficiaries with increased knowledge of SI after participating to the initiative/material and human resources allocated 4. # of beneficiaries with increased businesses knowledge and able to scale, replicate or adapt their initiative, after participating to the initiative/material and human resources allocated 5. # of SI initiatives scaled, after participating to the initiative/material and human resources allocated 6. # of SI initiatives transferred in other context, after participating to the initiative/material and human resources allocated 7. # of beneficiaries able to use the business seeding scale their initiative, after participating to the initiative/material and human resources allocated 8. # of beneficiaries with increased capability to attract funding after participating to the initiative/material and human resources allocated 9. # of beneficiaries matched with challenge-owners, after participating to the initiative/material and human resources allocated 10. Quantity of external funding accruing to the beneficiary initiatives/material and human resources allocated 11. Quantity of investment carried out by the beneficiaries of initiatives/material and human resources allocated 12. Quantity of business seeding funding collected by the beneficiary initiatives/material and human resources allocated 13. General increase in social innovation investment in the city/material and human resources allocated 14. Quantity of new patents developed by the beneficiaries of initiatives/material and human resources allocated 15. Cost-effectiveness of the implementation against the needs of involved stakeholders 16. Energy Savings from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated 17. t/CO_2 savings from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated 18. Renewable energy produced from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated

Table 3.31 Indicators from existing frameworks for category 6: Enabling Social Innovation/entrepreneurship initiatives scale-up beyond pilot projects

Indicator	Framework
Composite indicator X9.3 Beneficiaries • Indicator Ga1. New relationships amongst direct beneficiaries • Indicator Ga2. New relationships between the direct beneficiaries and institutions • Indicator Ga3. Inclusion of females in the beneficiary group • Indicator Ga4. Inclusion of young people in the beneficiary group	SIMRA

Table 3.32 Input/output/outcome indicators (own elaboration) for category 7: Testing and prototyping new funding mechanisms

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. Number of funding mechanisms set/up 2. Funding provided for business 3. # of beneficiaries of the interventions that completed the training 4. # of beneficiaries of the interventions that receive funding 5. # of trainings and workshops 6. # of citizens participating to dissemination campaigns	1. # of beneficiaries with increased knowledge of SI 2. # of beneficiaries with increased knowledge of funding 3. # of SI initiatives funded and scaled 4. # of beneficiaries able to use the mechanism to fund and scale their initiative 5. # of beneficiaries with increased capability to attract funding 6. # of citizens introduced to social innovation

Table 3.39 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

3.12 Evaluation Questions and Indicators for Category 9: Urban Planning for Social Innovation

Table 3.40 shows the input/output/outcome indicators elaborated by the research team.

Table 3.41 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.42 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.43 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 3.33 Evaluation questions and indicators of effectiveness (own elaboration) for category 7: Testing and prototyping new funding mechanisms

General evaluation questions	Specific evaluation questions	Indicators
To what extent the establishment of new funding mechanisms has been successful in boosting social innovation? How was it received by social innovators? Did it have side effects in introducing the general population to social innovation?	1. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries? 2. To what extent the intervention triggers an increase in empowerment of beneficiaries? 3. To what extent the intervention triggers an increase of the ability beneficiaries to create and scale social innovation initiatives? 4. How many beneficiaries joined the new funding mechanisms? 5. Were the new funding mechanisms more effective? 6. Were the new funding mechanisms more relevant to the needs of social innovators? 7. How much money was provided to the beneficiaries? Under what conditions? 8. To what extent the intervention triggers the ability of beneficiaries to get funding? 9. To what extent the intervention triggers investments in social innovation initiatives? 10. To what extent the intervention triggers investments in systemic innovation? 11. Did the general population felt involved in the process?	1. # of beneficiaries with increased knowledge of SI/ participants to the initiatives 2. # of SI initiatives created and sustainable/initiatives beneficiaries 3. % of beneficiaries with a favourable evaluation of the support (Likert scale) 4. % of expert with a favourable evaluation of the support (Likert scale, benchmarking with other funding mechanisms – especially traditional) 5. # of beneficiaries with increased capability to attract funding/participants to the initiatives 6. # of citizens more sensitive to SI themes (including changing their behaviour)/citizens having had contact with the initiatives 7. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative 8. Quantity of external funding accruing to the beneficiary initiatives 9. Quantity of investment carried out by the beneficiaries of initiatives 10. Quantity of funding collected by the beneficiary initiatives 11. General increase in social innovation investment in the city 12. Quantity of new patents developed by the beneficiaries of initiatives 13. # of employees hired by the beneficiaries of initiatives 14. Energy Savings from SI initiatives supported by the service 15. Improvement and recovering of city buildings produced from SI initiatives supported by the service 16. Elaboration of recommendations and lessons learnt on new funding mechanisms stemming from the evaluation of the initiative 17. Extent of adoption of recommendations on new funding mechanisms in the initiative iteration

Table 3.34 Evaluation questions and indicators of Efficiency (own elaboration) for category 7: Testing and prototyping new funding mechanisms

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries with increased knowledge of SI after participants to the support/material and human resources allocated 2. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated 3. % of beneficiaries with a favourable evaluation of the support (Likert scale)/ material and human resources allocated 4. # of beneficiaries with increased capability to attract funding after participants to the support after participants to the support/material and human resources allocated 5. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated 6. # of citizens that feel more empowered knowing that their taxpayer's money is used for the initiative/material and human resources allocated 7. % of expert with a favourable evaluation of the support in terms of efficiency (Likert scale, benchmarking with other funding mechanisms—especially traditional) 8. Cost-effectiveness of the implementation against the needs of involved stakeholders 9. Quantity of external funding accruing to the beneficiary initiatives/material and human resources allocated 10. Quantity of investment carried out by the beneficiaries of initiatives/material and human resources allocated 11. Quantity of funding collected by the beneficiary initiatives/material and human resources allocated 12. General increase in social innovation investment in the city/material and human resources allocated 13. Quantity of new patents developed by the beneficiaries of initiatives/material and human resources allocated 14. Energy Savings from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated 15. Improvement in city buildings status from SI initiatives supported by the service (and related increase after scaling)/material and human resources allocated

Table 3.35 Indicators from existing frameworks for category 7: Testing and prototyping new funding mechanisms

Indicator	Framework
Degree of diversity in the sources of financing for the development of social projects	RESINDEX

Table 3.36 Input/Output/Outcome Indicators (own elaboration) for category 8: Public procurement of Social Innovation services for sustainability

Input	Output	Intermediate Outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. Number of funding mechanisms set/up 2. Funding provided for business 3. # of beneficiaries of the interventions (i.e. accessing public procurement) 4. # of beneficiaries of the interventions that receive funding 5. # of new public procurement mechanisms produced 6. # of public procurement pathfinders and task forces teams established 7. # of civil servants taking part to the task forces	1. # of beneficiaries with increased knowledge of SI 2. # of beneficiaries with increased knowledge of public procurement 3. # of beneficiaries with increased capability to attract funding 4. # of SI initiatives funded 5. # of citizens introduced to social innovation 6. # civil servants with increased knowledge of SI 7. # of public procurement pathfinders and task forces teams focused on innovation established 8. # of civil servants operating in such teams 9. # of SI initiatives carried out by citizens and supported by the city 10. # of public services introducing social innovation paradigms 11. # of new approaches for public procurement related to SI developed 12. # of citizens feeling empowered

3.13 Evaluation Questions and Indicators for Category 10: Resource Circularity

Table 3.44 shows the input/output/outcome indicators elaborated by the research team.

Table 3.45 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 3.37 Evaluation questions and indicators of Effectiveness (own elaboration) for category 8: Public procurement of Social Innovation services for sustainability

General evaluation questions	Specific evaluation questions	Indicators
To what extent the establishment of new public procurement mechanisms has been successful in boosting social innovation? How was it received by social innovators? Did it have side effects in introducing the general population to social innovation? To what extent the establishment of public procurement task forces and pathfinders have been successful in boosting social innovation?	1. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens? 2. To what extent the intervention triggers behavioural change in citizens? 3. To what extent the intervention triggers behavioural change in policy makers? 4. To what extent the intervention triggers an increase in empowerment of citizens? 5. To what extent the intervention boosts the acceptance of new public services by citizens? 6. To what extent the intervention increases the adherence of public services with respect to the needs of the citizens? 7. How many beneficiaries joined the public procurement mechanisms? 8. Were the new public procurement mechanisms more effective? 9. Were the new public procurement mechanisms more relevant to the needs of social innovators? 10. How much money was provided to the beneficiaries? Under what conditions? 11. To what extent the intervention triggers the ability of beneficiaries to get funding? 12. To what extent the intervention triggers investments in social innovation initiatives? 13. To what extent the intervention boosts the trust of citizens in policy makers? 14. To what extent the intervention boosts the development of new approaches for public procurement related to SI? 15. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens? 16. What is the impact of the latter? 17. To what extent public services embedding SI are more effective for what concerns sustainability?	1. # of beneficiaries with increased knowledge of SI/participants to the initiatives 2. # of SI initiatives created and sustainable/initiatives beneficiaries 3. % of beneficiaries with a favourable evaluation of the public procurement mechanism (Likert scale) 4. % of expert with a favourable evaluation of the public procurement mechanism (Likert scale, benchmarking with other funding mechanisms—especially traditional) 5. # of beneficiaries with increased capability to attract funding/participants to the initiatives 6. # of citizens more sensitive to SI themes (including changing their behaviour)/citizens having had contact with the initiative and the public procured services 7. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative 8. # of new approaches for public procurement related to SI/total # of new approaches for public procurement 9. # of public services in line with citizens' needs/total # of public services procured 10. # of public services embedding SI procured by the city/# of total public services procured 11. # of public services stemming from the initiative related to SI/total # of public services 12. # of public services stemming from the initiative related to SI/total # of SI public services 13. # of public services procured boosting social innovation/# of public services procured 14. # of SI public services procured with a high level of acceptance/# of public services procured 15. # of SI public services procured with a high level of acceptance/# of SI public services procured 16. Quantity of external funding accruing to the beneficiary accessing the new public procurement mechanism 17. Quantity of investment carried out by the beneficiaries of accessing the new public procurement mechanism 18. Quantity of funding collected by the beneficiary accessing the new public procurement mechanism 19. General increase in social innovation investment in the city 20. Quantity of new patents developed by the beneficiaries of initiatives 21. # of employees hired by the beneficiaries of initiatives 22. Energy Savings from SI initiatives and public services developed with the procurement procedure 23. t/CO_2 savings from SI initiatives and public services developed with the procurement procedure 24. Renewable energy produced from the public services developed with the procurement procedure 25. Elaboration of recommendations and lessons learnt on public procurement stemming from the evaluation of the initiative 26. Extent of adoption of recommendations on public procurement in the initiative iteration

Table 3.38 Ten evaluation questions and indicators of Efficiency (own elaboration) for category 8: Public procurement of Social Innovation services for sustainability

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries with increased knowledge of SI after participants to the support/material and human resources allocated 2. # of citizens with increased empowerment after participating to the initiative/material and human resources allocated 3. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated 4. % of beneficiaries with a favourable evaluation of the support (Likert scale)/material and human resources allocated 5. # of beneficiaries with increased capability to attract funding after participants to the support after participants to the support/material and human resources allocated 6. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated 7. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative/material and human resources allocated 8. % of expert with a favourable evaluation of the support in terms of efficiency (Likert scale, benchmarking with other funding mechanisms – especially traditional) 9. # of public services stemming from the initiative related to SI/material and human resources allocated 10. # of new approaches for public procurement related to SI/material and human resources allocated 11. # of social innovations developed from public services procured/material and human resources allocated 12. Cost-effectiveness of the implementation against the needs of involved stakeholders 13. Quantity of external funding accruing to the beneficiary initiatives/material and human resources allocated 14. Quantity of investment carried out by the beneficiaries of initiatives/material and human resources allocated 15. Quantity of funding collected by the beneficiary initiatives/material and human resources allocated 16. Quantity of funding accruing to social innovation initiatives/material and human resources allocated 17. Energy Savings from SI initiatives and public services supported by the intervention/material and human resources allocated 18. t/CO_2 savings from SI initiatives and public services supported by the intervention/material and human resources allocated 19. Renewable energy produced from SI initiatives supported by the intervention/material and human resources allocated 20. Elaboration of recommendations and lessons learnt on public procurement stemming from the evaluation of the initiative/material and human resources allocated 21. Extent of adoption of recommendations on public procurement in the initiative iteration/material and human resources allocated

Table 3.39 Indicators from existing frameworks for category 8: Public procurement of Social Innovation services for sustainability

Indicator	Framework
Existence of individuals or units intended to identify needs/social demands	RESINDEX
Composite indicator X7.5 "Endogenous versus exogenous drivers of the Social Innovation process" (Da1, Da2, Da3) • Indicator Da1. "Role of newcomers in the Social Innovation process" • Indicator Da2. "Perception of Social Innovation actors of the contribution of external helpers to the results of the Social Innovation initiative • Indicator Da3. "Bridging capability of Social Innovation process actors with external actors"	SIMRA

Table 3.46 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 3.47 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

3.14 General Indicators

This final subsection depicts a series of evaluation indicators for initiatives stemming in general from the plan and its categories of implementation (Table 3.48).

Finally, Table 3.49 provides a summary of the number of indicators per category, per criteria (effectiveness—EFFE, efficiency EFFI, sustainability—SU, replicability—RE, scalability—SC), ad distinguishing if own (O) or mapped (M) from an existing framework (Table 3.49).

Table 3.40 Input/output/outcome indicators (own elaboration) for category 9: Urban planning for Social Innovation

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. # of citizens taking part to the online activities 2. # of citizens taking part to the offline activities 3. # of co-creation environments set-up (e.g. living labs) 4. # of online co-creation sessions 5. # of live co-creation workshops 6. # of co-creation task forces teams established 7. # of civil servants taking part to the task forces 8. # of beneficiaries of the interventions that completed the training 9. # number of training/ workshops/consultancies to social innovators in order to enable them to start businesses 10. # of civil servants taking part to the initiative 11. Funding provided for new initiatives 12. # of initiatives directly developed within the scope of the plan	1. Drafting of the new urban development plan 2. # of policies/actions concerning social innovation co-created within the scope of the plan 3. Funding provided to the plan 4. # of citizens feeling empowered 5. # participants with increased knowledge of SI/co-creation 6. # of co-creation environments set-up (e.g. living labs) devoted to social innovation 7. # policy makers with increased knowledge of SI/co-creation 8. # of co-creation task forces and design thinking teams focused on innovation established 9. # of SI initiatives carried out by citizens and supported by the city 10. # of public services/ initiatives developed within the scope of the plan and introducing the social innovation paradigm 11. # of beneficiaries with increased businesses knowledge and able to start their initiative 12. # of civil servants with increased knowledge of social innovation 13. # of civil servants incorporating social innovation in their daily activity 14. # of SI initiatives enabled by the plan carried out by citizens

Table 3.41 Evaluation questions and indicators of effectiveness (own elaboration) for category 9: Urban planning for Social Innovation

General evaluation questions	Specific evaluation questions	Indicators
To what extent the establishment of new public procurement mechanisms has been successful in boosting social innovation? How was it received by citizens? Did it have side effects in introducing the general population to social innovation? To what extent the establishment of public procurement task forces and pathfinders have been successful in boosting social innovation?	1. To what extent the intervention leads to decrease in energy consumption and in the reduction of pollution and CO_2? To what extent it decreases traffic and congestion? 2. To what extent the co-designed intervention is adopted by citizens? 3. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens? 4. To what extent the intervention boost the acceptance of Si initiatives by citizens? 5. To what extent the intervention boost the trust of citizens in public administration? 6. To what extent the intervention enables the development of new social innovation initiatives? Are the SI initiatives created or triggered by the interventions more effective than other types of support? 7. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries? 8. To what extent the intervention triggers an increase in empowerment of citizens? 9. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens? 10. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business? 11. To what extent the intervention triggers behavioural change in citizens? 12. To what extent the intervention triggers behavioural change in policy makers and civil servants? 13. To what extent the intervention triggers investments in social innovation initiatives? 14. To what extent the intervention triggers investments in systemic innovation? 15. To what extent the new initiatives developed within the scope of the intervention are relevant to the needs of citizens?	1. # of citizens with increased knowledge of SI/participants to the initiatives 2. # of beneficiaries with increased capability to attract funding/participants to the initiatives 3. # of beneficiaries with increased knowledge of SI/participants to the initiatives 4. # of citizens feeling empowered/participants to the initiatives 5. # of citizens more sensitive to SI themes (including changing their behaviour)/citizens having had contact with the initiative and the new initiatives 6. # of citizens that feel more empowered knowing that their taxpayer's money is used for the initiative 7. # of citizens with behavioural change towards SI/participants to the initiatives 8. % of beneficiaries with a favourable evaluation of the support (Likert scale) 9. % of citizens who feel that their needs are fulfilled by the initiative 10. % of expert with a favourable evaluation of the support (Likert scale, benchmarking with other funding mechanisms—especially traditional) 11. # of initiatives boosting social innovation enabled by the intervention/total # of SI initiatives in the city 12. # of initiatives boosting social innovation developed by PA within the scope of the intervention/total # of SI initiatives developed in the city 13. # of policy makers with behavioural change towards SI/participants to the initiatives 14. Quantity of external funding accruing to the beneficiary for carrying out initiatives within the scope of the intervention 15. General increase in social innovation investment in the city 16. Quantity of new patents developed by PA within the scope of the intervention 17. Quantity of investment carried out by citizens taking part to the intervention 18. Quantity of new patents developed by citizens taking part to the intervention 19. Renewable energy produced from SI initiatives (both from citizens and public) supported by the initiative 20. t/CO_2 savings from SI initiatives (both from citizens and public) supported by the initiative 21. Energy Savings from SI initiatives (both from citizens and public) supported by the initiative 22. Decrease in traffic and congestion 23. Elaboration of recommendations and lessons learnt on systemic innovation stemming from the evaluation of the initiative 24. Extent of adoption of recommendations on systemic innovation in the initiative iteration

Table 3.42 Evaluation questions and indicators of Efficiency (own elaboration) for category 9: Urban planning for Social Innovation

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries who completed the programme/initial # of beneficiaries 2. # of beneficiaries who completed the programme/material and human resources allocated 3. # of citizens with increased knowledge of SI after participating to the initiative/material and human resources allocated 4. # of beneficiaries with increased capability to attract funding after participating to the initiative/material and human resources allocated 5. # of beneficiaries with increased knowledge of SI after participating to the initiative/material and human resources allocated 6. # of citizens feeling empowered after participating to the initiative/material and human resources allocated 7. # of citizens with behavioural change towards SI after participating to the initiative/material and human resources allocated 8. # of initiatives boosting social innovation enabled by the intervention/material and human resources allocated 9. # of initiatives boosting social innovation developed by PA within the scope of the intervention/material and human resources allocated 10. # of citizens that feel more empowered knowing that their taxpayer's money is used for the initiative/material and human resources allocated 11. # of policy makers with behavioural change towards SI after participating to the initiative/material and human resources allocated 12. # of citizens more sensitive to SI themes (including changing their behaviour) after participating to the initiative/material and human resources allocated 13. % of beneficiaries with a favourable evaluation of the support (Likert scale)/material and human resources allocated 14. % of citizens who feel that their needs are fulfilled by the initiative/material and human resources allocated 15. % of expert with a favourable evaluation of the support (Likert scale, benchmarking with other funding mechanisms—especially traditional)/material and human resources allocated 16. Quantity of external funding accruing to the beneficiary for carrying out initiatives within the scope of the intervention/material and human resources allocated 17. General increase in social innovation investment in the city/material and human resources allocated 18. Quantity of new patents developed by PA within the scope of the intervention/material and human resources allocated 19. Quantity of investment carried out by citizens taking part to the intervention/material and human resources allocated 20. Quantity of new patents developed by citizens taking part to the intervention/material and human resources allocated 21. Renewable energy produced from SI initiatives (both from citizens and public) supported by the initiative/material and human resources allocated 22. t/CO_2 savings from SI initiatives (both from citizens and public) supported by the initiative/material and human resources allocated 23. Energy Savings from SI initiatives (both from citizens and public) supported by the initiative/material and human resources allocated 24. Decrease in traffic and congestion/material and human resources allocated 25. Elaboration of recommendations and lessons learnt on systemic innovation stemming from the evaluation of the initiative/material and human resources allocated 26. Extent of adoption of recommendations on systemic innovation in the initiative iteration/material and human resources allocated

Table 3.43 Indicators from existing frameworks for category 9: Urban planning for Social Innovation

Indicator	Framework
Composite indicator X10.1 "Feedback loops and multiplier effects" (Ha1, Ha2, Ha3, Ha4) • Indicator Ha1. "Likelihood of feedback loops due to dissemination activities" • Indicator Ha2. "Likelihood of upscaling of the Social Innovation initiative" • Indicator Ha3. "Likelihood of out-scaling of the Social Innovation initiative" • Indicator Ha4. "Capability of actors in the Social Innovation initiative to identify elements enabling its replication	SIMRA
Composite indicator X10.2 "Critical Innovation Effects" (Hb1, Hb2, Hb3) • Indicator Hb1. "Deadweight effects of the Social Innovation initiative in the territory" • Indicator Hb2. "Substitution effects of the Social Innovation initiative on other actors" • Indicator Hb3. "Displacement effects of the Social Innovation initiative outside the territory"	SIMRA
Goal 4—Enhancement of social cohesion and cultural particularity through ensuring sense of security and inclusion for all: • 4.1 Increased use of public spaces—(Introduce: Increased and comfortable public places—enlarge existing or introduce new) • 4.2 Higher ethnic and gender diversity—(Introduce: Introduce missing facilities for different gender and people groups –utilize BGS "gender planning criteria) • 4.3 Strong participatory process (target > 200)—(Introduce: Introduce systemic, comprehensive collaborative planning process)	EU POLIS
Green Space Management • 7.1 Green space accessibility • 7.2 Share of green urban areas • 7.3 Soil organic matter content • 7.3.1 Soil organic matter index	NBS
Air Quality • 11.1 Number of days during which ambient air pollution concentrations in the proximity of the NBS expressed as concentration of benzo[a]pyrene) exceeded threshold values during the preceding 12 months • 11.2 Proportion of population exposed to ambient air pollution in excess of threshold values during the preceding 12 months • 11.3 European Air Quality Index	NBS
Place regeneration • 13.1 Derelict land reclaimed for NBS • 13.2 Quantity of bluegreen space (as a ratio to built form) • 13.3 Perceived quality of urban blue-green spaces (accessibility, amenities, natural features, incivilities and recreational facilities) • 13.4 Place attachment: Place identity or "sense of place" • 13.5 Recreational value of public green space • 13.6 NBS incorporated in building design/incorporation of environmental design in buildings • 13.7 Cultural heritage protection	NBS

Table 3.44 Input/output/outcome indicators (own elaboration) for category 10: Resource circularity

Input	Output	Intermediate outcome
1. Cost of the intervention (per activity: promotion, design, deployment, monitoring and evaluation) 2. Human Resources allocated (hours spent for providing the interventions, hours spent for design and managing the interventions) 3. Material Resources allocated (e.g. cost of venues, equipment, training material, etc.) 4. Number of potential beneficiaries of the intervention	1. # of citizens taking part to the online activities 2. # of citizens taking part to the offline activities 3. # of co-creation environments set-up (e.g. living labs) 4. # of online co-creation sessions 5. # of live co-creation workshops 6. # of co-creation task forces teams established 7. # of civil servants taking part to the task forces 8. # of beneficiaries of the interventions that completed the training 9. # of training/workshops/ consultancies to social innovators in order to enable them to start businesses 10. # of civil servants taking part to the initiative 11. Funding provided for new initiatives 12. # of initiatives directly developed within the scope of the plan	1. Drafting of the new circular economy plan 2. # of services concerning social innovation co-created within the scope of the plan 3. Funding provided to the plan 4. # of citizens feeling empowered 5. # participants with increased knowledge of SI/co-creation 6. # of co-creation environments set-up (e.g. living labs) devoted to social innovation 7. # policy makers with increased knowledge of SI/co-creation 8. # of co-creation task forces and design thinking teams focused on innovation established 9. # of SI initiatives carried out by citizens after participating to the plan 10. # of beneficiaries with increased businesses knowledge and able to start their initiative 11. # of civil servants with increased knowledge of social innovation 12. # of civil servants incorporating social innovation in their daily activity

Table 3.45 Evaluation questions and indicators of Effectiveness (own elaboration) for category 10: Resource circularity

General evaluation questions	Specific evaluation questions	Indicators
To what extent the establishment of new public procurement mechanisms has been successful in boosting social innovation? How was it received by citizens? Did it have side effects in introducing the general population to social innovation? To what extent the establishment of public procurement task forces and pathfinders have been successful in boosting social innovation?	1. To what extent the intervention leads to decrease in waste and in the reduction of pollution and CO_2? To what extent the biomass is re-used and what is the value created? 2. To what extent the co-designed intervention is adopted by citizens? 3. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens? 4. To what extent the intervention boost the acceptance of Si initiatives by citizens? 5. To what extent the intervention boost the trust of citizens in public administration? 6. To what extent the intervention enables the development of new social innovation initiatives? Are the SI initiatives created or triggered by the interventions more effective than other types of support? 7. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries? 8. To what extent the intervention triggers an increase in empowerment of citizens? 9. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens? 10. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business? 11. To what extent the intervention triggers behavioural change in citizens? 12. To what extent the intervention triggers behavioural change in policy makers and civil servants? 13. To what extent the intervention triggers investments in social innovation initiatives? 14. To what extent the intervention triggers investments in systemic innovation? 15. To what extent the new initiatives developed within the scope of the intervention are relevant to the needs of citizens?	1. # of citizens with increased knowledge of SI/participants to the initiatives 2. # of beneficiaries with increased capability to attract funding/participants to the initiatives 3. # of beneficiaries with increased knowledge of SI/participants to the initiatives 4. # of citizens feeling empowered/participants to the initiatives 5. # of citizens more sensitive to SI themes (including changing their behaviour)/citizens having had contact with the initiative and the new initiatives 6. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative 7. # of citizens with behavioural change towards SI/participants to the initiatives 8. % of beneficiaries with a favourable evaluation of the initiative (Likert scale) 9. % of citizens who feel that their needs are fulfilled by the initiative 10. % of expert with a favourable evaluation of the initiative (Likert scale, benchmarking with other initiatives – especially traditional) 11. # of services boosting social innovation enabled by the intervention/total # of SI initiatives in the city 12. # of policy makers with behavioural change towards SI/participants to the initiatives 13. Quantity of external funding accruing to the beneficiary for carrying out services/products within the scope of the intervention 14. General increase in social innovation investment in the city 15. Quantity of new patents developed by PA within the scope of the intervention 16. Quantity of new patents developed by citizens taking part to the intervention 17. Revenues and employment from new services and initiatives created 18. Decrease in waste from the PA SI initiative and the supported initiatives by citizens 19. t/CO_2 savings from the PA SI initiative and the supported initiatives by citizens 20. Energy Savings from the PA SI initiative and the supported initiatives by citizens 21. Elaboration of recommendations and lessons learnt on systemic innovation stemming from the evaluation of the initiative 22. Extent of adoption of recommendations on systemic innovation in the initiative iteration

Table 3.46 Evaluation questions and indicators of Efficiency (own elaboration) for category 10: Resource circularity

General evaluation questions	Specific evaluation questions	Indicators
What is the cost/benefit ratio of the intervention?	1. Was the intervention result worth the invested time and effort in implementing the actions? 2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality? 3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?	1. # of beneficiaries who completed the programme/initial # of beneficiaries 2. # of beneficiaries who completed the programme/material and human resources allocated 3. # of citizens with increased knowledge of SI after participating to the initiative/material and human resources allocated 4. # of beneficiaries with increased capability to attract funding after participating to the initiative/material and human resources allocated 5. # of beneficiaries with increased knowledge of SI after participating to the initiative/material and human resources allocated 6. # of citizens feeling empowered after participating to the initiative/material and human resources allocated 7. # of citizens with behavioural change towards SI after participating to the initiative/material and human resources allocated 8. # of SI services enabled by the intervention/material and human resources allocated 9. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative/material and human resources allocated 10. # of policy makers with behavioural change towards SI after participating to the initiative/material and human resources allocated 11. # of citizens more sensitive to SI themes (including changing their behaviour) after participating to the initiative/material and human resources allocated 12. % of beneficiaries with a favourable evaluation of the intervention (Likert scale)/material and human resources allocated 13. % of citizens who feel that their needs are fulfilled by the initiative/material and human resources allocated 14. % of expert with a favourable evaluation of the support (Likert scale, benchmarking with other funding interventions—especially traditional)/material and human resources allocated 15. Quantity of external funding accruing to the beneficiary for carrying out services/products within the scope of the intervention/material and human resources allocated 16. General increase in social innovation investment in the city/material and human resources allocated 17. Quantity of new patents developed by PA within the scope of the intervention/material and human resources allocated 18. Quantity of new patents developed by citizens taking part to the intervention/material and human resources allocated 19. Revenues and employment from new services and initiatives created/material and human resources allocated 20. Decrease in waste from the PA SI initiative and the supported initiatives by citizens/material and human resources allocated 21. t/CO_2 savings from the PA SI initiative and the supported initiatives by citizens/material and human resources allocated 22. Energy Savings from the PA SI initiative and the supported initiatives by citizens/material and human resources allocated 23. Quantity of external funding accruing to the beneficiary for carrying out services/products within the scope of the intervention/material and human resources allocated 24. General increase in social innovation investment in the city/material and human resources allocated 25. Quantity of new patents developed by PA within the scope of the intervention/material and human resources allocated 26. Quantity of new patents developed by citizens taking part to the intervention/material and human resources allocated 27. Revenues and employment from new services and initiatives created/material and human resources allocated 28. Decrease in waste from the PA SI initiative and the supported initiatives by citizens/material and human resources allocated 29. t/CO_2 savings from the PA SI initiative and the supported initiatives by citizens/material and human resources allocated 30. Energy Savings from the PA SI initiative and the supported initiatives by citizens/material and human resources allocated

Table 3.47 Indicators from existing frameworks for category 10: Resource circularity

Indicator	Framework
Composite indicator X10.1 Feedback loops and multiplier effects 1. Indicator Ha1. Likelihood of feedback loops due to dissemination activities 2. Indicator Ha2. Likelihood of upscaling of the Social Innovation initiative 3. Indicator Ha3. Likelihood of out-scaling of the Social Innovation initiative 4. Indicator Ha4. Capability of actors in the Social Innovation initiative to identify elements enabling its replication	SIMRA
Composite indicator X10.2 Critical Innovation Effects 1. Indicator Hb1. Deadweight effects of the Social Innovation initiative in the territory 2. Indicator Hb2. Substitution effects of the Social Innovation initiative on other actors 3. Indicator Hb3. Displacement effects of the Social Innovation initiative outside the territory	SIMRA
Goal 4—Enhancement of social cohesion and cultural particularity through ensuring sense of security and inclusion for all: 1. 4.1 Increased use of public spaces—(Introduce: Increased and comfortable public places—enlarge existing or introduce new) 2. 4.2 Higher ethnic and gender diversity—(Introduce: Introduce missing facilities for different gender and people groups—utilize BGS "gender planning criteria) 3. 4.3 Strong participatory process (target > 200)—(Introduce: Introduce systemic, comprehensive collaborative planning process)	EU POLIS
Contextual indicators 1. E23—Water reuse (on-site) 2. E24—Waste reuse/management/recycle	EU POLIS

Table 3.48 General evaluation for initiatives

Indicator	Framework
Composite indicator X11.1 Relevance of the Social Innovation process • Indicator R1. Needs individually and collectively shared by actors of the Social Innovation process • Indicator R2. Vision of needs collectively shared by actors of the Social Innovation process Composite indicator X11.2 Relevance of the Social Innovation project • Indicator R3. Level of satisfaction of beneficiaries that the outputs of the Social Innovation project meet their needs, on a quantitative scale • Indicator R4. Level of satisfaction of beneficiaries that the outputs of the Social Innovation project meet their needs, on a qualitative scale Composite indicator X11.3 Relevance of the Social Innovation initiative • Indicator R5. Level of satisfaction of the actors with territorial needs with the Social Innovation initiative • Indicator R6. Needs shared by the actors and beneficiaries of the Social Innovation initiative, on a qualitative scale • Indicator R7. Marginalisation problems dealt with by the Social Innovation initiative	SIMRA
Composite indicator X12.1 Efficiency of the Social Innovation process • Indicator E1. Expectations of the actors of the use of time in the Social Innovation process • Indicator E2. Perceived efficiency of the use of resources invested in the Social Innovation process • Indicator E3. Efficiency of the collaborations in the network of the Social Innovation process Composite indicator X12.2 Efficiency of the Social Innovation project • Indicator E4. Change in the unit cost per direct beneficiary of the Social Innovation project • Indicator E5. Project Manager self-evaluation of the schedule of the Social Innovation project • Indicator E6. Project Manager self-evaluation of the Social Innovation project meeting its budgetary goals • Indicator E7. Project Manager self-evaluation of the Social Innovation project activities planned and completed Composite indicator X12.3 Efficiency of the Social Innovation initiative • Indicator E8. Perceived efficiency of the use of resources invested in the Social Innovation initiative	SIMRA
Composite indicator X15.1 Sustainability of the Social Innovation project • Indicator S1. Internal financing of the Social Innovation project • Indicator S2. Social Innovation project's financial sustainability over time Composite indicator X15.2 Sustainability of the Social Innovation initiative • Indicator S3. Sustainability of collaborations amongst the actors of the Social Innovation process • Indicator S4. Likelihood of the Social Innovation initiative to continue into the future • Indicator S5. Likelihood of the Social Innovation initiative of being sustainable over the long term	SIMRA

(continued)

Table 3.48 (continued)

Indicator	Framework
Composite indicator X13.1 Effectiveness of the Social Innovation process • Indicator F1. Comparison between expected and observed changes in the Social Innovation process, on a qualitative scale • Indicator F2. Extent of the changes created by the Social Innovation process as perceived by the actors • Indicator F3. Change in the collaborative relationships between the actors of the Social Innovation process • Indicator F4. Change in internal and external governance arrangements of the Social Innovation initiative as perceived by the actors of the Social Innovation process Composite indicator X13.2 Effectiveness of the Social Innovation project • Indicator F5. Level of satisfaction of beneficiaries with the results of the Social Innovation project • Indicator F6. Comparison between proposed and delivered outputs of the Social Innovation project, on a qualitative scale • Indicator F7. New direct beneficiaries reached by the Social Innovation project • Indicator F8. Project Manager self-evaluation of the Social Innovation project achieving the specific objectives Composite indicator X13.3 "Effectiveness of the Social Innovation initiative" (F9, F10, F11) • Indicator F9. Perception of actors of the Social Innovation process of being able to make a difference in the territory with the Social Innovation initiative • Indicator F10. Level of satisfaction of all the actors of the Social Innovation initiative with its results • Indicator F11. Change in the collaborative relationships between the actors of the Social Innovation initiative	SIMRA
Composite indicator X14.1 Impact of the Social Innovation project • Indicator I1. Improvement in social inclusion as perceived by the direct beneficiaries of the Social Innovation project due to the initiative • Indicator I2. Proportion of indirect beneficiaries of the total number of beneficiaries (direct and indirect), as estimated by the direct beneficiaries of the Social Innovation project Composite indicator X14.2 Impact of the Social Innovation initiative • Indicator I3. Proportion of marginalisation problems improved by the Social Innovation initiative, as perceived by stakeholders • Indicator I4. Proportion of the number of impacts of the Social Innovation initiative in the four domains which were positive, according to the stakeholders • Indicator I5. Balance of positive to negative significant impacts of the Social Innovation initiative in the four domains, according to perception of stakeholders • Indicator I6. Level of effects of the Social Innovation initiative in the four domains according to the actors • Indicator I7. Level of effects of the Social Innovation initiative inside the territory in the four domains according to the actors • Indicator I8. Level of effects of the Social Innovation initiative outside the territory in the four domains according to the actors • Indicator I9. Proportion of positive effects of the Social Innovation initiative in the four domains according to the perception of beneficiaries, on a qualitative scale • Indicator I10. Perceptions of actors of the level of improvement in governance aspects due to the social innovation initiative • Indicator I11. Perceptions of actors of the level of improvement in European societal challenges due to the Social Innovation initiative	SIMRA
Heat Risk [Number of combined tropical nights (>20° C) and hot days(>35 °C)]	EU POLIS
Goal 7—Number of planned natural systems: Quantified improvements of local conditions by implemented NBS such as microclimate control (measurable improvements in local outdoor microclimate conditions; # of kWh of energy saved through HI effect reduction) • 7.1 Microclimate improvement—(Introduce: Comprehensive and noticeably better quality microclimate compared to surroundings) • 7.2 Energy saving in immediate neighbourhood—(Introduce: Demonstration site urban components affecting energy consumption in the neighbouring buildings) • 7.3 Heat Island reduction—(Introduce: Demonstration site urban components affecting directly and indirectly Heat Island intensity at the site and at the neighbouring buildings) • 7.4 Enhance environment • 7.5 Provide adequate infrastructure for water amenities	EU POLIS

(continued)

Table 3.48 (continued)

Indicator	Framework
Goal 8—Significant improvement of habitat, biodiversity, resilience, Ecosystems (ES) in case studies: The list of Regenerated ES and resulting effects; 30% improvement of ecological status at each case study; The list of resilience measures and their expected results, € savings in case of weather extremes • 8.1 City ESS (Ecosystem Services) mapping • 8.2 Meet basic urban planning criteria for quality ES • 8.3 City to develop system to support the private sector in its efforts to use market-based approaches and payments for ecosystem services • 8.4 Test above interventions to adjust solutions to produce tangible results and other positive impacts from ESS • 8.5 ESS Provisioning functions—provision of clean air, food, raw materials… (Introduce: ESS quality and intensity significantly contributing to PH&WB and site resilience) • 8.6 ESS Regulating functions—(Introduce: ESS quality and intensity significantly contributing to PH&WB—Physical Health and Well-Being—and site resilience) • 8.7 Socio-Cultural ESS—(Introduce: ESS quality and intensity significantly contributing to PH&WB and site resilience) • 8.8 ecological environment status/effects—With NBS enhance quality of site ecology conducive to enhanced PH & WB • 8.9 Improve quality of site components related to PH & WB function. Additionally, based on existing city/site vulnerability study introduce additional site resilience measures to cope with extreme weather conditions	EU POLIS
Social Justice and Social Cohesion • 19.1 Bridging and bonding – quality of interactions within and between social groups • 19.2 Inclusion of different social groups in NBS projects • 19.3 Trust within the community • 19.4 Solidarity among neighbours • 19.5 Tolerance and respect • 19.6 Availability and equitable distribution of blue-green space • 20.1 Linking social capital • 20.2 Perceived social interaction • 20.3 Quantity and quality of social interaction • 20.4 Perceived social support • 20.5 Perceived social cohesion • 20.6 Perceived ownership of space and sense of belonging to the community • 20.7 Proportion of community who volunteer • 20.8 Proportion of target group reached by an NBS project • 20.9 Perceived personal safety • 20.10 Perceived safety of neighbourhood • 20.11 Number of violent incidents, nuisances and crimes per 100 000 population • 20.12 Realised safety • 20.13 Area easily accessible for people with disabilities • 20.14 Change in properties incomes	NBS

(continued)

Table 3.48 (continued)

Indicator	Framework
Health and Well-being • 21.1 Level of outdoor physical activity • 21.2 Level of chronic stress (perceived stress) • 21.3 General wellbeing and happiness • 21.4 Self-reported mental health and wellbeing • 21.5 Prevalence of cardiovascular disease (prevalence, incidence, morbidity and mortality) • 21.6 Quality of life Number (1–5) • 22.1 Self-reported physical activity • 22.2 Observed physical activity within NBS—% over three levels of physical activity (sedentary, walking, or vigorous) • 22.3 Encouraging a healthy lifestyle • 22.4 Incidence of obesity % per year • 22.5 Heat-related discomfort: Universal Thermal Climate Index (UTCI) • 22.6 Hospital admissions due to high temperature during extreme heat events • 22.7 Heat-related mortality • 22.8 Exposure to noise pollution % • 22.9 Perceived chronic loneliness • 22.10 Somatisation • 22.11 Mindfulness • 22.12 Visual access to green space • 22.13 Perceived restorativeness of public green space/NBS • 22.14 Perceived social support • 22.15 Connectedness to nature Number (1–5) across 14 categories • 22.16 Prevalence of attention deficit hyperactivity disorder (ADHD) % • 22.17 Exploratory behaviour in children • 22.18 Self-reported anxiety Mild, Moderate, Severe • 22.19 Prevalence, incidence, morbidity and mortality of respiratory diseases • 22.20 Morbidity, Mortality and Years of Life Lost due to poor air quality • 22.21 Prevalence of autoimmune diseases %	NBS

(continued)

Table 3.48 (continued)

Indicator	Framework
New Economic Opportunities and Green Jobs • 23.1.1 Valuation of NBS: Value of NBS calculated using GI-Val € • 23.1.2 Economic value of urban nature € • 23.2 Mean land and/or property value in proximity to green space € • 23.2.1 Change in mean house prices/rental markets € • 23.2.2 Average land productivity and profitability €/ha • 23.2.3 Property betterment and visual amenity enhancement • 23.3 Direct economic activity: Number of new jobs created €/year • 23.4 Direct economic activity: Retail and commercial activity in proximity to green space % • 23.5 Direct economic activity: Gross value added to local economy from new business creation %/year • 23.6 Recreational monetary value €/year • 23.7 Overall economic, social and health well-being Human Development Index • 24.1 Indirect economic activity: number of new businesses established in proximity to NBS No./year • 24.2 Indirect economic activity: Value of rates paid by businesses in proximity to NBS €/year • 24.3 Indirect economic activity: New customers to businesses in proximity to NBS Mean No./day per quarter • 24.4 Indirect economic activity: local economy GDP in proximity to NBS €/year • 24.5 NBS cost/benefit analysis: Initial costs € • 24.6 NBS cost/benefit analysis: Maintenance costs €/year • 24.7 NBS cost/benefit analysis: Replacement costs € • 24.8 NBS cost/benefit analysis: Avoided costs € • 24.9 NBS cost/benefit analysis: Payback period year • 24.10 Reduced/avoided damage costs from hydro meteorological risk reduction €/year • 24.11 Social return on investment (SROI) €/€ • 24.12 Income generated via application of green administrative policies within Living Lab district €/year • 24.13 Subsidies applied for private NBS measures €/year • 24.14 Private finance attracted to the NBS site/private investment in the bioeconomy €/year • 24.15 Increase in tourism Mean no. visitors/day per year • 24.16 New activities in the tourism sector • 24.17 Gross profit from nature-based tourism €/year per km^2 • 24.18 Number of new jobs in green sector % • 24.19 Number of new jobs related to NBS construction and maintenance • 24.20 New employment in the tourism sector • 24.21 Turnover in the green sector % • 24.22 Employment in agriculture No./ha • 24.23 Rural Productivity Index €/ha • 24.24 Economic value of the productive activities vulnerable to risks €/km^2 • 24.25 Innovation impact No. innovations • 24.26 Income per capita €/year per person • 24.27 Upskilling and related earnings increase in employment earnings per person per year • 24.28 Population mobility % in 1 y % in 2 y % in 5 y • 24.29 Avoided cost of run-off treatment €/y • 24.30 Correction cost of groundwater quality €/m^3 • 24.31 Dissuasive cost of water abstraction €/m^3 • 24.32 Average water productivity €/m^3 • 24.33 New areas made available for traditional productive uses km^2 • 24.34 Value of food produced in NBS • 24.35 Renewable energy produced in NBS	NBS

(continued)

Table 3.48 (continued)

Indicator	Framework
Climate Resilience	NBS
1.1 Total carbon removed or stored in vegetation and soil per unit area per unit time	
1.2 Avoided greenhouse gas emissions from reduced building energy consumption	
1.3 Monthly mean value of daily maximum temperature	
1.4 Monthly mean value of daily minimum temperature	
1.5 Heatwave incidence: Days with temperature > 90th percentile	
2.1.2 Total carbon stored in vegetation	
2.1.3 Total leaf area	
2.1.4 Carbon storage score	
2.1.6 Soil carbon content	
2.1.7 Rate of soil carbon decomposition	
2.2 Energy use savings due to NBS implementation	
2.3 Carbon emissions due to building cooling	
2.4 Carbon emissions due to treatment of runoff water (combined sewers)	
2.5 Soil temperature	
2.6 Total surface area of wetlands	
2.7 Surface area of restored and/or created wetlands	
2.8 Aboveground tree biomass	
2.9.1 Human comfort: Universal Thermal Climate Index	
2.9.2 Thermal Comfort	
2.9.3 Human comfort: Physiological Equivalent Temperature	
2.9.4 Mean or peak daytime temperature	
2.10.1 Urban Heat Island (incidence)	
2.10.2 Number of combined tropical nights and hot days	
2.10.3 Thermal Storage Score	
2.10.4 Thermal Load Score	
2.11 Peak summer temperature	
2.12 Maximum surface cooling	
2.13.1 Mean local daytime temperature	
2.13.1 Peak local daytime temperature	
2.14 Daily temperature range	
2.15 Air cooling	
2.16 Tree shade for local heat reduction	
2.17 Rate of evapotranspiration	
2.18 Land surface temperature	
2.19 Surface reflectance—albedo unitless	
2.20 Carbon emissions from vehicle traffic	

Table 3.49 Summary table on the number of indicators

SI Category	Evaluation criteria indicators						Total
	EFFE/Impact	EFFI	SU	RE	SC	Input/output/outcome	
General	17(O)	11(O)	8(O)	6(O)	5(O)	25(O)	
Generic	167(M)	9(M)	5(M)	7(M)			188(M)
1	16(O) 5(M)	10(O)				15(O)	41(O) 5(M)
2	21(O) 17(M)	20(O)				16(O)	56(O) 17(M)
3	24(O) 44(M)	21(O)				22(O)	67(O) 44(M)
4	26(O) 33(M)	22(O)				26(O)	74(O) 33(M)
5	18(O) 3(M)	19(O)				19(O)	56(O) 3(M)
6	19(O) 4(M)	18(O)				20(O)	57(O) 4(M)
7	17(O) 1(M)	15(O)				16(O)	48(O) 1(M)
8	26(O) 4(M)	21(O)				23(O)	70(O) 4(M)
9	24(O) 24(M)	26(O)				30(O)	80(O) 24(M)
10	21(O) 12(M)	30(O)				28(O)	79(O) 12(M)
Sub-total	229(O) 314(M)	213(O) 9(M)	8(O) 5(M)	6(O) 7(M)	5(O)	240(O)	701(O) 335(M)
Total	543	222	13	13	5	240	1036

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Chapter 4
Applying the Indicators in Cities

In the previous chapters, over one thousand indicators for assessing the social innovation component of cities action plans have been presented, according to defined categories. The practical and theoretical implications of such catalogue of indicators are discussed, firstly providing concrete steps and checklists for deploying indicators in city by publica administrators, policy makers and transition teams members. Secondly, a set of 40 process indicators is provided to equip cities with questions for progressive evaluation and reflexive learning. Finally, theoretical implications and future directions are discussed.

4.1 Operationalization of the Impact Measurement Tool

The following table presents a checklist of the steps that city administrators have to follow in order to apply the indicators to their local case.

S. Bresciani et al., *Assessment Framework for People-Centred Solutions to Carbon Neutrality*, PoliMI SpringerBriefs, https://doi.org/10.1007/978-3-031-53111-8_4

	WHAT	WHO	HOW	WHEN
Step 1	Stakeholders' engagement	Staff of the public administration and of social innovation organizations at policy/strategic/operational level and representatives of relevant stakeholders in the area of reference of the intervention	Mapping of the stakeholders according to their stake and interest to collaborate as well as the role/availability. Involvement of the stakeholders in the decision process through dedicated communication channels and periodical meetings/workshops/focus groups or interviews	Steps 1, 2 and 3 are crucial for ex-ante evaluation to support conducting the situational analysis (e.g., SWOT Analysis) (see Step 3) as well as the estimation of expected outputs/outcomes/impacts to be achieved by the intervention (see Step 5) However, these activities should be conducted periodically during the execution of the social innovation interventions to support the *in-itinere* evaluation and at the end of the intervention as part of the *ex-post* evaluation, in order to support assessment of progresses and impacts achieved by the interventions
Step 2	Appraisal of mission, strategy and objectives of the public administration and of the social innovators		Structured discussion (e.g., workshops/focus groups) between staff members and engaged stakeholders	
Step 3	Context analysis and baseline definition	Staff of the public administration and social innovation organizations at policy/strategic/operational level, and, if required, with the support of external experts and/or local researchers, as well as involving experts and representatives of relevant stakeholders for integrating external perspectives and suggestions	Collection of quantitative data based on primary and secondary sources on the environmental and socio-economic context of reference for the analysis complemented by qualitative situational analysis	
Step 4	Appraisal of the strategic and operational objectives of the intervention/s to be implemented/monitored/assessed		Analysis and selection of the intervention/s on the basis of: context analysis trends; relevance in comparison with other interventions; external factors and policy goals at intermediary and context level	Steps 4, and 5 are crucial for ex-ante evaluation to support designing the strategy and operational intervention/s to be implemented/monitored/assessed and associate relevant indicators for monitoring and evaluation as well as estimate expected target value for each indicator in relation to the objectives of the social innovation intervention/s However, these activities should be conducted periodically during the execution of the intervention to support the *in-itinere* evaluation and at the end of the intervention as part of the *ex-post* evaluation, in order to support assessment of progresses and impacts achieved by the social innovation intervention
Step 5	Selection and quantification of the Input, Output, Outcome, Impact indicators	Staff of the public administration and social innovation organizations at policy/strategic/operational level, and, if required, with the support of external experts and/or local researchers	The selection of indicators can be done combining: (1) The selection of suitable indicators from the system of social innovation indicators; (2) The definition of more specific additional indicators more representative of the characteristics of the intervention/s to be implemented/monitored/assessed	

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	WHAT	WHO	HOW	WHEN
Step 6	Definition of a data gathering strategy (monitoring) and methodology for (impact) evaluation		Define practical steps and procedures for monitoring and evaluation (i.e., data gathering and evaluation methodologies to be used). This depends on availability of data, resources and expertise (internal/external) to conduct the monitoring and evaluation	Step 6 and 7 should be defined during the ex-ante evaluation and updated if needed during the execution of the social innovation intervention/s to support *in-itinere* and *ex-post* evaluations
Step 7	Development of questionnaires for data gathering of selected indicators (including, if required a specific set of questionnaires for impact evaluation)	Staff of the public administration and social innovation organizations at policy/strategic/operational level, and, if required, with the support of external experts and/or local researchers	Questionnaires should be able to capture relevant indicators defined according to the system of measurement indicators or additional more appropriate indicators identified, and they should be adapted to the intervention/s that are under observation and the indicators that have been decided to measure in Step 5	

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	WHAT	WHO	HOW	WHEN
Step 8	Data gathering based on the strategy defined and indicators selected	*Input and output data*: Staff of the public administration and social innovation organizations at operational level *Outcome and Impact data:* Staff of public administration and social innovation organizations at operational and strategic level, and, if required, with the support of external experts and/or local researchers	Various techniques for data gathering can be applied: (1) Input data are mainly related to list of beneficiaries of the intervention/s and (human, material, financial, technological, etc.) resources allocated. They are usually available to the organisation managing the intervention/s (2) Output data are mainly related to the immediate results of the social innovation intervention/s (e.g., participants that completed a training course, etc.). They are usually available to the organisation managing the intervention/s (3) Outcome data are mainly related to information gathered in the short/mid-term after the end of the intervention (e.g., six months to one year). They are usually collected in a systematic way administering questionnaires (e.g., on-line questionnaires, emails, CATI, direct phone calls or papers). (4) Impact data are mainly related to information gathered in the mid-long term after the end of the intervention (usually more than 1 year). They are usually collected through ad hoc surveys on a sample of beneficiaries (through e.g., on-line questionnaires or CATI)	Step 8 and 9 are conducted during the execution of the social innovation intervention/s to support *in-itinere* and *ex-post* evaluations However, once data are available the results of these activities are highly beneficial during ex-ante evaluation to define or update benchmarks for constructing the baselines and estimate target objectives/indicators for the next programming period

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	WHAT	WHO	HOW	WHEN
Step 9	Analysis of the data gathered and quantification/estimation of measurement indicators	Staff of the public administration and social innovation organizations at policy/strategic/operational level, and, if required, with the support of external experts and/or local researchers	Typical activities include: (1) Data cleaning to remove possible inconsistencies in the answers collected in the previous steps; (2) Statistical elaborations to associate raw data collected to the system of measurement indicators identified in Step 5 and quantify/estimate the indicators on input, output, outcome and impact	
Step 10	Measurement of the degree of efficiency, effectiveness and sustainability of the intervention/s in order to assess the degree of achievement of the specific dimensions of impact on sustainability associated to the system of measurement indicators		Aggregated measurement of indicators gathered and calculation of the ratios according to the evaluation criteria as follows: (1) Efficiency: calculating the OUTPUT/INPUT ratio from the measurement indicators. (2) Effectiveness: calculating the OUTCOME/OUTPUT ratio from the measurement indicators. (3) SUSTAINABILITY: calculating the IMPACT/OUTPUT ratio from the measurement indicators	Step 10 is normally conducted at the end of the social innovation intervention/s to support ex-post evaluation. If data are gathered in a structured manner since the beginning of the intervention it can also be used to support *in-itinere* evaluation and, once data are made available the results of this measurement can be used for *ex-ante* evaluation to define or update benchmarks for constructing the baselines and estimate target objectives/indicators for the next programming period

4.2 Process Indicators and Questions for Reflexive Learning

The large number of indicators identified and described in the previous chapter provides a comprehensive catalogue of indicators that cities can select based on their specific needs and aims. Based on the work developed in the NetZeroCities project, experts' opinion and cities' feedback, questions for progress evaluation are developed and included to provide cities with reflexive questions for qualitative in-depth evaluations of progresses, related to specific actions, explained in detail in related publications and project deliverables (Bresciani et al., 2023a, b).

To support cities in the selection of indicators, a set of core indicators is presented in Table 4.1: the structured list can be utilized by transition teams and public administrators to monitor progresses of their efforts to leverage social innovation for supporting climate neutrality and it comprise both quantitative and qualitative answers, related to actions as defined in Bresciani et al. (2023b).

4.3 Scientific Implications: Responding to the Need for Assessing People-Based Solutions for Sustainability and Climate Neutrality

The focus on reflexive learning and quali-quantitative assessment is rooted in scientific evidence. In the scholarly article "Why sustainable development requires societal innovation and cannot be achieved without this", Diepenmaat et al. (2020) review multi-disciplinary perspectives related to societal innovation for sustainable development. The authors propose the need to acknowledge that "actors require each other in realizing their own needs and wishes and may help each other in this respect. Contextual aspects are embedded through the improvement perspectives (Diepenmaat et al., 2020). Their work presents a co-evolutionary understanding of innovation-based transformations, which is based on an iterative relationship between innovations, improvement perspectives and socio-economic transformations (Diepenmaat et al., 2020, p. 3). They specifically frame societal innovation as systemic type of innovation which requires design thinking and system building. The focus on design thinking finds justification in the ability of the method in facilitating the identification of configurations that are suitable for diverse types of actors. They base their argument on the work of Ceschin and Gaziulusoy (2016) who highlight how the focus of design has broadened to include socio-technical system innovation. Such socio-technical transitions are required for deep decarbonization (Geels et al., 2017) and entails a shift in the way the transition to carbon neutrality is framed and communicated to the broader public (Rosenbloom et al., 2016). Terstriep et al. (2020) provided a framework for favourable social innovation ecosystems, while Engelbrecht (2018) outlined how the nexus between social innovation and perceived wellbeing can be assessed. According to Unceta et al., (2020, p. 908), social innovation "measurement

Table 4.1 Selection of qualitative and quantitative indicators of social innovation

Category	Action	Indicators	Indicator description	Type of data
1. SI capacity building	1. Public administration capacity building in social innovation	SI1.1.1 Public administrators' social innovation skills development activities	Total number of people involved into 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.)	Numeric
		SI1.1.2 PA Social Innovation skills development	According to the city civil servants, what is social innovation and which 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?	Textual

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
		SI1.2 Social Innovation experts	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.)	Numeric
	2. Social Innovation in the transition team and in the city's strategy making	SI2.1 Social innovation experts participating to the city transition team/ climate task force	Number of social innovation experts (public administrators or external experts) participating to the city' transition team/task force, with expertise on social innovation for climate sustainability	Numeric
		SI2.2 Social innovations in the city strategy/ climate action plan	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	Numeric

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
		SI2.3.1 Media strategy on SI for climate sustainability	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? Which are the main lessons learned?	Textual
		SI2.3.1 Press and media coverage on city's initiatives for climate neutrality	Number of articles in the press, appearance in broadcast media and social media covering the city's initiatives for climate neutrality	Numeric
7. Testing and prototyping new funding mechanisms	3. Funding for Social Innovation initiatives for climate neutrality	SI3.1 Funds for Social Innovation	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	Numeric
1. SI capacity building	4. Citizens' capacity building in social innovation for climate neutrality	SI4.1.1 Citizens' Social Innovation for climate neutrality skills development SI4.1.2 Social innovation initiatives created	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, other (please specify)	Numeric

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
2. SI skills of citizens and urban stakeholders			Proportion of participants to SI training initiatives that created social innovation for climate neutrality	
5. Funding/ supporting community-led initiatives	5. City Social Innovation mapping/ observatory	SI5.1.1 Activities and partners mapped in the city's Social Innovation observatory	Number of social innovations and potential partners actively mapped in a SI innovation observatory or social innovation urban mapping/tracking platform	Numeric
		SI5.1.2 Number of social innovations for climate neutrality in the city	In the city, how many social innovations, NGOs and social enterprises focus on social innovation for climate sustainability?	Textual
3. Co-design of policies	6. Social innovation policies	SI6.1.1 Policies that support social innovation for climate neutrality	Which policies has the municipality developed to support social innovation for climate neutrality? Which are the benefits, challenges and lessons learned?	Textual
		SI6.1.2 Co-created policies that support social innovation for climate neutrality	Which social innovation initiatives have been developed from policy initiatives co-created with citizens? Which are the benefits, challenges and lessons learned compared to developing policies not co-created with citizens?	Textual
8. Public procurement		SI6.2 Percentage of procurement from sustainable providers	Percentage of procurement of public services of the city from sustainable providers or social innovations out of the number of total public services procured	Numeric (percentage)

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
5. Funding/ supporting community-led initiatives	7. Co-creation platforms and environments	SI7.1.1 Social Innovation Infrastructure	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)	Numeric
		SI7.1.2 Social Innovation Infrastructure	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?	Textual
		SI7.1.3 Number of newly established enterprises, initiatives or social Innovations for climate neutrality	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?	Numeric
		SI7.2 Open data for climate action initiatives	Is the city providing open data and platforms to share public administration data (such as citizen science)? How is the open data used by citizens to develop initiatives for climate neutrality or social innovations?	Textual

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
	8. Incubating and accelerating social innovations for climate neutrality	SI8.1.1 Public administration support for bottom-up social innovation projects for climate neutrality	How does the public administration support bottom-up social innovation projects and activities for climate neutrality?	Textual
4. Co-creation of social innovation initiatives		SI8.1.2 Social innovations for climate neutrality supported by the public administration	Number of social innovations the public administration supported with consulting, mentoring and funding to start and scale up	Numeric
		SI8.1.3 Social innovations funded with PA business seeding	Number of initiatives funded with business seeding to start a social innovation for climate neutrality	Numeric
6. Enabling/ supporting social innovation initiatives scale-up		SI8.1.4 Sustaining social innovations	How do social innovations for climate neutrality of the city sustain their operations and impact over time? How can the city support innovators sustain their operations to scale their impact toward climate neutrality?	Textual
5. Funding/ supporting community-led initiatives		SI8.1.5 Participation to social innovations for climate neutrality	How many people have joined or co-created initiatives for climate neutrality through the city's initiatives?	Numeric
		SI8.1.6 Assessing the impact of social innovations for climate neutrality	How does the city measure the impact of the social innovations it supports or it has co-created? Which are the main learnings from measuring the impacts?	Textual

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
		SI8.1.7 Inclusion of minorities	To what extent does the city promote participation among women, people with disabilities and minorities to social innovation for climate neutrality initiatives promoted by the public administration?	Textual
		SI8.1.8 Targeting minorities	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?	Textual
6. Enabling/ supporting social innovation initiatives scale-up		SI3.1.1 Funds for incubating and accelerating social innovations for climate neutrality	Amount of funds the city invests yearly for incubating and accelerating social innovations for climate neutrality	Numeric (monetary)
		SI8.2.1 Beneficiaries of mentoring or scaling program of social innovation for climate neutrality	Number of beneficiaries who attended a scaling or mentoring program of social innovation for climate neutrality	Numeric
		SI8.2.2 SI initiatives for climate sustainability funded for scaling	Number of high-potential social innovation initiatives for climate sustainability funded for scaling (an already established social innovation)	Numeric

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
		SI8.2.3 Most successful social innovation initiatives for climate neutrality	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)	Textual
		SI8.2.4 Social innovations replication	Proportion of Social innovation initiatives for climate sustainability r replicated in other contexts, out of the number of SI initiatives joining the mentoring programme	Numeric (%)
	9. Co-creation and cross-sector partnerships	SI9.1.1 Cross-sector partnerships for climate neutrality	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	Numeric

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
		SI9.1.2 Cross-sector partnerships' contribution to climate neutrality	Which cross-sector partnerships and public–private partnerships have been developed in the city to boost climate neutrality through social innovation? Which 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	Textual
4. Co-creation of social innovation initiatives with citizens		SI9.2 Social innovation initiatives co-created by the PA to address climate neutrality	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?	Textual
9. Urban planning for social innovation 10. Resource circularity	10. Systemic innovation approaches which include social innovation	SI10.1 Systemic change	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.)?	Textual

(continued)

Table 4.1 (continued)

Category	Action	Indicators	Indicator description	Type of data
		SI10.2 Social Innovation impact on climate neutrality	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)	Textual
Impact		SI10.3 Wellbeing derived from SI initiatives	How has the wellbeing of citizens and urban stakeholders changed as a consequence of social innovation policies and initiatives developed by the public administration? What still need to be addressed?	Textual

and socioeconomic impact have been for a long time a required and challenging area of research inside SI studies, acknowledged by the research community, policy-makers, social investment funds, practitioners, social entrepreneurs and social innovators themselves. However, there is still a lack of consensus on what are the major and determining methodological tools and indicators involved in its measurement and impact assessment. Despite this difficult task, there are three approaches that can be identified in the academic field which seek to build a system of indicators for SI measurement: 'the individualistic approach', 'the organizational approach' and 'the regional/national approach' (Unceta et al., 2016)."

The structured catalogue of indicators provided in this book offers a first answer to these calls to action for the context of carbon neutrality.

4.4 Future Developments and Applications

In this book we have provided indicators and assessment methods of the social innovation categories of cities' action plan. In order to assess the impact of social innovation, it is necessary to measure which activities lead to which outputs (direct

result), outcomes (intermediate results) and impacts (long-term results). The developed methodology focuses on measuring the effectiveness, efficiency, relevance, replicability, and scalability of the social intervention in the future pilots devising ten categories of interventions ad produced a set of intervention logics and indicators for the general case and for each related category. Next, key indicators have been selected and adapted to cities' needs of progressive evaluation and reflexive learning: such selected core indicators are part of the NetZeroCities comprehensive indicators set.[1]

Over one thousand indicators have been proposed and clustered in this volume. This broad set of indicators can be utilized by cities to select indicators relevant for their specific local needs, according to their readiness level in terms of sustainability and social innovation. The core indicators are currently being utilized in the NetZeroCities project and refined through testing with cities, adapting them according to the feedback provided by the co-design of impact assessment framework with each pilot city of the project. From this pragmatic application, several important theoretical implications can be derived: the developed social innovation evaluation framework provides scholars with a solid and comprehensive assessment methodology. Results of assessments based on the framework, through the indicators, can support scholars testing hypotheses and theory of change models, in addition to providing evidence-based design guidelines for selecting people-centred solutions to reach climate neutrality in cities.

Policy makers, civil servants, public administrators, service designer and relevant stakeholders can be informed by the results of applying the social innovation assessment framework.

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