



Horizon 2020
Programme

NetZeroCities

Research and Innovation Action (RIA)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036519

Start date : 2021-10-01 Duration : 48 Months
<https://netzerocities.eu/>



Report on Indicators & assessment methods for social innovation action plans

Authors : Mrs. Francesca RIZZO (POLIMI), Francesco Mureddu, Sabrina Bresciani

NetZeroCities - Contract Number: 101036519

Project officer: Mirjam WITSCHKE

Document title	Report on Indicators & assessment methods for social innovation action plans
Author(s)	Mrs. Francesca RIZZO, Francesco Mureddu, Sabrina Bresciani
Number of pages	94
Document type	Deliverable
Work Package	WP2
Document number	D2.7
Issued by	POLIMI
Date of completion	2022-09-27 11:26:44
Dissemination level	Public

Summary

This report presents the rationale, framework, methodology and instruments to evaluate the impact of the social innovation categories of the action plans in thirty selected NZC project pilot cities. It specifies the importance of social innovation in Net Zero Cities, the intervention logics, indicators, metrics and tools for data collection and data analysis at both the general action plan level and that of the individual social innovation initiatives. Specifically, the developed methodology focuses on measuring the effectiveness, efficiency, relevance, replicability, and scalability of the social intervention in the future pilots devising 10 categories of interventions and produced a set of intervention logics and indicators for the general case and for each related category. Further, the research team mapped to the general case and to each category the indicators elaborated in existing evaluation frameworks. The next step of the work will be to select and adapt the indicators to the city cases.

Approval

Date	By
2022-09-27 11:29:45	Mrs. Ghazal ETMINAN (AIT)
2022-10-11 20:44:27	Mr. Thomas OSDoba (CKIC)



NET ZERO CITIES

Report on Indicators & assessment methods for social innovation action plans Deliverable D2.7

Version N°1

Authors: Francesco Mureddu (POLIMI), Sabrina Bresciani (POLIMI)



This project has received funding from the H2020 Research and Innovation Programme under the grant agreement n°101036519.

Disclaimer

The content of this deliverable reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.



This project has received funding from the H2020 Research and Innovation Programme under the grant agreement n°101036519.

Document Information

Grant Agreement Number	101036519
Project Title	NetZeroCities
Project Acronym	NZC
Project Start Date	01 October 2021
Related Work Package	WP2
Related Task(s)	Task 2.2.4
Lead Organisation	Polytechnic University of Milan
Submission Date	30 September 2022
Dissemination Level	Public

History

Date	Submitted by	Reviewed by	Version (Notes)
4 March 2022	Francesco Mureddu	POLIMI Team	ToC
25 June 2022	Francesco Mureddu	POLIMI Team	0.5
11 March 2022	Francesco Mureddu	AIT	ToC
11 September 2022	Francesco Mureddu	AIT	1



Table of contents

1	Introduction	9
1.1	Purpose of the document	9
1.2	Relation to other project work.....	10
1.3	Structure of the document	10
2	Social innovation in Net Zero Cities	10
2.1	Impact Assessment Framework Methodology	10
2.2	Social innovation case studies	10
2.3	Social innovation and sustainability	21
2.4	Social innovation action plans examples	22
3	Social innovation categories of the action plan	25
3.1	Social Innovation Intervention Logic	32
3.2	Category 1 Intervention Logic: SI capacity building of public officials and policy makers	33
3.3	Category 2 Intervention Logic: SI skills of citizens and urban stakeholders	34
3.4	Category 3 Intervention Logic: Co-design of policies with social innovators and urban stakeholders	34
3.5	Category 4 Intervention Logic: Co-creation of social innovation initiatives with citizens and urban stakeholders	35
3.6	Category 5 Intervention Logic: Funding/supporting community-led initiatives and small-scale pilots/experimentations.....	36
3.7	Category 6 Intervention Logic: Enabling/supporting social innovation initiatives scale-up beyond pilots	36
3.8	Category 7 Intervention Logic: Testing and prototyping new funding mechanisms	37
3.9	Category 8 Intervention Logic: Public procurement of social innovation services for sustainability	37
3.10	Category 9 Intervention Logic: Urban planning for systemic social innovation	38
3.11	Category 10 Intervention Logic: Systemic resource circularity	38
4	Evaluation approach.....	39
4.1	Background from scientific research and projects	39
4.1.1	Framing the context of energy transitions	40
4.1.2	Framing Social Innovation.....	42
4.1.3	Toward A Multi-Disciplinary Systematic Framework of Social Innovation for Climate Change	46
4.2	Impact measurement and evaluation approach.....	48
4.2.1	Evaluation questions and indicators in the general case	49
4.2.2	Evaluation questions and indicators for category 1: SI capacity building of public officials and policy makers	52
4.2.3	Evaluation questions and indicators for category 2: SI skills of citizens and urban stakeholders	55
4.2.4	Evaluation questions and indicators for category 3: Co-design of policies with social innovators and urban stakeholders	58



4.2.5	Evaluation questions and indicators for category 4: Co-creation of social innovation initiatives with citizens and stakeholders.....	61
4.2.6	Evaluation questions and indicators for category 5: Funding/supporting community-led initiatives and small-scale pilots/experimentations	65
4.2.7	Evaluation questions and indicators for category 6: Enabling social innovation/entrepreneurship initiatives scale-up beyond pilots.....	68
4.2.8	Evaluation questions and indicators for category 7: Testing and prototyping new funding mechanisms	71
4.2.9	Evaluation questions and indicators for category 8: Public procurement of social innovation services for sustainability	73
4.2.10	Evaluation questions and indicators for category 9: Urban planning for social innovation	76
4.2.11	Evaluation questions and indicators for category 10: Resource circularity	81
4.2.12	Generic Indicators	85
5	Conclusion.....	90
	Bibliography.....	91

List of figures

<i>Figure 1: Taiwan Social Innovation Action Plan</i>	<i>22</i>
<i>Figure 2: Montreal Action Plan/1</i>	<i>23</i>
<i>Figure 3: Montreal Action Plan/2</i>	<i>23</i>
<i>Figure 4: British Columbia Social Innovation Action Plan.....</i>	<i>24</i>
<i>Figure 5: SI Component of the Action Plan Process Building Blocks.....</i>	<i>24</i>
<i>Figure 6: NZC Theory of Change – Overall Structure and Its Essential Elements (developed in D2.14)</i>	<i>25</i>
<i>Figure 7: NZC Social Innovation Impact Pathways (developed in D2.14)</i>	<i>25</i>
<i>Figure 8: WP2 Overall Framework (developed in D2.4)</i>	<i>26</i>
<i>Figure 9: SI categories mapped on the NZC Climate Transition Map.....</i>	<i>32</i>
<i>Figure 10: Basic intervention logic.....</i>	<i>32</i>
<i>Figure 11: General Intervention Logic</i>	<i>33</i>
<i>Figure 12: Intervention logic for the category “SI capacity building of public officials and policy makers”</i>	<i>34</i>
<i>Figure 13: Intervention logic for the category “SI skills of citizens and urban stakeholders”</i>	<i>34</i>
<i>Figure 14: Intervention logic for the category “Co-design of policies with social innovators and urban stakeholders”</i>	<i>35</i>
<i>Figure 15: Intervention logic for the category “Co-creation of social innovation initiatives with citizens and urban stakeholders”</i>	<i>35</i>
<i>Figure 16: Intervention logic for the category “Funding/supporting community-led initiatives and small-scale pilots/experimentations”</i>	<i>36</i>
<i>Figure 17: Intervention logic for the category “Enabling/supporting social innovation initiatives scale-up beyond pilots”</i>	<i>37</i>
<i>Figure 18: Intervention logic for the category “Testing and prototyping new funding mechanisms”</i>	<i>37</i>
<i>Figure 19: Intervention logic for the category “Public procurement of social innovation services for sustainability”</i>	<i>38</i>
<i>Figure 20: Intervention logic for the category “Urban planning for systemic social innovation”</i>	<i>38</i>
<i>Figure 21: Intervention logic for the category “Systemic resource circularity”</i>	<i>39</i>
<i>Figure 22: Socio-technical System Elements.....</i>	<i>41</i>
<i>Figure 23: SI Drive framework adapted from Howaldt et al. (2017).....</i>	<i>43</i>
<i>Figure 24: The SIMRA framework by Secco et al 2017</i>	<i>45</i>
<i>Figure 25: A comprehensive framework of Social Innovation for Climate Change.....</i>	<i>47</i>



Figure 26: Impact assessment metric development process.....	49
--	----

List of tables

Table 1 Outline of the case studies developed in D9.1	10
Table 2: NZC Theory of Change for Interventions in Social Innovation (developed in D2.14).....	26
Table 3: Social Innovation Categories of the Action Plan	27
Table 4: Mapping of Case Studies Against Social Innovation Categories.....	30
Table 6: Input/Output/Outcome Indicators (own elaboration).....	50
Table 7: Evaluation Questions and Indicators of Effectiveness (own elaboration)	50
Table 8: Evaluation Questions and Indicators of Efficiency (own elaboration).....	51
Table 9: Evaluation Questions and Indicators of Relevance (own elaboration).....	51
Table 10: Evaluation Questions and Indicators of Replicability (own elaboration)	52
Table 11: Evaluation Questions and Indicators of Scalability (own elaboration).....	52
Table 12: Input/Output/Outcome Indicators (own elaboration).....	52
Table 13: Evaluation Questions and Indicators of Effectiveness (own elaboration)	53
Table 14: Evaluation Questions and Indicators of Efficiency (own elaboration).....	54
Table 15: Indicators from Existing Frameworks	54
Table 16: Input/Output/Outcome Indicators (own elaboration).....	55
Table 17: Evaluation Questions and Indicators of Effectiveness (own elaboration)	55
Table 18: Evaluation Questions and Indicators of Efficiency (own elaboration).....	56
Table 19: Indicators from Existing Frameworks	57
Table 20: Input/Output/Outcome Indicators (own elaboration).....	58
Table 21: Evaluation Questions and Indicators of Effectiveness (own elaboration)	58
Table 22: Evaluation Questions and Indicators of Efficiency (own elaboration).....	59
Table 23: Indicators from Existing Frameworks	60
Table 24: Input/Output/Outcome Indicators (own elaboration).....	61
Table 25: Evaluation Questions and Indicators of Effectiveness (own elaboration).....	62
Table 26: Evaluation Questions and Indicators of Efficiency (own elaboration).....	63
Table 27: Indicators from Existing Frameworks	64
Table 28: Input/Output/Outcome Indicators (own elaboration).....	65
Table 29: Evaluation Questions and Indicators of Effectiveness (own elaboration)	66
Table 30: Evaluation Questions and Indicators of Efficiency (own elaboration).....	67
Table 31: Indicators from Existing Frameworks	68
Table 32: Input/Output/Outcome Indicators (own elaboration).....	68
Table 33: Evaluation Questions and Indicators of Effectiveness (own elaboration).....	69
Table 34: Evaluation Questions and Indicators of Efficiency (own elaboration).....	70
Table 35: Indicators from Existing Frameworks	71
Table 36: Input/Output/Outcome Indicators (own elaboration).....	71
Table 37: Evaluation Questions and Indicators of Effectiveness (own elaboration)	71
Table 38: Evaluation Questions and Indicators of Efficiency (own elaboration).....	72
Table 39: Indicators from Existing Frameworks	73
Table 40: Input/Output/Outcome Indicators (own elaboration).....	73
Table 41: Evaluation Questions and Indicators of Effectiveness (own elaboration)	74
Table 42: Evaluation Questions and Indicators of Efficiency (own elaboration).....	75
Table 43: Indicators from Existing Frameworks	76
Table 44: Input/Output/Outcome Indicators (own elaboration).....	76
Table 45: Evaluation Questions and Indicators of Effectiveness (own elaboration)	77
Table 46: Evaluation Questions and Indicators of Efficiency (own elaboration).....	78
Table 47: Indicators from Existing Frameworks	80
Table 48: Input/Output/Outcome Indicators (own elaboration).....	81
Table 49: Evaluation Questions and Indicators of Effectiveness (own elaboration)	81



Table 50: Evaluation Questions and Indicators of Efficiency (own elaboration)..... 83
Table 51: Indicators from Existing Frameworks 84
Table 52: General Evaluation for Initiatives 85
Table 53: Summary Table on the number of Indicators 89
Table 54: Exemplary application of the template 90



Abbreviations and acronyms

Acronym	Description
WP	Work Package
ESS	Ecosystem Services
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 marginalised rural areas

Summary

This report presents the rationale, framework, methodology and instruments to evaluate the impact of the social innovation categories of the action plans in thirty selected NZC project pilot cities. It specifies the importance of social innovation in Net Zero Cities, the intervention logics, indicators, metrics and tools for data collection and data analysis at both the general action plan level and that of the individual social innovation initiatives. Specifically, the developed methodology focuses on measuring the effectiveness, efficiency, relevance, replicability, and scalability of the social intervention in the future pilots devising 10 categories of interventions and produced a set of intervention logics and indicators for the general case and for each related category. Further, the research team mapped to the general case and to each category the indicators elaborated in existing evaluation frameworks. The next step of the work will be to select and adapt the indicators to the city cases.

Keywords

Social innovation action plan, social innovation, impact assessment, environmental sustainability



1 Introduction

The aim of this introductory section is to give the reader a global overview of the Net Zero Cities project, in order to make the document self-contained.

NetZeroCities aims to support Europe and in particular 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 recognises the need for cities to develop specific strategies that are tailored to suit local and regional contexts, and will support them 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 and hands-on support through several programmes. Specific objectives of the project are the following:

- Develop an approach to support climate-neutral transformation in cities
- Help cities build capabilities and ways of working to advance systemic change using innovation
- Forge a platform for cities to use for all services & expertise critical to climate neutrality
- 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 & Social Innovation Action Plans. 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 social innovation action plans, part of the Climate-neutral City Contracts, and the stemming social innovation initiatives. This is the scope of the document.

1.1 Purpose of the document

In order to measure the impact of the social innovation component of action plans and the stemming social innovation initiatives in the NZC selected cities and pilots, this document defines an impact assessment framework, methodology and instruments directly linked to the plans and the future pilots, their specificities and the experimentation that will take place. This document answers the following key questions:

- What are the foreseen activities and results of the social innovation action plans and the stemming social innovation initiatives?
- What are suitable evaluation criteria to assess the impact of the social innovation action plans and the stemming social innovation initiatives?
- What indicators need to be measured in order to operationalise the evaluation criteria across the pilots' intervention logic?

The specific steps carried out for the development of the evaluation framework are the following:

1. Development of SI part of the action plans intervention categories and relative explanation building on the NZC pilot impact pathways and theory of change;
2. Mapping of those categories with respect to social innovation initiatives at city level taken from WP9 cases and literature;
3. Taking inspiration also from the social innovation action plans (SIAP) developed in other context even if not aimed at increasing sustainability;
4. Development of intervention logics for the general plan and for each category of intervention;
5. Starting from the intervention logics, development of a set of indicators to be integrated with the ones found in the literature both for the general plan and for each category of intervention.



1.2 Relation to other project work

This deliverable has several links with different parts of the NZC project. A first link is with Task 1.5, which provides the definition and description of the social innovation plan for cities to be developed within the scope of the project. Likewise important is the link with T9.1 which will extract, map and systematise cases of effective social innovation initiatives for climate neutrality. Further, the intervention logics developed within the scope of the project will have to be in line with the general theory of change elaborated in WP2, and the indicators produced (and therefore criteria and evaluation questions) will have to be integrated with the different categories of indicators elaborated in T2.2.

1.3 Structure of the document

Section 2 presents the rationale for social innovation in Net Zero Cities, especially concerning the relationship between social innovation initiatives and environmental sustainability. Section 3 describes the general intervention logic of the NZC social action plan and those of a set of specific initiatives. 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. Section 4 then moves on to develop criteria, evaluation questions, indicators and sources, as well as validation methods. Section 5 specifies the data collection and analysis of the data to be collected using the aforementioned methods. The concluding section 6 lays out the main steps and guidelines for the implementation of the framework in the pilots.

2 Social innovation in Net Zero Cities

2.1 Impact Assessment Framework 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 10 categories (clustered in four themes), according to which intervention logics for social innovation are derived and presented in Section 3. Specific indicators for each of the 10 categories will be presented in Section 4.

2.2 Social innovation case studies

In WP9.1, 36 Social Innovation case studies are developed and analysed in T9.1 (D9.1 forthcoming). We report here the abstracts and short descriptive titles for each case, which provides the grounding for the bottom-up categorization of social innovation categories to build the evaluation framework, presented in the following section 3.

Table 1 Outline of the case studies developed in D9.1

Case title	City/Nation	Initiative
1.5 degree lifestyles	Finland	Climate app
Agroecology	France	Training program
Applause	Ljubljana, Slovenia	Systemic approach
Better Reykjavik	Reykjavik, Island	Online platform
Blok 19	Zagreb, Croatia	Collaborative renewal program
Bologna's Citizen Collaboration Pacts	Bologna, Italy	Collaborative policy making
Brainport Smart District	Helmond, Netherland	Participatory smart city district
Children ride sharing service	Helsinki, Finland	Ride sharing initiative from school to football training



City Experiment Fund	Europe and Central Asia	City councils applying systems thinking to explore new approaches for urban transformation
City Studio Program	Spanish Cities	City-University collaboration: students are given scholarships to design solutions for sustainable urban transformation as part of their thesis
Clean Cities ClimAccelerator	Vienna, Austria & Madrid, Spain	Accelerator program for high impact and high growth cleantech startups that help cities achieve climate neutrality through system-level innovations
Climate Meal	Helsinki, Finland	Tools to help restaurants be more aware of, calculate and communicate about carbon footprint + labels to help consumers identify it
Climate Quarter Project		Co-creation of a residential quarter where essential services are within 15-min reach for low-carbon mobility
Cloughordan Ecovillage	Ireland	Community of environmentalists created and eco-village
Ecohouse Antwerp	Antwerp, Belgium	Workshops and advice for sustainable building and living; bringing together climate action and social cohesion
Collaboration for a fair energy transition in Zagreb	Zagreb, Croatia	Partnership to map energy-poor households, assess energy needs, educate on energy use and implement low-cost energy efficiency measures
El Día Después	Spanish cities	Multistakeholder platform for action toward climate neutrality - creating collectives who develop ideas and plans (workshops, co-lab)
Elektrizitätswerke Schönau (EWS)	Germany	Nuclear- and coal-free energy supply belonging to citizens
Entrepatisos – Las Carolinas	Madrid	Ecologic cohousing
EVA – maakt het plantaardig	Ghent, Belgium	Cooking and awareness activities to promote plant-based diets
Green Squares	Niš, Serbia	Collaborative design of solutions to improve air quality in local communities
Just transition listening platform	Northern Spain	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
KLIK (Križevci Climate Innovation Laboratory)	Križevci, Croatia	Cooperative to engage citizens in the energy transition, implement actions and help make the city energy sufficient
Nappi Naapuri (Nifty Neighbor)	Finland	Social web service to create a neighborhood with increased social wellbeing and participation
Paris: 15-minute city	Paris, France	Daily necessities can be accomplished in 15 minutes walking/cycling
PentaHelix	5 countries	Establishment of regional task forces to empower local and regional authorities to develop and implement actions for energy and climate neutrality
Play!UC	Netherlands, Belgium, Austria	games that raise awareness on urban carbon footprint and help trigger behavioral change in young adults
Real Junk Food	Berlin, Germany	Workshops and courses to raise awareness on food waste and new sustainable food systems
Smart House Training Program	Tartu, Estonia	Training programs to spark behavioral change for smart house and smart city living



Synathina platform	Athens, Greece	City social innovation platform to collect and support execution of citizen ideas and projects for better city life
Superblocks (Vitoria-Gasteiz)	Vitoria-Gasteiz, Spain	Participatory approach to reorganize the city into superblocks, car-free areas that maximise public space for new social uses
SONNET – The Bristol City Lab	Bristol, UK	Crowdfunding to collectively raise capital to install energy efficiency measures in local community buildings engaging building managers
SONNET - Mannheim City Lab	Mannheim, Germany	Living lab for the development of a neighbourhood with migration background
Ulisse	Italy	Digital platform of cultural and experiential activities for deaf people (inactive)
Valencia Local Energy Communities	Valencia, Spain	The Valencia City Council is promoting Local Energy Communities giving legal advice to neighbours communities and providing different private and public experiments guarantee the inclusive access.
Viable Cities	Sweden	Innovation program building a mission infrastructure to support new forms of governance, citizen engagement, cooperation, policy development, etc. to accelerate the climate transition
You Decide	Braga, Portugal	You Decide participatory budgeting for youth and project development support
Zklaster	Poland	Establishment of energy clusters to build an independent, local energy market and accelerate the energy transition in the region

Title	1.5 degree lifestyles
One-liner	City application to calculate individuals' carbon footprint and suggest behavior changes for more sustainable living
Abstract	Finnish cities have been experimenting with a vision of sustainable living. 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 were calculated at the project start and the development was monitored over time.
Keywords	<i>Gamification, climate apps, behavioural change</i>

Title	Agroecology
One-liner	Promotion and training on agroecology and its application to support the transition to more sustainable farming practices and change in production model
Abstract	Terre & Humanisme promotes agroecology as an approach and trains people in its application in order to support the transition to more sustainable farming practices. The association 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: 1. Raising Awareness: To share agroecology (and its practices) as an approach and promote its adoption as a fundamental contribution towards safer, more equitable and climate-positive food systems.



	<p>2. Transmit: Training modules and internships on various themes according to a pedagogy that reconciles theoretical requirements and humanist practice. Technical support on agroecological practices to specific projects for a wide range of clients.</p> <p>3. Network and Community Support: The association has forged long-term partnerships with local organisations in their project areas to support thousands of farmers and citizens in their projects to disseminate agroecology (with technical, methodological and financial support). Support of a network of ambassadors throughout France trained in the Agroecological approach and its dissemination.</p>
Keywords	<i>Agroecology, Production models, Support programmes, Agricultural training, Awareness-raising</i>

Title	Applause
One-liner	Collaborative, educational and awareness-raising project to find solutions to invasive alien plant species in cities
Abstract	<p>Applause is a project led by the city of Ljubljana, Slovenia aiming to find solutions to invasive alien plant species (IAPS) in cities. Ljubljana is applying a zero-waste and circular economy principle to deal with this harmful plant species.</p> <p>Ljubljana is moving from a linear model for managing IAPS to a circular one that is valuable for the entire ecosystem. This process involves six steps: plant identification, biomass harvest, processing & storage, value recovery, final production, and new products & services to market.</p> <p>Through a variety of educational and awareness-raising actions, citizens are encouraged to participate in different stages of APPLAUSE circular model. To do so, Ljubljana implements a participatory model that adapts to the needs and interests of different target groups.</p>
Keywords	<i>Circular economy; zero-waste; city-led; IAPS</i>

Title	Better Reykjavik
One-liner	Innovative online platform to crowdsource solutions to urban challenges that has multiple democratic function and is the umbrella for several city programs
Abstract	<p>Better Reykjavik is an online platform for the crowdsourcing of solutions to urban challenges launched in May 2010. Better Reykjavik is a co-creation project of the Citizens Foundation, Reykjavik City and its citizens that connects them and improves trust and policy. It's a platform for crowdsourcing solutions to urban challenges and has multiple democratic functions: Agenda setting, Participatory budgeting and Policymaking. Innovations include unique debating system, crowd-sourcing, submission of multimedia content and extensive use of AI to improve the user experience as well as content submitted. 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 is called "Your Voice". Over 20% of the population of the City regularly uses the platform, which has over 27,000 registered users, primarily for participatory budgeting.</p>
Keywords	<i>Online platform, urban, co-creation, democratic</i>

Title	Blok 19
One-liner	Blok 19 Renewal Program in Zagreb
Abstract	<p>Collaborative city initiative to conduct studies for an inclusive and climate-friendly renovation of the historical centre. Programme of comprehensive renewal of the historical centre of Zagreb was a pilot project that did studies on an area of Zagreb called "Blok 19". The idea came after the devastating earthquake that hit the City of Zagreb. It was clear that a fast renovation needs to be done, but the City wanted to go step further and make the renovation inclusive, meaning that not only the needed renovation would be done, but instead measures for climate change mitigation and adaptation would be included. Altogether 12 sectorial studies were made, followed by the opening of the process of public consultation, after which the Mayor Invited all experts and citizens to participate in the development of the final document. Besides</p>



	the experts, the most important participants in the process were the inhabitants of the buildings in the Blok 19 and the people who work in the area.
Keywords	<i>Inclusive renovation, earthquake, climate change mitigation and adaptation measures, sectoral studies, experts</i>

Title	Bologna's Citizen Collaboration Pacts
One-liner	Participatory approach to policymaking to create a collaborative city; platform to co-design projects for urban development
Abstract	The Participatory Budget in the city of Bologna is the result of a political process that involved bottom-up and top-down measures with the aim of creating a collaborative city. It provides a platform for citizens to co-design community projects through collaborative pacts for urban development – in its most recent edition, it was extended to socio-cultural projects, as well. The case provides interesting reflection regarding the adoption of a design for services approach that focuses on (1) the context for interaction and relationship-building between different actors and (2) the gradual adoption by the government of a citizen-centered perspective of (public) value creation.
Keywords	<i>Community assets, urban social innovation, co-creation, territory-making, participatory budget</i>

Title	Brainport Smart District
One-liner	Participatory building of a smart city district with 8 program lines (e.g. social, health, energy, water) that will have low impact and improve quality of life
Abstract	Brainport Smart District (BSD) is a smart city district in the city of Helmond, the Netherlands. The mixed-use district, set on 380 acres, will use 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 not be built according to a set design plan but 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, which can then be used for more enjoyable activities.
Keywords	<i>Participation, health, data, mobility, energy and circularity</i>

Title	Children ride sharing service
One-liner	Ride sharing initiative from school to football training
Abstract	Ride sharing service initiated by local football club PPJ started from an agile pilot and became a permanent activity in the club. School children get a minibus transport from school to football training right after school. This saves time and reduces the amount of trips. Lower price of early practice hours compensates the transportation costs.
Keywords	<i>Transportation, leisure, children, schools, sports</i>

Title	City Experiment Fund
One-liner	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 embarked on an exploration of a new approach to problem solving, which is rooted in systems thinking. The city councils began designing what are called systems thinking portfolios for urban transformation with the support of UNDP Europe and Central Asia.
Keywords	<i>Systems thinking, organisational learning, sensemaking</i>

Title	City Studio Program in Spanish Cities
--------------	--



One-liner	City-University binomios in which 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 they work together to design solutions that contribute to sustainable urban transformation through final master and degree thesis. Each student receives a scholarship to develop their work, and has a double tutor: a university lecturer and a civil servant.
Keywords	<i>Binomios, Final Master/Degree Thesis, Climate Neutrality, Co-Creation, Students</i>

Title	Clean Cities ClimAccelerator
One-liner	Accelerator program for high impact and high growth cleantech startups that help cities achieve climate neutrality through system-level innovations
Abstract	Clean Cities ClimAccelerator is a 9-month accelerator program that targets startups that help cities achieve climate neutrality, particularly through the use and commercialisation of clean technology. The program is focused on system-level innovations and is demand-led, matching startups in an early phase with challenge-owners. 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. In the first, startups are given a funding grant of up to €5k (no equity taken) to focus on making sure the solution fits the challenge, to train and network with other ventures, city representatives and investors (also through specific network events). In the second stage, startups are matched with challenge owners to validate the fit of solutions to the specific challenges. Startups can access a funding grant of up to €20,000 in this stage to develop a proof-of-concept plan. This grant is made in the form of a CLIMA-SAFE Investment Agreement (which is in short, a founder-friendly simple agreement for future equity in exchange for a cash and services investment package). In the last stage, startups are given individual support to access investors and new markets. As a demand-led accelerator, the objective is to create real solutions to real problems. The target is for high-growth projects that already have an existing market footprint and solid team (minimum 2 people) – established or in the process of incorporation, EU SMEs (or global but must establish one in case of becoming a beneficiary).
Keywords	<i>Accelerator; cleantech; urban resilience; sustainability; startup</i>

Title	Climate Meal
One-liner	Tools to help restaurants be more aware of, calculate and communicate about carbon footprint + labels to help consumers identify it
Abstract	The Climate Meal label helps restaurants and their customers to identify meals from the menu that have a smaller-than-average carbon footprint. Restaurants were invited to join the initiative through a campaign by providing them with the Climate Meal label, including tools for calculating the carbon footprint of their dishes, and tools for communication about their commitment. The campaign was run through a project under Forum Virium which is an innovation company owned by the city of Helsinki. City of Helsinki, with its canteen chain Palmia, took part in the campaign.
Keywords	<i>Food service business, climateneutrality, restaurants, SME's, consumers</i>

Title	Climate Quarter Project
One-liner	Co-creation of a residential quarter where essential services are within 15-min reach for low-carbon mobility
Abstract	The goal is to create a residential quarter that prevents the necessity to travel more than 15 minutes to get the most essential goods and services, and therefore reduces the amount of carbon emissions related to transport – the key to averting the so-called heat-island effect. An important aspect of the implementation will be the involvement of citizens and the active cooperation of all parties (city units) to discuss about the problems, vision for the Climate Quarter and future interventions.
Keywords	<i>Carbon neutrality, Mobility, Community engagement</i>



Title	Cloughjordan Ecovillage
One-liner	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; to buy a site on which they could build their lives. The very first residents of the Ireland's first ecovillage moved into their homes in 2009. Today, with 55 low-carbon homes, a carbon-neutral district heating system, a community farm, a green enterprise center, a planned reed-bed treatment plant, a photovoltaic power plant, and Ireland's lowest ecological footprint, the ecovillage is demonstrating different ways to achieve ecological, economic, and social sustainability.
Keywords	<i>Local Community, cooperation, ecovillage, sustainability, low ecological footprint</i>

Title	Ecohouse Antwerp
One-liner	Workshops and advice for sustainable building and living; bringing together climate action and social cohesion
Abstract	Ecohouse is an advice and demonstration centre for sustainable building and living run by the city of Antwerp. Its focus is on energy reduction and using renewable energy. It is open to the general public, with a substantive part of its work focused on more vulnerable groups. It offers workshops and advice on energy retrofitting, as well as both short and long term solutions for saving energy and money.
Keywords	<i>Buildings, Energy Efficiency, Social Economy, One-Stop-Shop, Vulnerable Communities</i>

Title	Collaboration for a fair energy transition in Zagreb
One-liner	Partnership to map energy-poor households, assess energy needs, educate on energy use and implement low-cost energy efficiency measures
Abstract	A partnership between the City Council, NGOs, students and academia aiming at mapping energy-poor households in Zagreb, implementing low-cost energy-efficiency measures, and providing advice on how to reduce energy use.
Keywords	<i>Energy poverty, multi-stakeholder partnership, fair transition, training, capacity building</i>

Title	EI Día Después (EDD)
One-liner	Multistakeholder platform for action toward climate neutrality - creating collectives who develop ideas and plans (workshops, co-lab) to address the SDGs (17)
Abstract	EI día después (EDD) is a multi-stakeholder platform for networks to address the sustainable development goals, specifically SDG 17. There are four communities within this project: environment & health, cooperation & global governance, city transformation, and inequality & new economic model. Within these communities, there are experts and professionals from the field who collaborate to create different services that they believe will create useful change. Through these collectives, lessons can be drawn from meetings that can catalyse and accelerate the transition towards models and systems that support cities, the environment, and global governance.
Keywords	<i>Collaboration; platform; multi-stakeholder</i>

Title	Elektrizitätswerke Schönau (EWS)
One-liner	Nuclear- and coal-free energy supply belonging to citizens
Abstract	In the aftermath of Chernobyl, a handful 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. Today the EWS supplies people throughout Germany with green power and eco-gas and works in various ways towards bringing about the energy revolution.
Keywords	<i>Renewable energy, sustainable, citizens' initiative, electricity, Germany</i>

Title	Entrepatios – Las Carolinas
--------------	------------------------------------



One-liner	Co-design and -management of a nearly zero energy residential building
Abstract	Entrepatios – Las Carolinas” is a nearly zero energy residential building consists of 17 houses, CO2 zero and made of wood, under the Right of Use regime in the Community of Madrid. The first ecological cohousing built in Madrid, nearly zero energy building which operates with the Right of Use of the dwelling, but not ownership of it. the ownership of the co-housing building is cooperative and not private. 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.
Keywords	<i>Green cohousing; Right of Use regime: high energy efficiency; nearly zero energy building; CO2 zero</i>

Title	EVA – maakt het plantaardig
One-liner	Cooking and awareness activities to promote plant-based diets
Abstract	EVA is a bottom-up initiative to promote plant-based diets for the environment through cooking & awareness. EVA believes that, on average, plant-based products have the greatest overall positive impact on the well-being of people, animals and the planet. All activities are not only about information but about tasting, discovering and cooking. Working also on a larger scale with company restaurants, hospitals and schools through guidance at institutional kitchens for large-scale impact.
Keywords	<i>Plant-based, food, cooking, climate, social work</i>

Title	Green Squares
One-liner	Collaborative design of solutions to improve air quality in local communities
Abstract	Improving air quality through community collaboration. The Green Squares project aims to support the local communities in climate action by piloting a model for joint engagement of residents, students, local artists and civil society in a collaborative process of co-designing solutions for neglected urban pockets in line with particular needs of local communities. The goal of the project is for communities to collaboratively design micro public spaces to improve air quality in Niš.
Keywords	<i>Collaborative co-design, Air quality, Community-building, Oasis Game</i>

Title	Just transition listening platform
One-liner	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 in accordance with the SDGs
Abstract	Listening platform to transform the process of closing the coal-fired power plants into new green economy opportunities. 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 are: the ecosystem (3 promoters organizations) based on social innovation approach (new forms of diagnosis, co-creation, sense-making, prototypes), and an interconnected portfolio of initiatives.
Keywords	<i>Just transition; listening; co-creation; coal-fired power plants; economic recovery</i>

Title	KLIK (Križevci Climate Innovation Laboratory)
One-liner	Cooperative to engage citizens in the energy transition, implement actions and help make the city energy sufficient
Abstract	Energy cooperative KLIK (Križevci Climate Innovation Laboratory), was founded 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.
Keywords	<i>Self-sufficient city, citizen engagement, technology implementation, joint creation, capacity building</i>



Title	Nappi Naapuri (Nifty Neighbor)
One-liner	Social web service to create a neighborhood with increased social wellbeing and participation
Abstract	Nifty Neighbor is a non-profit, map and location based social web service. It aims to create contemporary neighborhood where you can meet people near you, ask and get help, employ each other and create projects together. Nifty Neighbor aim is to increase social wellbeing and participation in the society.
Keywords	<i>Neighbor, Social, Map, Wellbeing, Sharing economy</i>

Title	Paris: 15-minute city
One-liner	Daily necessities can be accomplished in 15 minutes walking/cycling
Abstract	Urban planning concept in which most daily necessities can be accomplished by either walking or cycling from residents' homes in 15 minutes maximum.
Keywords	<i>Urban development, urban mobility, walking, cycling, Paris</i>

Title	PentaHelix
One-liner	Establishment of regional task forces to empower local and regional authorities to develop and implement actions for energy and climate neutrality
Abstract	PentaHelix project aimed to empower local and regional authorities to find innovative and cost-effective approaches to develop, finance, implement and improve sustainable energy and climate action plans (SECAP) that contribute to reaching national and European climate and energy goals and policies. 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: • Public authorities • Industry • Academia • NGOs • Citizens.
Keywords	<i>Pentahelix, SECAP, stakeholders, EU climate and energy goals and policies</i>

Title	Play!UC
One-liner	Playing with Urban Complexity. Engaging games that raise awareness on urban carbon footprint and help trigger behavioral change in young adults
Abstract	Using co-located serious games to reduce the urban carbon footprint among young adults” aims 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.
Keywords	<i>Urban Complexity, Serious Games, Participatory Processes, Co-Creation, Gamification</i>

Title	Real Junk Food Berlin
One-liner	Workshops and courses to raise awareness on food waste and new sustainable food systems
Abstract	Real Junk Food Berlin is part of the international organization The Junk Food Project that aims to raise awareness around the topic of food waste and new sustainable food systems. Their activities include the use of food that would otherwise go to waste and the conduction of workshops and courses sharing ways to avoid food waste.
Keywords	<i>Fighting food waste, sustainable food systems, pay-as-you-feel, movement, awareness</i>

Title	Smart House Training Program
One-liner	Training programs to spark behavioral change for smart house and smart city living
Abstract	The core idea of the experiment is the fact that a city is not made smart only through applying smart solutions but by also cultivating smart citizens. The training program was developed to encourage pilot area residents to learn from each other by training



	so-called Ambassadors in every pilot area building who would be able to help and support their neighbors in various aspects of smart house and smart city living.
Keywords	<i>Learning; Smart solutions; Behavioural change; Ambassadors; Training program</i>

Title	Synathina platform
One-liner	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.
Keywords	<i>Citizen engagement, Partnerships, Participation, Digital</i>

Title	Superblocks (Vitoria-Gasteiz)
One-liner	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.
Keywords	<i>Urban mobility, social innovation, SUMP, urban planning</i>

Title	SONNET – The Bristol City Lab
One-liner	Crowdfunding to collectively raise capital to install energy efficiency measures in local community buildings engaging building managers
Abstract	In its SONNET City Lab, Bristol City Council searched for ways to make use of crowdfunding as an investment activity to collectively raise capital to install energy efficiency measures in local community buildings. The Bristol municipality, working with the Bristol Energy Network, engaged building managers to assess the costs and energy-related savings associated with energy efficiency works in community buildings. They then investigated the possibility of using a Community Municipal Bond (CMB) mechanism to fund this work. Finally, the City Lab conducted a survey among citizens to see the level of interest in this type of investment.
Keywords	<i>Crowdfunding, Community Municipal Bond, surveys, community buildings, energy efficiency measures</i>

Title	SONNET - Mannheim City Lab
One-liner	City Lab on Social Innovation in Energy Transitions (SONNET) in Mannheim. Living lab for the development of a neighbourhood with migration background
Abstract	The city of Mannheim developed and implemented a city lab (“living lab” approach) to mobilise citizens for the development of the neighbourhood Neckarstadt-West; a neighbourhood with many residents with migration background, where language barriers posed a challenge to the city to engage with citizens for energy transition efforts. The city lab entailed mobile participation containers, gamification with apps, and explored measures for the neighbourhood such as energy role model flats, a neighbourhood fund (crowdfunding) for energy efficiency measures, and more.
Keywords	<i>Social Innovation, energy efficiency, behaviour change, citizen engagement, vulnerable groups</i>

Title	Ulisse
One-liner	Digital platform of cultural and experiential activities for deaf people



Abstract	Ulisse is the first ever European digital platform that creates, markets and promotes local travel experiences and full holiday bundles designed for deaf people by deaf people.
Keywords	<i>Deaf community, travel, local experience, class, sign language</i>

Title	Valencia Local Energy Communities
One-liner	Valencia promotes Local Energy Communities
Abstract	The Valencia City Council is promoting Local Energy Communities giving legal advice to neighbours 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 and assuming a fee payment in Energy Communities located in vulnerable areas. Template of legal form (Association) and facilitation workshops to create the Energy Community.
Keywords	<i>Local Energy Communities, Energy policy, Energy co-production, prosumer</i>

Title	Viable Cities
One-liner	Innovation program building a mission infrastructure to support new forms of governance, citizen engagement, cooperation, policy development, etc. 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 mission means that cities' climate transition should take place from a broad perspective, where social, ecological and economic sustainability is taken into account. By leading the way in the transition, through co-creation and learning with cities and actors in other countries and at international level, the programme strives to fulfil the vision that Sweden inspires and has a leading role in the energy and climate transition through climate-neutral and sustainable cities.
Keywords	<i>Climate transition, city, systemic, mission-driven, quadruple helix</i>

Title	You Decide participatory budgeting
One-liner	You Decide participatory budgeting for youth and project development support
Abstract	You Decide [Tu Decides] is a participatory budget for youth. It allows young people to develop and vote upon which projects they would like to see completed in their city. The winning young citizens get to also implement the project under the supervision and support of the municipality.
Keywords	<i>Participatory budgeting, Youth, Democratic Innovation, Participation, Empowerment</i>

Title	Zklaster
One-liner	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 the most successful energy clusters in Poland. 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. The agreement was initiated by the Powiat Starosty Board in Zgorzelec. The role of the Committee is to work for the transformation of the coal region, in accordance with the requirements of national and international law, in cooperation with the European Commission under the "'Platform for Coal Regions in Transition"'.
Keywords	<i>Participatory Incubation and Experimentation, Renewable Energy Cooperatives, Coal Exit</i>



2.3 Social innovation and sustainability

According to scientific literature (reviewed in more details in section 4.1 based on a systematic literature review), 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 (2 articles) and (b) behavior change (4 articles), to (c) the systemic consideration of socio-technical systems (6 articles) and (d) empowerment (9 articles), which (e) influence wellbeing (3 articles).

At the most basic level, it was outlined that if there is no *acceptance* by organizations (in particular, incumbent firms), local governments, citizens and the various actors, energy transitions will fail (Nakano et al. 2018; Gregg et al., 2020). Social innovations can provide a relevant contribution for climate neutrality by bringing *behavioural change* toward more sustainable practices (Schanes et al., 2016, Grottera et al., 2020; Loyarte-López et al., 2020; Mukai et al., 2022). Schanes et al. (2016: 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 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 reviewed 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, Hekkert & Jacobsson, 2008: 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, Berton and Meadowcroft (2016: 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, Kemp and Velter (2020) published a theoretical paper with the eloquent title “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” (pg. 1270). They outline that sustainable development needs collective action for creating new systems, which in turn requires social innovation. Furthermore citizens need to take up a new role for finding and sustaining new business models for a circular economy (Diepenmaat, Kemp & Velter, 2020). Wuebben et al. (2020: 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” (pg. 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. Also 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” (pg. 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” (pg. 36) which seem relevant for classifying social innovations, in particular for the context of the circular economy.

2.4 Social innovation action plans examples

Very few social innovation action plans developed in the world. The following cases have been collected and analysed (Figure 1Figure 2Figure 3Figure 4).

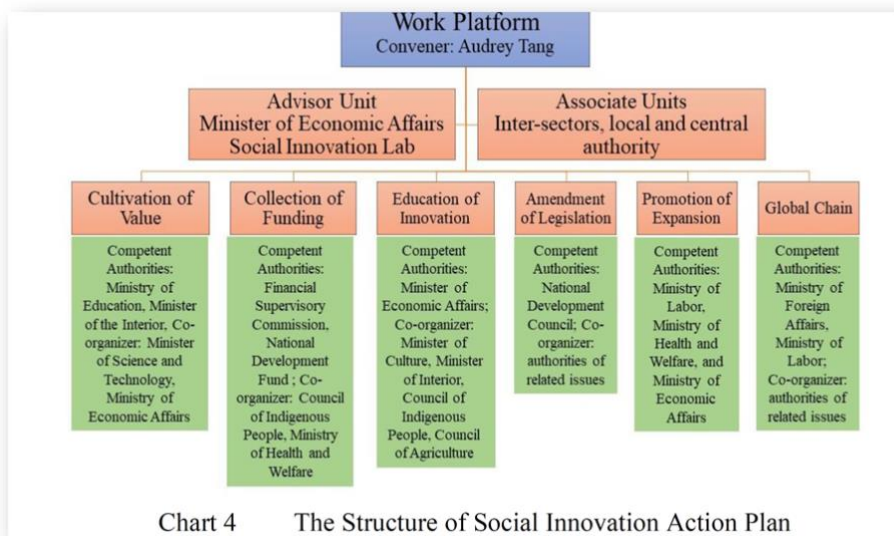


Figure 1: Taiwan Social Innovation Action Plan

Summary of the action plan

Areas		Strategies
1	Create conditions conducive to emergence of social innovations	<ul style="list-style-type: none"> Strengthen the social-innovation support ecosystem in Montréal; Facilitate conversations around socio-economic challenges that bring about social innovation; Support social-innovation zones as fertile ground for novel solutions.
2	Promote social innovation and the social economy	<ul style="list-style-type: none"> Recognize the contributions of the social economy and social innovation to Montréal's development; Support enhancement of the international reputation and influence of Montréal's social economy and social innovation; Ensure the positioning of Montréal, a university city, as a catalyst for development of social innovation.
3	Boost municipal procurements from social economy providers	<ul style="list-style-type: none"> Follow up on diversification of contract awarding methods; Promote the social economy to purchasers; Value purchaser-supplier best practices; Conduct periodic evaluations of practices established with stakeholders.
4	Strengthen provision of support and guidance to social entrepreneurs and innovators	<ul style="list-style-type: none"> Support and emphasize initiatives that provide innovative responses to the needs and challenges of entrepreneurs.
5	Stimulate priority targets	<ul style="list-style-type: none"> Increase direct aid to social economy businesses, via the PME MTL network; Increase human resources in support of the social economy within the PME MTL network; Support promotion and consensus-building within the social economy; Innovate in support of promising solutions.

Figure 2: Montreal Action Plan/1

Strategies	Actions	Performance Indicators
Strengthen the social-innovation support ecosystem in Montréal	<ul style="list-style-type: none"> Back support/guidance organizations specialized in social innovation in the emergence and formalization of social-innovation projects 	<ul style="list-style-type: none"> Number of support/guidance organizations
Facilitate conversations around socio-economic challenges that bring about social innovation	<ul style="list-style-type: none"> Support social-innovation processes so as to generate novel solutions to key challenges of Montréal's development 	<ul style="list-style-type: none"> Number of socio-economic challenges identified and subjected to a social-innovation process
Support social-innovation zones as fertile ground for novel solutions	<ul style="list-style-type: none"> Identify social-innovation zones and support community projects for enhancement of living environments 	<ul style="list-style-type: none"> Number of zones supported

Figure 3: Montreal Action Plan/2



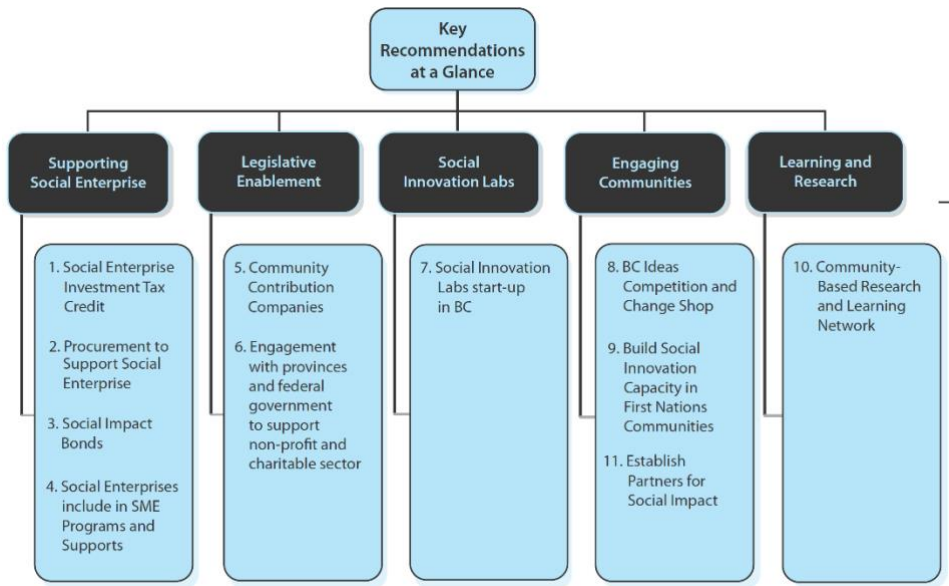


Figure 4: British Columbia Social Innovation Action Plan

Based on the few available action plans and the work conducted in the NZC project, WP9 developed the Social Innovation Action Plan process (WP9.5 - under development), based on progressive building blocks (Figure 5).

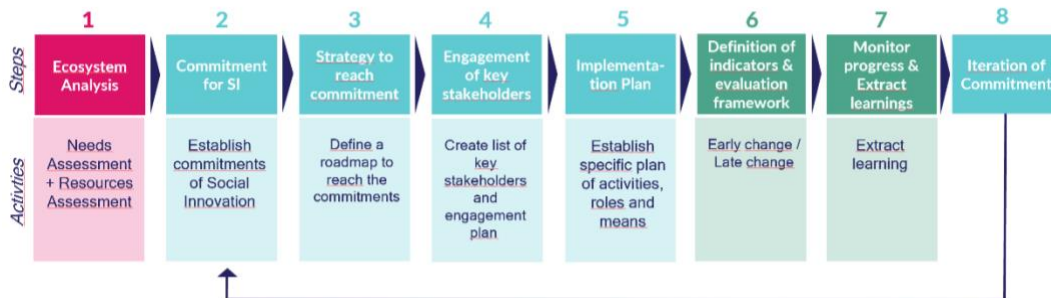


Figure 5: SI Component of the Action Plan Process Building Blocks

3 Social innovation categories of the action plan

In order to evaluate the initiatives of the action plan related to social innovation, the study team has devised a set of intervention categories based on the NCZ theory of change (Figure 6), the NZC impact pathways (Figure 7), the NZC Theory of Change for Interventions in Social Innovation (Table 2) developed in D2.14, and the WP2 overall framework available in D2.4 (Figure 8).

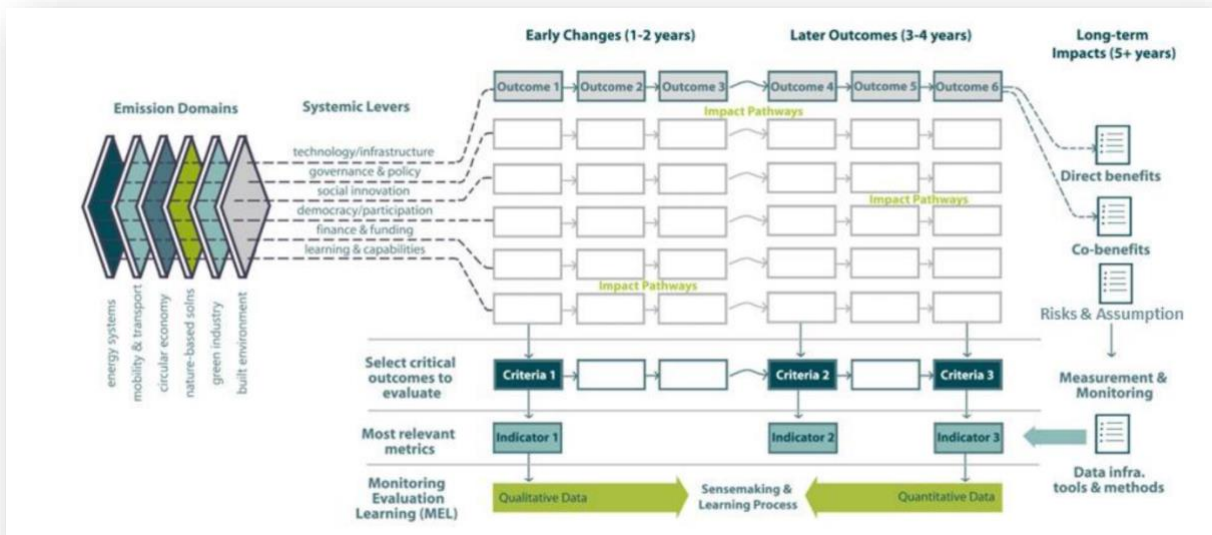


Figure 6: NZC Theory of Change – Overall Structure and Its Essential Elements (developed in D2.14)

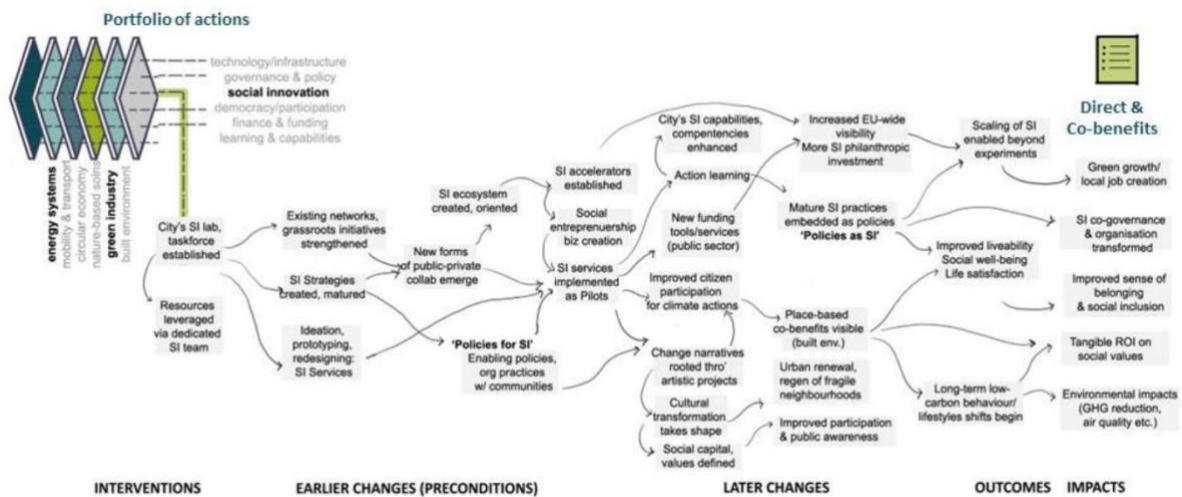


Figure 7: NZC Social Innovation Impact Pathways (developed in D2.14)

Table 2: NZC Theory of Change for Interventions in Social Innovation (developed in D2.14)

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.)



Figure 8: WP2 Overall Framework (developed in D2.4)



Based on the aforementioned work carried out in the NZC project, the study team therefore elaborated a set of social innovation categories of the action plan (Table 3).

Table 3: Social Innovation Categories of the Action Plan

Category	Description	
Skills and capacity building <i>What is the level of skills and knowledge of citizens and public officials about social innovation for sustainability?</i>	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.
Empowerment and inclusion	3. Co-design of policies with social innovators	Several studies show that involving citizens and urban stakeholders in governmental processes and empowering them through active engagement boosts the acceptance of

<p>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?</p>	<p>and urban stakeholders</p>	<p>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.</p>
<p>Regulation and support How does the city mobilise resources to support community-led initiatives of social innovation for sustainability?</p>	<p>4. Co-creation of social innovation initiatives with citizens and urban stakeholders</p>	<p>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.</p>
	<p>5. Funding/supporting community-led initiatives and small-scale pilots/experimentations</p>	<p>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).</p>
	<p>6. Enabling/supporting social innovation initiatives scale-up beyond pilots</p>	<p>This intervention considers the possibility to implement actions enabling scaling, replication or adaptation, acceleration and socially relevant business seeding.</p>
	<p>7. Testing and prototyping new funding mechanisms</p>	<p>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.</p>
<p>8. Public procurement of social innovation services for sustainability</p>	<p>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</p>	

		of value purchaser-supplier best practices, conduction of periodic evaluations of practices established with stakeholders.
Systemic innovations - Top-down systemic approaches <i>Are top-down systemic solutions for climate neutrality that involve social innovation implemented?</i>	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-minute 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).

Finally, the study team has elaborated a mapping of the case studies carried out in WP9 (D9.1) in order to refine the categories and to ensure that they cover all the most relevant facets of the action plan (Table 4).

Table 4: Mapping of Case Studies Against Social Innovation Categories

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
		Valencia promotes Local Energy Communities
		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		

		Entrepatis – Las Carolinas
		Just transition Listening platform
		Applause
		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

In order to ensure consistency with the rest of the project activities, the research team has also mapped the devised categories with respect to the NZC climate transition maps elaborated by the partners Dark Matters Lab and ICLEI Europe (Figure 9).

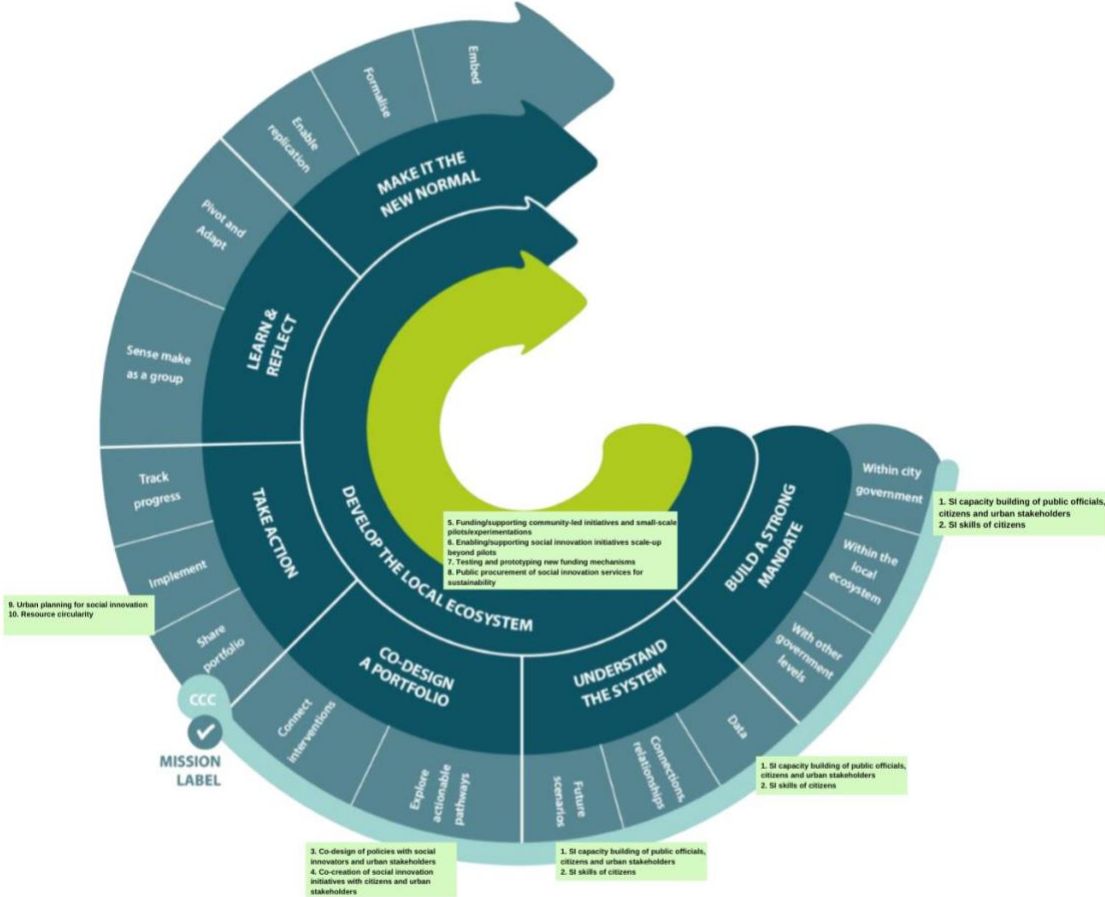


Figure 9: SI categories mapped on the NZC Climate Transition Map

3.1 Social Innovation Intervention Logic

The next step is the definition of the intervention logics at plan level and at the level of single categories. The intervention logic defines the project objectives and inputs with respect to the expected results in terms of outputs, outcomes, and impacts. It is normally depicted in form of a process diagram. Establishing the intervention logic is the first step in setting up an impact assessment framework (Figure 10).



Figure 10: Basic intervention logic



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 (Figure 11).

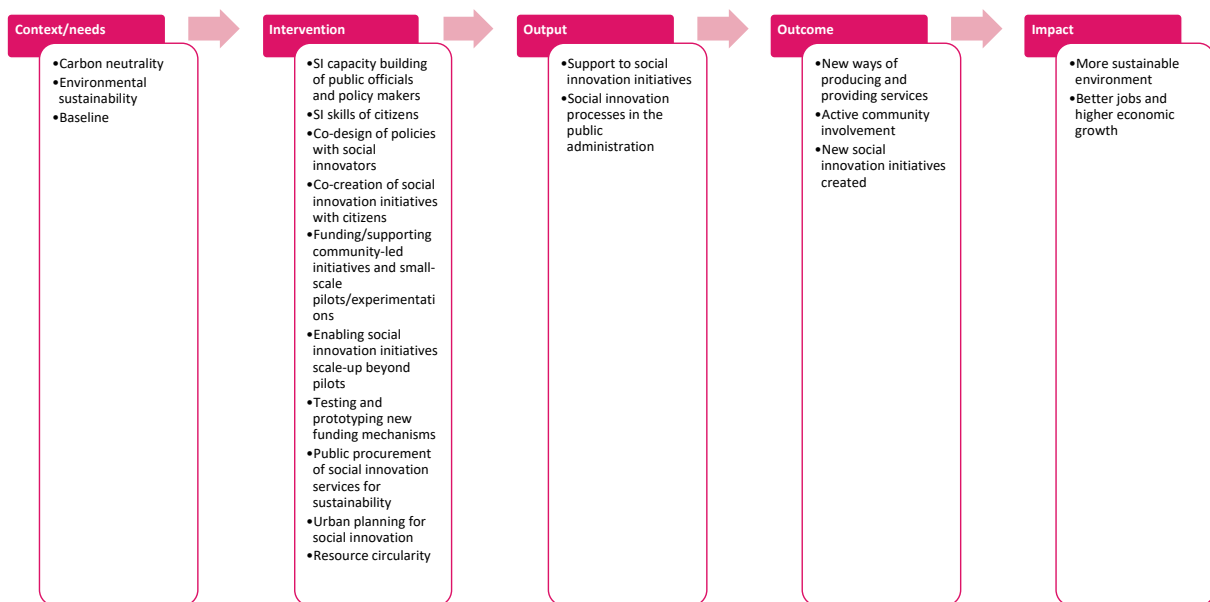


Figure 11: General Intervention Logic

After the definition of the general intervention logic, the research team has devised an intervention logic for each of the aforementioned categories, based on exemplary social innovation cases.

3.2 Category 1 Intervention Logic: SI capacity building of public officials and policy makers

Here is depicted the specific intervention logic for the category “SI capacity building of public officials, and policy makers” (exemplary case: PentaHelix, Figure 12).

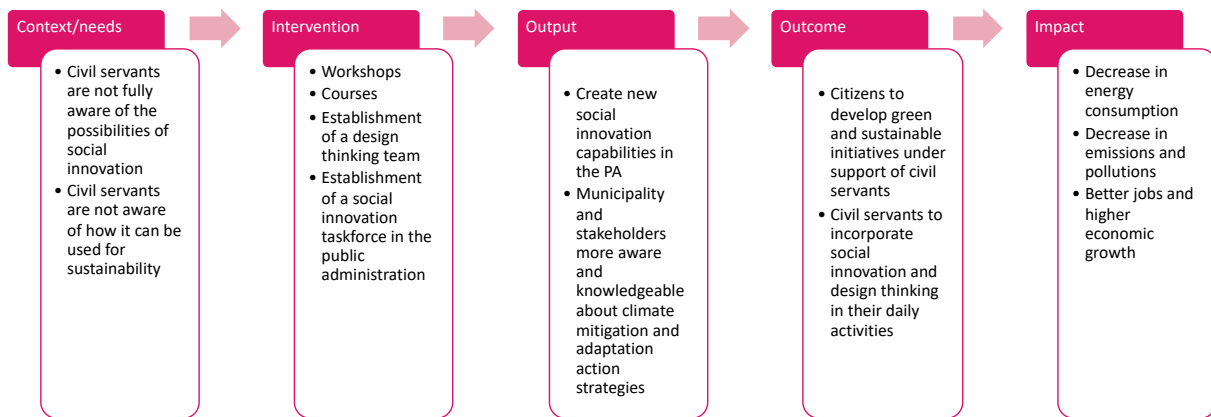


Figure 12: Intervention logic for the category “SI capacity building of public officials and policy makers”

3.3 Category 2 Intervention Logic: SI skills of citizens and urban stakeholders

Here is depicted the specific intervention logic for the category “SI skills of citizens and urban stakeholders” (exemplary cases: Play!UC & Ecohouse Antwerp, Figure 13).

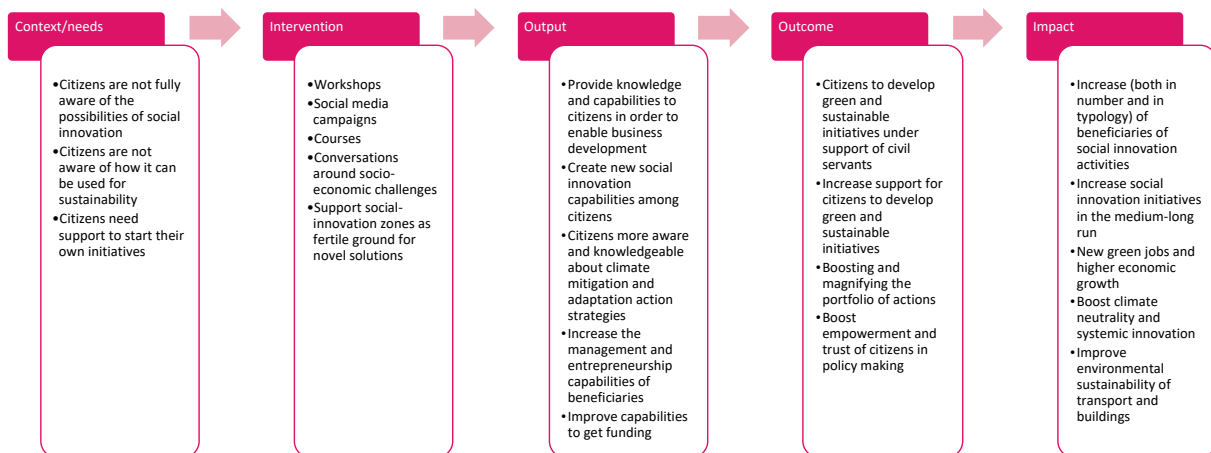


Figure 13: Intervention logic for the category “SI skills of citizens and urban stakeholders”

3.4 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’ (exemplary case: Bologna’s Citizen Collaboration Pacts, Figure 14).

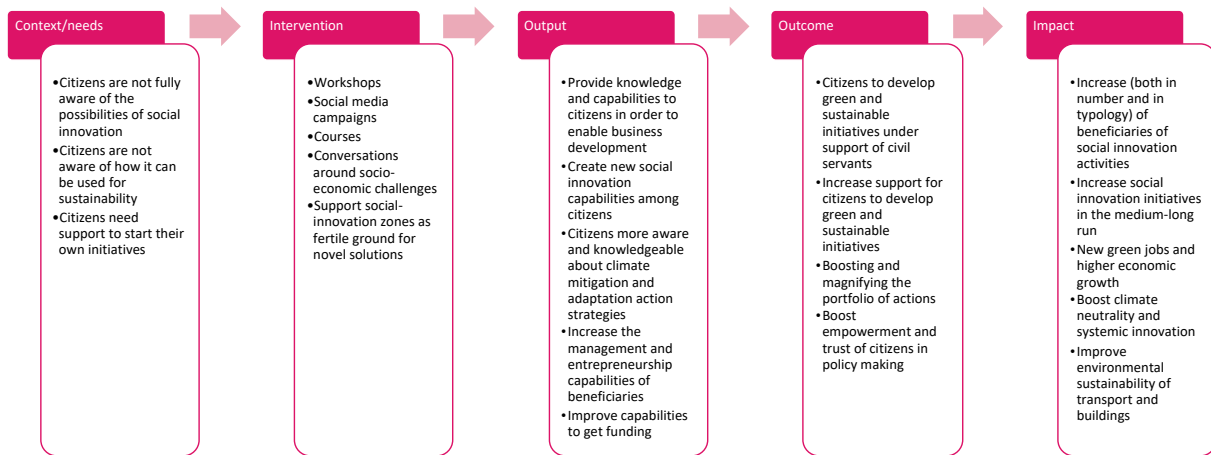


Figure 14: Intervention logic for the category ‘Co-design of policies with social innovators and urban stakeholders’

3.5 Category 4 Intervention Logic: Co-creation of social innovation initiatives with citizens and urban stakeholders

Here is depicted the specific intervention logic for the category “Co-creation of social innovation initiatives with citizens and urban stakeholders” (exemplary cases: Bologna’s Citizen Collaboration Pacts & SONNET Mannheim City Lab, Figure 15).

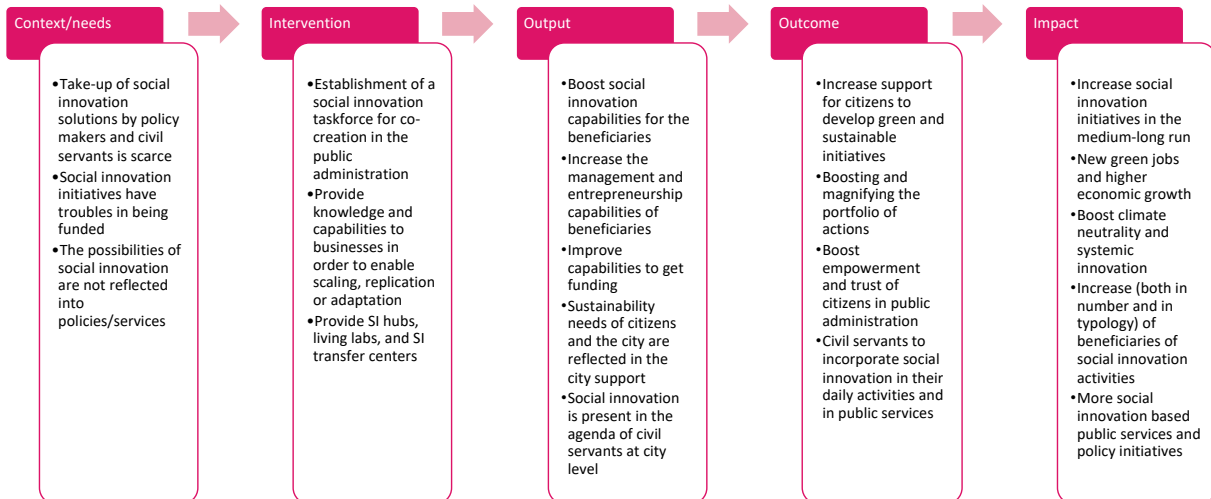


Figure 15: Intervention logic for the category “Co-creation of social innovation initiatives with citizens and urban stakeholders”

3.6 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” (exemplary cases: You decide and Clean Cities ClimAccelerator, Figure 16).

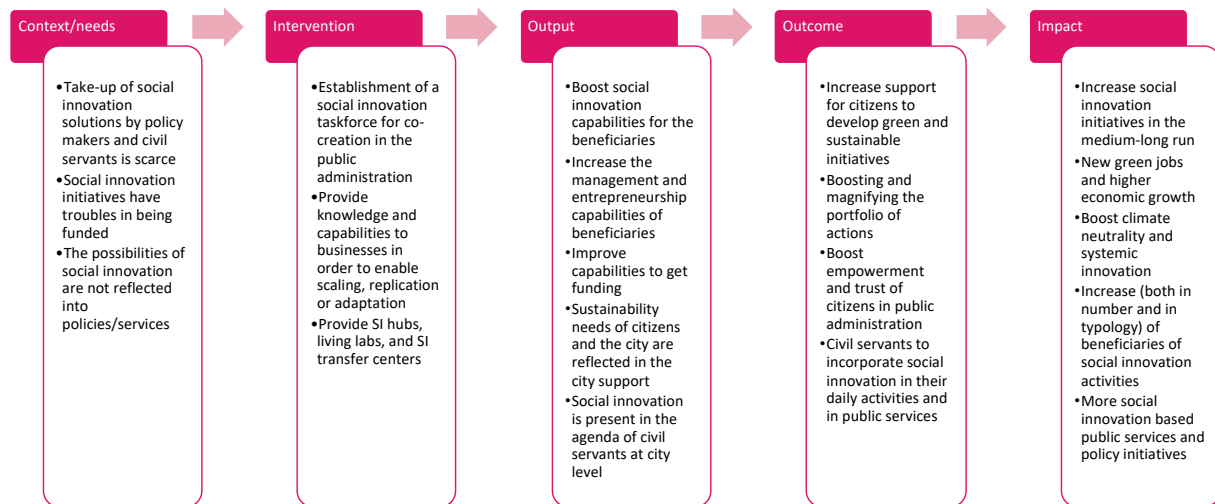


Figure 16: Intervention logic for the category "Funding/supporting community-led initiatives and small-scale pilots/experimentations"

3.7 Category 6 Intervention Logic: Enabling/supporting social innovation initiatives scale-up beyond pilots

Here is depicted the specific intervention logic for the category “Enabling/supporting social innovation initiatives scale-up beyond pilots” (exemplary case Clean Cities ClimAccelerator, Figure 17).

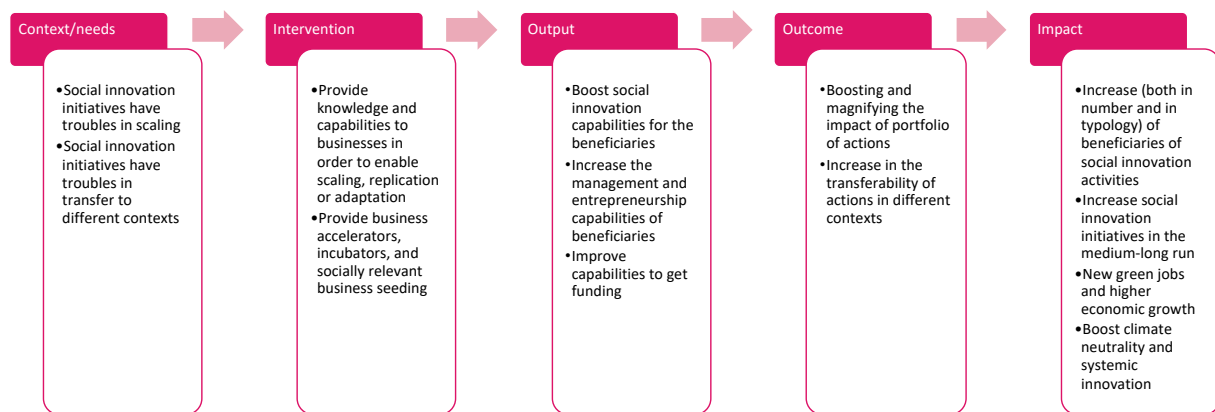


Figure 17: Intervention logic for the category “Enabling/supporting social innovation initiatives scale-up beyond pilots”

3.8 Category 7 Intervention Logic: Testing and prototyping new funding mechanisms

Here is depicted the specific intervention logic for the category “Testing and prototyping new funding mechanisms” (exemplary case: SONNET – The Bristol City Lab, Figure 18).

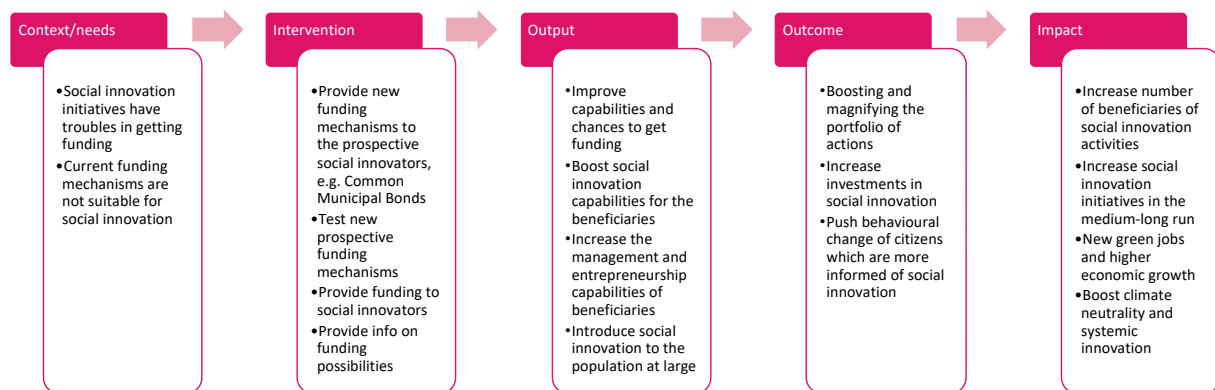


Figure 18: Intervention logic for the category “Testing and prototyping new funding mechanisms”

3.9 Category 8 Intervention Logic: Public procurement of social innovation services for sustainability

Here is depicted the specific intervention logic for the category “Public procurement of social innovation services for sustainability” (exemplary cases: Oslo public procurement and Public Procurement Pathfinders, Figure 19).

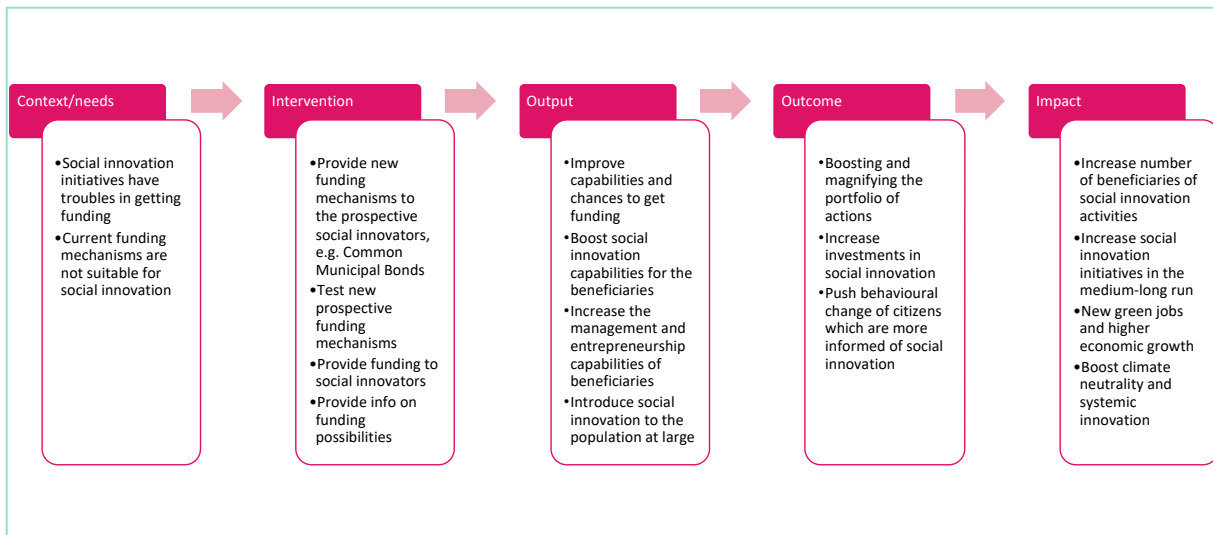


Figure 19: Intervention logic for the category “Public procurement of social innovation services for sustainability”

3.10 Category 9 Intervention Logic: Urban planning for systemic social innovation

Here is depicted the specific intervention logic for the category “Urban planning for systemic social innovation” (exemplary cases: Paris: 15-minute city + Superblocks + Climate Quarter Project, Figure 20).

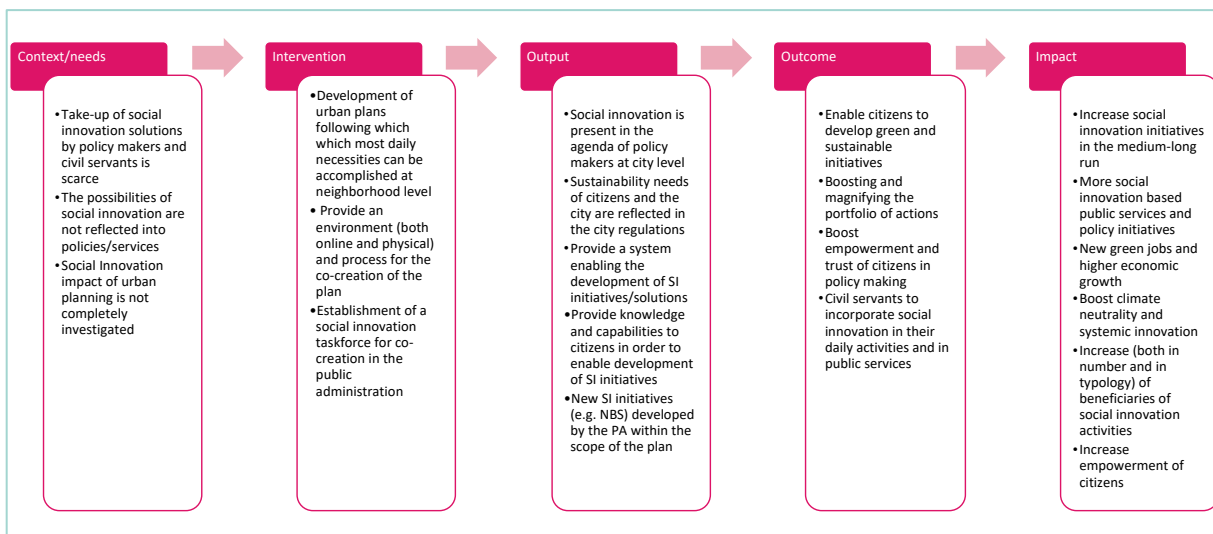


Figure 20: Intervention logic for the category “Urban planning for systemic social innovation”

3.11 Category 10 Intervention Logic: Systemic resource circularity

Here is depicted the specific intervention logic for the category “Systemic resource circularity” (exemplary case: Applause, Figure 21).

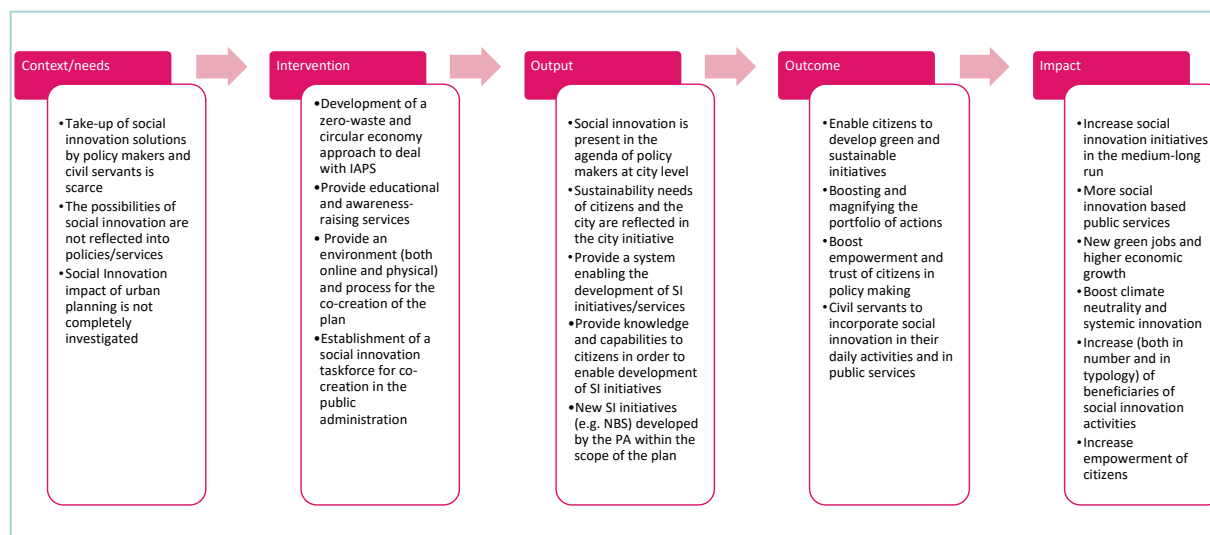


Figure 21: Intervention logic for the category “Systemic resource circularity”

4 Evaluation approach

4.1 Background from scientific research and projects

With the aim to identify scientific papers from diverse disciplines that address social innovation for climate neutrality and decarbonization, we searched scientific databases and key scientific journals. We started by performing a keywords search in Scopus and Google Scholar, with a broad set of keywords combinations in order to identify articles from related fields which might use different terminologies. Specifically, we performed multiple searches in the databases by combining one keyword related to social innovation (*social innovation, social innovation action plan, social impact, social value, social innovation ecosystems, wellbeing, social impact assessment, social innovation metrics*) and a keyword related to climate neutrality (*decarbonization, environmental sustainability, climate change, climate neutrality, carbon neutrality, net zero, carbon footprint, ecology, circular economy, nature-based solutions*). In a second phase, key journals related to the topic of interest were manually scanned, specifically the scientific journals “Nature Climate Change”, “Sustainable Cities and Societies” and “Sustainability”, for the last 3 years. This search resulted into the identification of 267 articles from 2008 to 2022, including two special issues: “Social Innovation and the Energy Transition” published in the journal Sustainability in 2018, and “The dynamics of sustainable innovation journeys” published in Technology Analysis & Strategic Management in 2008. All articles were processed by reading the



abstract and keywords in order to understand if the paper contained a relevant contribution to answer our research question, in the form of a theoretical model, a framework or indicators related to social innovation for decarbonization. When the contribution was not clear from the abstract, the entire article was processed. The analysis of the abstracts lead to the identification of 35 articles from the fields of sustainability, energy, climate change, management and public policy, Thirty out of the 35 articles were published from 2017, indicating that the topic has been addressed only rather recently by the academic community. In particular, among the 35 most relevant papers, 7 were published in the journal Sustainability and 5 in the journal Nature Climate Change. The papers were published in the fields of science and energy (17), sustainability (9), management (7), policy (4) or varied other fields (5).

All 35 articles were read and analysed, and their outcome systematized in the following sub-sections: providing the motivations for considering social innovation in the context of climate change, theoretical models and frameworks, development of a comprehensive framework to classify indicators.

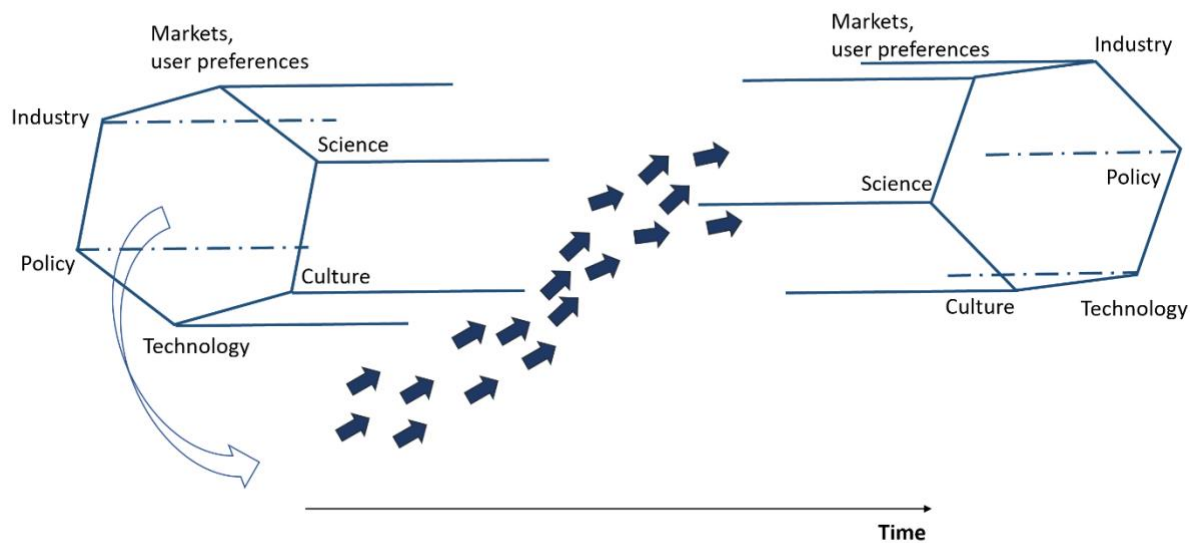
4.1.1

Framing the context of energy transitions

In a highly cited paper published on Science, Geels et al. (2017) invite the public to go beyond individual elements and consider socio-technical systems, that is, the interlinked mix of regulations, markets, infrastructures, technologies and user practices – which in combination deliver value for the society (Figure 22). They present the Multi-Level Perspective (MLP) framework for understanding the complex causal mechanisms that characterize systems transitions for deep decarbonization. They map socio-technical system elements: (i) market and user preferences, (ii) science, (iii) culture, (iv) technology, (v) policy, and (vi) industry. They explain how niche innovations can bring radical innovation break throughs which trigger the adjustments of socio-technical systems. The authors argue that the acceleration of transitions “involves three mutually reinforcing processes: growing internal momentum of niche-innovations, weakening of existing systems [...], and growing exogenous pressures. The resulting socio-technical transitions go beyond the adoption of new technologies and include investment in new infrastructures, the establishment of new markets, the development of new social preferences and the adjustment of user practices” (Geels et al., 2017, pg. 1244).

In particular, it is argued that to motivate citizens to change practices, beliefs, conventions, skills and purchase decisions, information about climate change threats and financial incentives should be complemented by positive discourses about the benefits of innovations for decarbonizations. Businesses and citizens’ support toward decarbonization can be built “through bottom-up learning processes, participatory governance and polycentric stakeholder” (Geels et al., 2017, pg. 1245).





Simplified and adapted from: Geels et al., 2017

Figure 22: Socio-technical System Elements

In a more recent paper, the same author (Geels 2020) further developed a “multi-dimensional model of agency through crossovers between social constructivism, evolutionary economics and neo-institutional theory” (pg. 1). He reviewed the strengths and weaknesses of each of these three theoretical perspectives, highlighting their complementarity. Some of the identified strengths of social constructivism are, for example, the “interest in the shape and design of artefacts and patterns of use” and the “focus on cognitive processes”. Among the weaknesses – or less elaborated topics- of the social constructivism approach, Geels (2020) identified the “idealist bias (limited attention for competition, markets, financial resources)”, “limited link to broader social sciences (due to dominance of micro-interactionism)” (pg. 11). Regarding the second theoretical perspective, evolutionary economics, he identified among the strengths, the “deep understanding of ‘material’ processes (market competition, resources, performance, investment) and knowledge/capabilities”, while among the weakness of the approach, we find the “limited understanding of institutions (as exogenous regulations)” and “limited interest in technical details (due to primary interest in economic implications of technology for firms/sectors)” (Geels, 2020, pg. 11). Finally, the third theoretical perspective of neo-institutionalism has the strengths of showing “relational, processual understanding of institutions” and “recursive interactions between local practices and organizational fields” but the weaknesses of having a limited focus on “technology and ‘material’ dimensions” and “economic processes” (Geels, 2020, pg. 11).

In a paper with the eloquent title “Why Sustainable Development Requires Societal Innovation and Cannot Be Achieved without This”, Diepenmaat, Kemp and Velter (2020) review multi-disciplinary perspectives related to societal innovation for sustainable development, in particular the business literature on value creation, the literature on business model innovations, on sustainability strategy and on sustainability transitions, adding the “recursive perspective on innovation and society” applied to societal innovation. The authors are critical of the triple helix models “because these underestimate the importance of disinterest and conflicts of interests to be managed via multiple value creation on the basis of recursive multi-actor intentionality.” (Diepenmaat et al. 2020, pg. 1). They 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 enter via the improvement perspectives” (Diepenmaat et al. 2020, pg. 13). Their work presents an historical discussion of modalities in which business addressed sustainability, and offers a systematic approach to innovation types. In particular, it provides a “co-



evolutionary understanding of innovation-based transformations, based on a recursive relationship between innovations, improvement perspectives and socio-economic transformations, including the transformation of modernity.” (Diepenmaat et al. 2020, pg. 3).

In the paper they specifically review societal Innovation, framing it as systemic type of innovation which requires design thinking and system building. They further argue that “Societal innovation involves social innovation in the form of cross-sector partnerships (resulting in new value chains) and possibly changes in ownership (energy cooperatives for renewable energy to heat and powerhouses)” (Diepenmaat et al. 2020, pg. 16). The focus on design thinking is justified by the ability of the method to find configurations that are suitable for several actors (users, governments, finance). They base their argument on the work of Ceschin and Gaziulusoy (published in Design Studies in 2016) in which the authors visually presented the evolution of design for the field of sustainability, from the level of product design, to the level of product-service system, to the spatio-social level and finally to the socio-technical system level (pg. 17). Thus, more recently, the focus of design broadened to include socio-technical system innovation, focusing on transforming systems by supporting the development of long-term visions, and linking those visions to strategic decisions of design and innovation teams (Ceschin & Gaziulusoy, 2016, p. 31).

Creutzig, Niamir, Bai et al. (2022) analysed mitigation solutions in terms of effects on human wellbeing. Although such mitigation solutions are usually evaluated in terms of GHG (greenhouse gasses) reduction, they systematically assessed the potential of demand-side solutions in terms of *avoiding*, *shifting* and *improving* consumption, and calculates the link to human wellbeing. With a methodology based on expert judgment and an analysis of extant literature, they evaluated “306 combinations of well-being outcomes and demand-side options” and found that “bridging socio-behavioural, infrastructural and technological domains, can reduce counterfactual sectoral emissions by 40–80% in end-use sectors.” (pg. 36). In terms of solutions’ categories, they identify: (1) Building: sufficiency, efficiency; lower carbon and renewable energy. (2) Food: food waste, overconsumptions, animal-free protein; (3) Transport: teleworking and online education systems, non-motorized transport, shared mobility and BEVs. (4) Urban: compact city, circular and shared economy, systems approach in urban policy and practice, nature-based solutions. (5) Industry: using less material by design, product life extension, energy efficiency, circular economy (Creutzig, Niamir, Bai et al., 2022).

4.1.2 Framing Social Innovation

According to Unceta et al. 2020 (pg. 908), social innovation “measurement and socioeconomic impact have been for a long time a required and challenging area of research inside SI studies, acknowledged by the research community, policymakers, 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).” In this paper we focus on the urban level, but take into account all levels of complexity.

A special issue on “Social innovation and the energy transition” was published on the scientific journal sustainability in 2018, with 20 articles contributing to the topic from different academic disciplines. The editors (Hoppe & de Vries, 2018) categorize the contributions into key topics relevant to social innovation: “(i) technological innovation leading to new market models, actor configurations, and institutional settings creating room for social innovation; (ii) new governance arrangements; (iii) community energy, its impact, implications, and social incentives and policy to empower it; (iv) new participative research approaches to test and learn from livings labs and best practices; (v) ‘green nudges’ to stimulate behavioral change; and (vi), serious energy games.” (pg. 141).



A recent literature review on “social innovation related to ecological crises” has analysed the 40 most relevant articles related to the topic, and found that only five of those articles explicitly aligned strong sustainability (Haskell et al. 2021). For the literature analysis, the authors deployed the framework developed by Howaldt et al. (2017) which combines innovation studies and theories of social change. The framework was developed with the EU-funded project SI Drive: it has a focus on social practices oriented toward societal challenges and it has already been applied specifically to environmental challenges (Schartinger et al., 2017). The framework is composed of five dimensions that can guide stakeholders in facilitating social innovation development. The focus is on an audience of policy makers and actors within the civil society, with the aim to assess the potential for diffusion when social innovations are imitated and diffused across contexts (Haskell et al. 2021). The five dimensions of the the framework (Figure 23; Howaldt et al. 2017) are: (1) Concepts and understanding; (2) Addressed societal needs and challenges; (3) Resources, capabilities and constraint (capacity building, empowerment and conflict); (4) process dynamics (mechanisms of diffusions, imitation, social learning, relationship to social change; and (5) governance, networks, actors (functions, roles and new concepts).

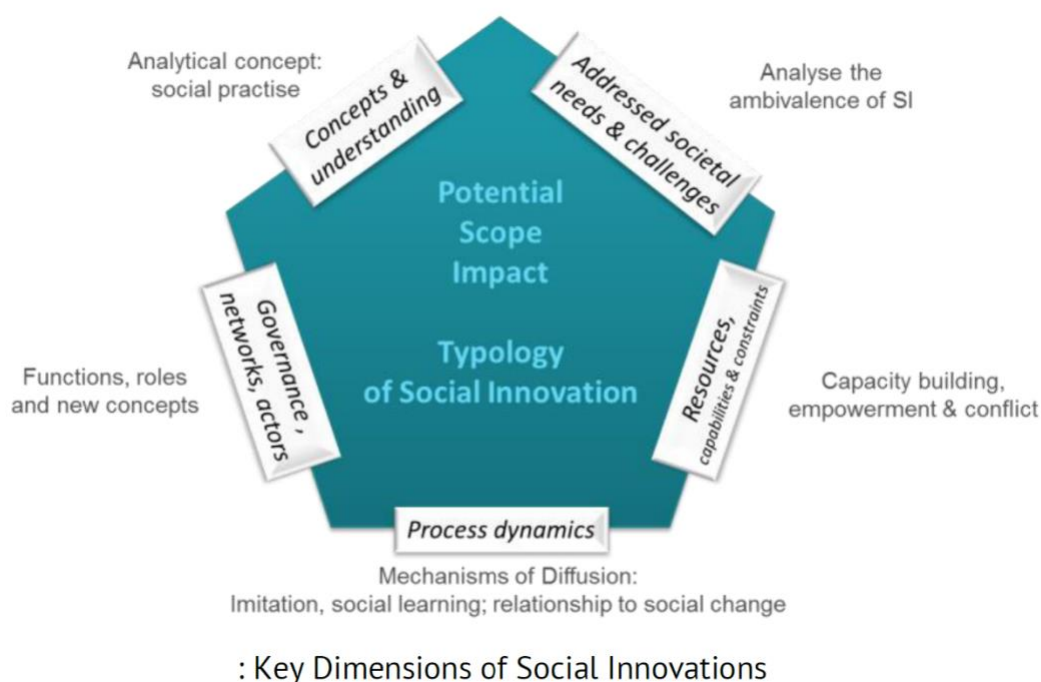


Figure 23: SI Drive framework adapted from Howaldt et al. (2017)

Based on data and insights from both the SI-DRIVE (reviewed above) and SIMPACT EU-funded research projects, Terstriep, Rehfeld & Kleverbeck (2020) reflect on social innovation ecosystems. Results suggest that to establish a social innovation ecosystem it needs “(1) a mode of governance that integrates actors from civil society, and the social, economic and academic field; (2) social innovation hubs, labs and transfer centres as intermediaries that accelerate social innovation activities; and (3) the integration of different modes of innovation in transformational innovation strategies.” (pg. 881).

More specifically, within the analyzed SIMPACT project (Rizzo, Deserti & Komatsu, 2020; Unceta et al. 2020), a practical framework is proposed (Dhondt, S., et al. 2016; Castro-Spila et al. 2016) for policy makers, social innovators and social innovators, to forecast ex-ante the potential impact of social impact options. Such framework is based on 5 steps: (1) determining the goals and socio-economic outcomes; (2) determining causal relationships between inputs, outputs and outcomes, (3) determining the role of stakeholders, (4) calculating the impact and (5) the decision process.



A more comprehensive evaluation framework for evaluating social innovation has been developed by Secco and colleagues (Secco, Pisani, Da Re, Rogelja, Burlando, Vicentini, ... & Nijnjk, 2019) and applied to a variety of contexts, from forest-dependent rural communities (Secco et al., 2019), 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., 2019) 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. More specifically it outlines the intervention logic (logic model) which provides the causal link from inputs to activities, which lead to outputs and culminate into outcome and impacts, with the additional contribution of feedback and learning processes that loops back. The comprehensive SIMRA framework (Figure 24; 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 9 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., 2019).



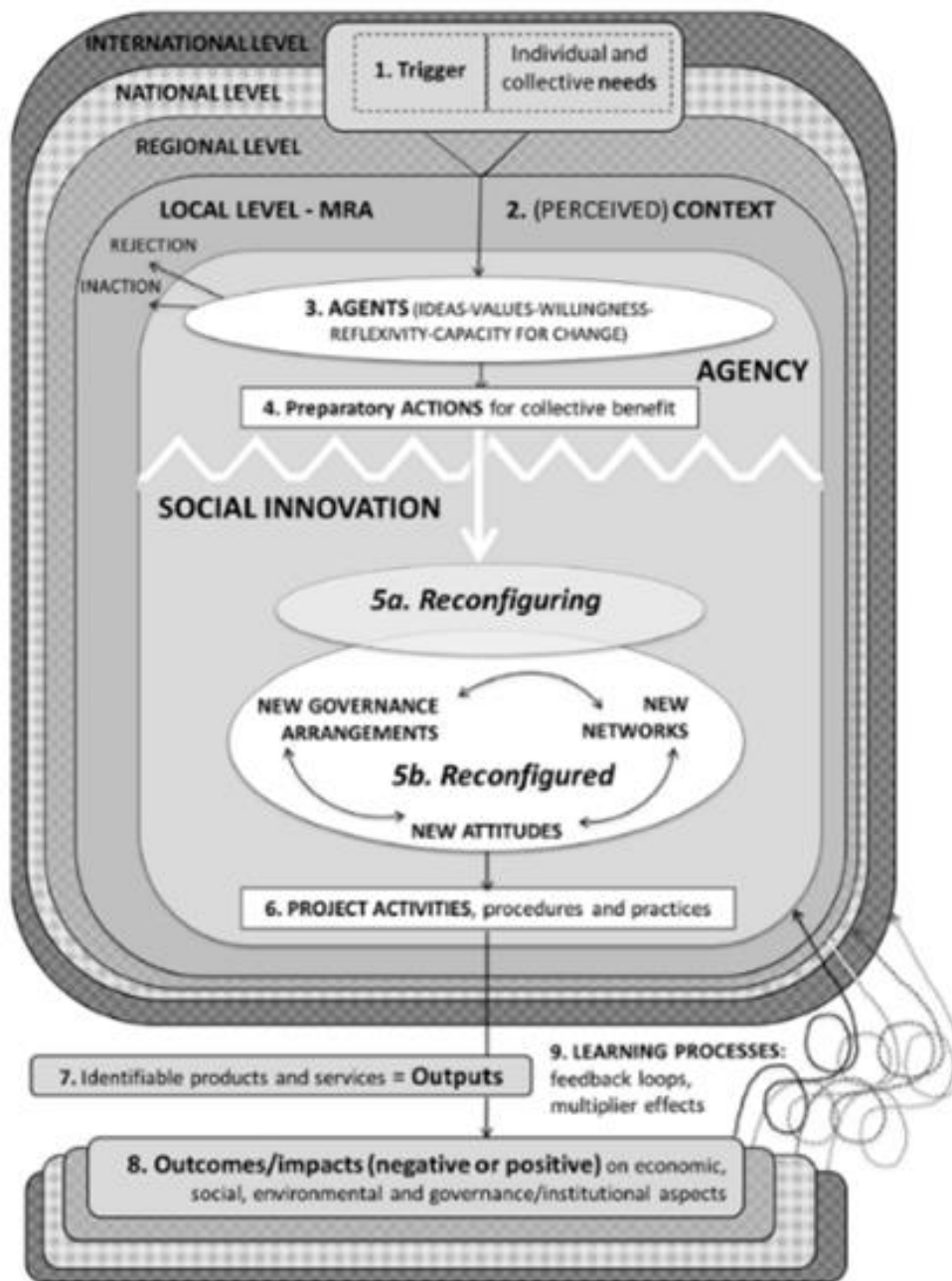


Figure 24: The SIMRA framework by Secco et al 2017

The Regional Social Innovation Index (RESINDEX) Model (Unceta, Castro-Spila & Garcia Fronti, 2016), adds a further level to social innovation indicators, comparing the potential capacity to the realized capacity. The model was developed within a research project funded by Innobasque, the Basque Innovation Agency and comprises a series of indicators grouped in 3 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.

In an analysis of social innovation ecosystems and sustainability in cities, Andion and colleagues (2022) proposed five dimensions that reinforce or hinder social innovation in cities – based on the case of the Brazilian city Florianopolis. The dimensions are categorized according to the scale of analysis: macro, meso and micro level. At macro level they identify the “institutional” dimension; at meso level, they identify the level of “SIE supply- network of support actors”, “SIE demand- network of social innovation initiatives”, and interaction and governance. At micro level they identify the dimension of “practice and consequences – social innovation initiatives and their actions in public arena” (Andion et al., 2022, pg. 1276).

Angelidou and Psaltoglou (2017) investigated social innovations for sustainable development at urban level. They explored the characteristics of social innovation across “the three basic and distinct dimensions of social innovation, as they are put forward by a large body of literature: i. Content, ii. Process and iii. Empowerment” (pg. 113). They analysed the literature to categorize domains of social innovation for sustainable urban development, categorized into *content* (principal subject, sustainability challenge, urban setting characteristics), *process* (organization type, innovation mechanism, and ICT component), and *empowerment* (type, beneficiaries, outcome).

Baer et al. (2021) developed a categorization of approaches to social innovation related to Positive Energy Districts by comparing three in-depth case studies in Norway. The three dimensions that emerged from the case studies are: (1) citizen involvement, (2) stakeholder interaction and (3) capacity building and education.

Focusing only at the human agency level, Angelidou and Psaltoglou (2017, pg. 113) provide a categorization of “four primary citizen profiles in social innovation for sustainable urban development: the ‘citizen-sensor’, the ‘sharing citizen’, the ‘collaborative citizen’ and the ‘entrepreneurial citizen’.”

4.1.3 Toward A Multi-Disciplinary Systematic Framework of Social Innovation for Climate Change

All the dimensions identified in the above reviewed literature have been included into a comprehensive map, utilizing the well-established logic model (Knowlton & Phillips, 2012) as the underpinning structure (Figure 25).



Dimensions of Social Innovation for Climate Neutrality

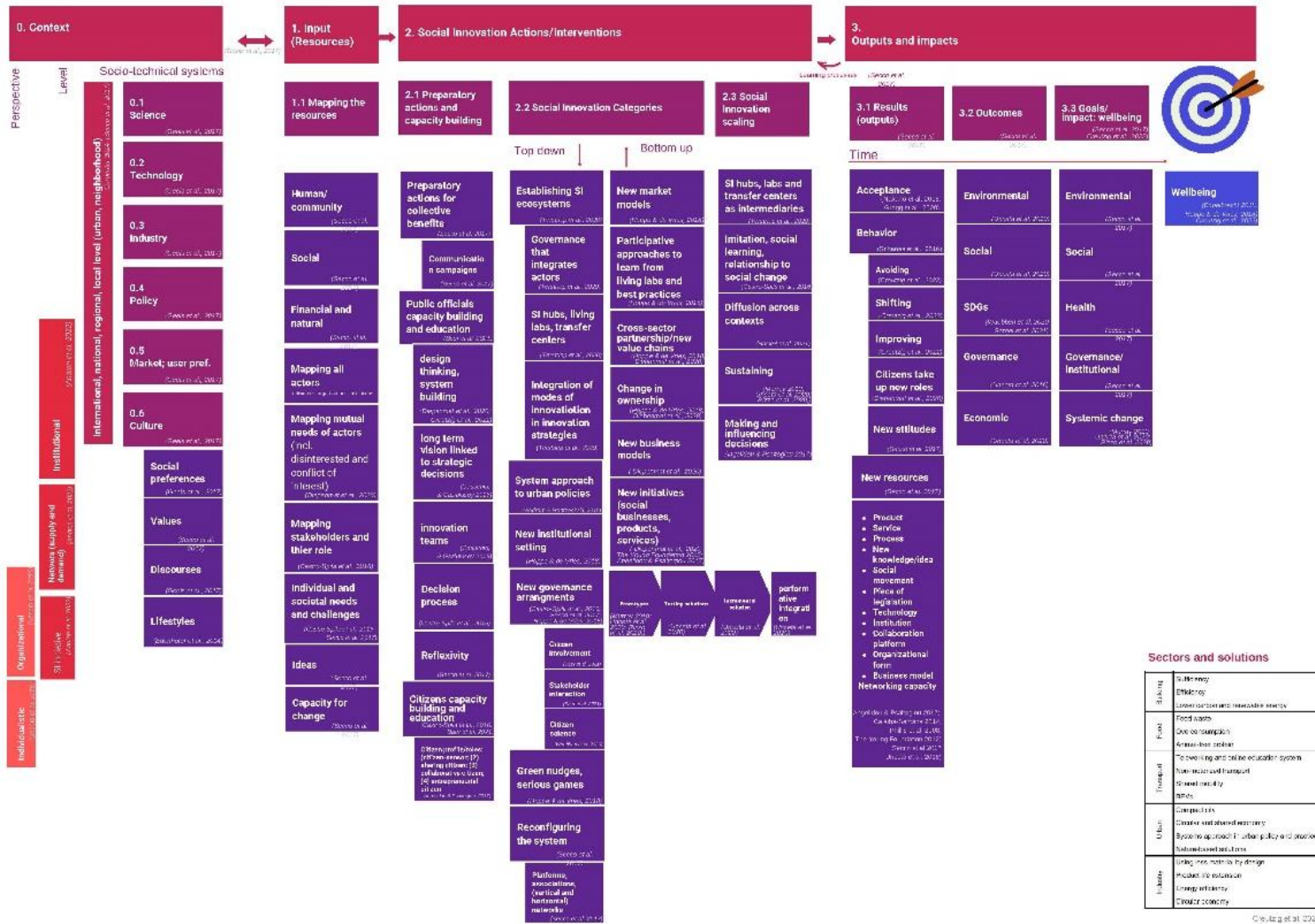


Figure 25: A comprehensive framework of Social Innovation for Climate Change

Given the broad number of dimensions identified, in particular for the category of social innovation actions or initiatives, some of the original categories of the logic model have been expanded. In particular, the social innovation actions are organized into three sub-categories: Social Innovation capacity building activities, top-down initiatives and bottom-up initiatives. While we are aware that the four sub-dimensions are not necessarily mutually exclusive, we find the clustering useful to organize the multitude of social innovation approaches and initiatives sourced from the literature review. Capacity building seem to emerge as a pre-requisite for supporting the emergence and scaling of social innovation initiatives, thus indicating a pathway.

The categories related to the results are defined according to the newest labelling adopted by the European Commission (Horizon Europe Key Impact Pathways): results, output and impacts.

The mapping of existing scientific knowledge on the topic of social innovation for climate neutrality provides a complex and multi-faceted overview, indicating the variety of levels and perspectives adopted by researches in diverse 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).

With the aim to develop theoretically based and pragmatically relevant categories to classify indicators of social innovation for supporting climate neutrality at city level, we have synthesized extant academic literature in the above framework and complemented it with categories that emerged bottom-up from the analysis of 36 case studies (developed in WP9 D9.1). The result is a framework of 10 categories clustered in 4 macro-themes, as outlined in Section 3, Table 5.

In the next section, the intervention logic for each of the 10 identified categories is outlined, based on academic literature, previously funded projects and cases studies.

4.2 Impact measurement and evaluation approach

In general terms the evaluation will take place at the level of plan, and at the level of initiatives stemming from the single categories. The evaluation approach is based on indicators, which build on the intervention logics in chapter 3 and are integrated with indicators extracted from existing frameworks. The evaluation criteria for the plan are effectiveness, efficiency, relevance, replicability, and scalability. These criteria are applied to the NZC overall project and to each pilot but tailored according to the respective pilot objectives.

- 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;
- 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 26: Impact assessment metric development process

Figure 26 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 level of plan, the research team considers all the evaluation criteria. For the single categories, the focus is on the criteria of effectiveness and efficiency. Finally, as a good measure, the research team has also elaborated input, output and outcome indicators, which will serve as a basis for the elaboration of the indicators related to the evaluation criteria:

- Input indicators, available within organisations budget, programming, and accounting documents, relate to resources allocated to each specific intervention.
- Output indicators, which represent the immediate result of interventions and data about their progresses and are reported in monitoring documents of each intervention.
- Intermediate outcomes, distinguishing between direct and indirect benefits that the excluded groups targeted can gain from the interventions. They are structured according to the dimensions of specific impact that have been identified as relevant.
- Long term outcomes, allowing the estimation of the contribution that those interventions are having in terms of systemic broader impact.

The evaluation of the plan excludes the use of the Social return on investment (SROI). Although SROI is an internationally recognized performance management method, utilized by social enterprises to demonstrate the social, economic and environmental value they create. Yet, the method is not free of challenges for social enterprises and social innovation initiatives (Arvidson, Lyon, McKay & Moro, 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 not considered within the social innovation indicators set (WP2) but suggested as an optional tool in evaluating the single initiatives stemming from the plan and its categories, as well as the initiatives studies in WP9 (T9.2).

4.2.1 Evaluation questions and indicators in the general case

Here are depicted the evaluation questions and indicators for the general case, both produced by the research team and mapped from existing frameworks, for all the five criteria (effectiveness, efficiency, sustainability, replicability, scalability). The specific publications related to the aforementioned evaluation frameworks, and used for the mapping of the indicators are the following:

- **RESINDEX**: Regional Social Innovation Index (Sinnergiak 2013);
- **SIMRA**: Innovative methods to assess social innovation and its impacts in marginalised rural areas (Secco et al. 2020);
- **EU POLIS**: Integrated NBS-based Urban Planning Methodology for Enhancing the Health and Well-Being of Citizens (EU-Polis 2021);
- **NBS**: Evaluating the Impact of Nature-based Solutions - Appendix of Methods.

Table 5 shows the input/output/outcome indicators elaborated by the research team.



Table 5: Input/Output/Outcome Indicators (own elaboration)

Input	Output	Intermediate Outcome
<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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

Table 6 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 6: Evaluation Questions and Indicators of Effectiveness (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
<p>What kind of support to social innovation was provided? Was it successful? What is the extent of learning from the evaluation?</p>	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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



	interventions stemming social innovations?	15.# of implementation of systemic activities leading to SI/# of implementation of systemic activities
8.	To what extent the results of the evaluation can be used to boost learning and improving the plan?	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 7 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 7: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the plan?	<ol style="list-style-type: none"> 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? 	<ol style="list-style-type: none"> 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 8 depicts the evaluation questions and indicators of Relevance (own elaboration).

Table 8: Evaluation Questions and Indicators of Relevance (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
Does the SIAP responds to the necessities of the city?	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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



	<p>match the real needs and requirements of the city SI scenario?</p> <p>6. Does the original design of the SIAP interventions meet the actual scenario requirements, independently from the (subjective) perception of stakeholders and policy-makers?</p>	
--	---	--

Table 9 depicts the evaluation questions and indicators of Replicability (own elaboration).

Table 9: Evaluation Questions and Indicators of Replicability (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
Is the plan replicable?	<ol style="list-style-type: none"> Under what conditions can the SIAP methods and services be reused in other city management settings and vice versa? 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? 	<ol style="list-style-type: none"> Key characteristics of replicability scenarios Perceived usefulness of replicability scenarios in terms of technical, financial, skills and governance requirements # and definition of characterising elements of the SIAP # Map of characteristics of the solution and assessment of the approaches to replication in different scenario # of replication guidelines containing also results of the evaluation and lessons learned Adoption of replication guidelines in other cities

Table 10 depicts the evaluation questions and indicators of Scalability (own elaboration).

Table 10: Evaluation Questions and Indicators of Scalability (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
Is the plan scalable?	<ol style="list-style-type: none"> To what extent can the SIAP be applied on a bigger scale? To what extent and under what circumstances it can trigger 	<ol style="list-style-type: none"> # number and definition of scalability of variables and parameters # actors, actions and transactions Project platform functionalities to be extended # of replication guidelines containing also results of the evaluation and lessons learned Adoption of replication guidelines in other public administrations

4.2.2 Evaluation questions and indicators for category 1: SI capacity building of public officials and policy makers

Table 11 shows the input/output/outcome indicators elaborated by the research team.

Table 11: Input/Output/Outcome Indicators (own elaboration)

Input	Output	Intermediate Outcome
-------	--------	----------------------



<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. # of civil servants beneficiaries of the interventions that completed the training 2. # number 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 	<ol style="list-style-type: none"> 1. # of civil servants with increased knowledge of SI 2. # of civil servants feeling empowered regarding SI thematics 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
--	--	---

Table 12 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 12: Evaluation Questions and Indicators of Effectiveness (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
<p>What kind of support to the creation of social innovation by citizens was provided? Was it successful?</p> <p>To what extent the establishment of task forces and design thinking teams been successful in boosting social innovation?</p>	<ol style="list-style-type: none"> 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? 	<ol style="list-style-type: none"> 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/CO2 savings from SI initiatives supported by trained civil servants and/or by the SI task force and/or by the design thinking team



	8. What is the impact of the latter?	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 13 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 13: Evaluation Questions and Indicators of Efficiency (own elaboration)

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 participants in capacity building activities who completed the training/ initial # of civil servants 2. # of civil servants 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/CO2 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 14 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 14: Indicators from Existing Frameworks

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
---	---------------	-------

4.2.3 Evaluation questions and indicators for category 2: SI skills of citizens and urban stakeholders

Table 15 shows the input/output/outcome indicators elaborated by the research team.

Table 15: Input/Output/Outcome Indicators (own elaboration)

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. # number of training and workshops 2. # of beneficiaries of the interventions that completed the training 3. # number 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 thematic 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 16 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 16: Evaluation Questions and Indicators of Effectiveness (own elaboration)

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?	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 favorable evaluation of the support (Likert scale) 5. % of expert with a favorable 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



	<p>6. To what extent the intervention triggers an increase in empowerment of beneficiaries?</p> <p>7. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business?</p> <p>8. To what extent the newly created initiative were relevant to the needs of citizens?</p> <p>9. To what extent the intervention triggers the ability of beneficiaries to get funding?</p> <p>10. To what extent the intervention triggers investments in social innovation initiatives?</p> <p>11. To what extent the intervention triggers investments in systemic innovation?</p> <p>12. What is the impact of the latter?</p> <p>13. To what extent the intervention boosts the trust of citizens in public administration?</p>	<p>12. Quantity of new patents developed by the beneficiaries of the initiative that start their own</p> <p>13. # of employees hired by the beneficiaries of the initiative that start their own</p> <p>14. General increase in social innovation investment in the city</p> <p>15. Quantity of new patents developed by the beneficiaries of initiatives</p> <p>16. Energy Savings from SI initiatives on recovering of city buildings stemming from the training acquired from citizens</p> <p>17. t/CO2 savings from SI initiatives on mobility stemming from the training acquired from citizens</p> <p>18. Renewable energy from SI initiatives on recovering of city buildings stemming from the training acquired from citizens</p> <p>19. Improvement and recovering of city buildings produced from SI initiatives supported by the service</p> <p>20. Elaboration of recommendations and lessons learnt on training from the evaluation of the initiative</p> <p>21. Extent of adoption of recommendations on training in the initiative iteration</p>
--	---	--

Table 17 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 17: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<p>1. Was the intervention result worth the invested time and effort in implementing the actions?</p> <p>2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality?</p> <p>3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?</p>	<p>1. # of beneficiaries who completed the programme/ initial # of beneficiaries</p> <p>2. # of beneficiaries who completed the programme/ material and human resources allocated</p> <p>3. # of beneficiaries with increased knowledge of SI after participating to the initiative/ material and human resources allocated</p> <p>4. # of beneficiaries with increased businesses knowledge and able to start their SI business, after participating to the initiative/ material and human resources allocated</p> <p>5. # of beneficiaries able to use the business seeding to start their SI initiative, after participating to the initiative/ material and human resources allocated</p> <p>6. # of beneficiaries with increased capability to attract funding after participating to the initiative/ material and human resources allocated</p> <p>7. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated</p> <p>8. % of beneficiaries with a favorable evaluation of the support (Likert scale) /material and human resources allocated</p>



		<p>9. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated</p> <p>10. # of citizens that feel more empowered from the initiative/material and human resources allocated</p> <p>11. % of expert with a favorable evaluation of the support in terms of efficiency (Likert scale, benchmarking with other funding mechanisms – especially traditional)</p> <p>12. Quantity of external funding accruing to the beneficiary of the initiative that start their own/material and human resources allocated</p> <p>13. Quantity of investment carried out by the beneficiaries of the initiative that start their own/material and human resources allocated</p> <p>14. General increase in social innovation investment in the city/material and human resources allocated</p> <p>15. Quantity of new patents developed by the beneficiaries of the initiative that start their own/material and human resources allocated</p> <p>16. # of employees hired by the beneficiaries of the initiative that start their own/material and human resources allocated</p> <p>17. General increase in social innovation investment in the city/material and human resources allocated</p> <p>18. Energy Savings from SI initiatives on recovering of city buildings stemming from the training acquired from citizens/material and human resources allocated</p> <p>19. t/CO2 savings from SI initiatives on mobility stemming from the training acquired from citizens/material and human resources allocated</p> <p>20. Renewable energy from SI initiatives on recovering of city buildings stemming from the training acquired from citizens/material and human resources allocated</p>
--	--	---

Table 18 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 18: Indicators from Existing Frameworks

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” <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 	NBS



<ul style="list-style-type: none"> • 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 	
--	--

4.2.4 Evaluation questions and indicators for category 3: Co-design of policies with social innovators and urban stakeholders

Table 19 shows the input/output/outcome indicators elaborated by the research team.

Table 19: Input/Output/Outcome Indicators (own elaboration)

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

Table 20 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 20: Evaluation Questions and Indicators of Effectiveness (own elaboration)

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?	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



	<p>5. To what extent the intervention boost the acceptance of policy decisions and new regulations by citizens?</p> <p>6. To what extent the intervention increases the adherence of policy decisions and new regulations to the needs of the citizens?</p> <p>7. To what extent the intervention boost the trust of citizens in policy makers?</p> <p>8. To what extent the intervention boost the co-design of SI policy?</p> <p>9. To what extent the co-designed policies are adopted by the city?</p> <p>10. To what extent the intervention boosts the development of new approaches for policy formulation related to SI?</p> <p>11. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens?</p> <p>12. What is the impact of the latter?</p> <p>13. To what extent co-created SI policies are more effective?</p> <p>14. To what extent co-created policies are more effective embody more social innovation elements?</p>	<p>10. # of co-created SI policies with a high level of acceptance/total # of SI policies</p> <p>11. # of public services stemming from co-creation sessions related to SI/# of public services stemming from co-creation sessions</p> <p>12. # of public services stemming from co-creation sessions related to SI/total # of public services</p> <p>13. # of public services stemming from co-creation sessions related to SI/total # of SI public services</p> <p>14. # of co-created policies in line with citizens' needs/total # of policies elaborated</p> <p>15. # of co-created SI policies adopted by the city/# of total SI policies</p> <p>16. # of new approaches for policy formulation related to SI/total # of new approaches for policy formulation</p> <p>17. # of co-creation environments devoted to SI/total # of co-creation environments</p> <p>18. # of social innovations developed from policy initiatives co-created/# of social innovations developed from policy initiatives non-co-created</p> <p>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</p> <p>20. Energy Savings from SI initiatives and public services supported by co-created policies</p> <p>21. t/CO2 savings from SI initiatives and public services supported by co-created policies</p> <p>22. Renewable energy produced from SI initiatives and public services supported by co-created policies</p> <p>23. Elaboration of recommendations and lessons learnt on co-creation stemming from the evaluation of the initiative</p> <p>24. Extent of adoption of recommendations on policy co-creation in the initiative iteration</p>
--	---	--

Table 21 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 21: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<p>1. Was the intervention result worth the invested time and effort in implementing the actions?</p> <p>2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality?</p> <p>3. How can the benefits associated with the intervention be achieved more</p>	<p>1. # of citizens who completed the programme/ initial # of citizens</p> <p>2. # of citizens who completed the programme/material and human resources allocated</p> <p>3. # of citizens with increased knowledge of SI after participating to the initiative/ material and human resources allocated</p> <p>4. # of citizens with increased empowerment after participating to the initiative/ material and human resources allocated</p> <p>5. # of citizens with increased with behavioural change after participating to the initiative/ material and human resources allocated</p>



	efficiently and at lower costs?	6. # of policy makers with increased 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/CO2 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 22 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 22: Indicators from Existing Frameworks

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) <ul style="list-style-type: none"> • 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	NBS



<ul style="list-style-type: none"> • 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 publicprivate 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 	
<p>Goal 4 - Enhancement of social cohesion and cultural particularity through ensuring sense of security and inclusion for all:</p> <ul style="list-style-type: none"> • 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
<p>Goal 5 - Sense of place and place attachment among users:</p> <ul style="list-style-type: none"> • 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
<p>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;</p> <ul style="list-style-type: none"> • 6.1 Higher trust in local community members - (Introduce: Level and quality of communication in defining site requirements) • 6.2 New forms of unneighborly exchange - neighborhood 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

4.2.5 Evaluation questions and indicators for category 4: Co-creation of social innovation initiatives with citizens and stakeholders

Table 23 shows the input/output/outcome indicators elaborated by the research team.

Table 23: Input/Output/Outcome Indicators (own elaboration)

Input	Output	Intermediate Outcome
-------	--------	----------------------



<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Number of SI hubs set up 2. Number of living labs set up 3. Number of SI transfer centers 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. # number 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 	<ol style="list-style-type: none"> 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
--	--	---

Table 24 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 24: Evaluation Questions and Indicators of Effectiveness (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
<p>What kind of support to the co-creation of social innovation by citizens was provided? Was it successful?</p> <p>To what extent the establishment of co-creation task forces have been successful in boosting social innovation?</p> <p>To what extent the establishment of SI hubs, living labs, and SI transfer centers has been successful in boosting social innovation?</p>	<ol style="list-style-type: none"> 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 centers 	<ol style="list-style-type: none"> 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 favorable evaluation of the support (Likert scale) 4. % of expert with a favorable 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 taxpayers 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



6. To what extent the intervention triggers investments in social innovation initiatives?	12. # of co-creation environments devoted to SI/total # of co-creation environments
7. To what extent the intervention triggers investments in systemic innovation?	13. # of co-created initiatives boosting social innovation/# of co-created initiatives
8. To what extent the intervention triggers an increase in empowerment of citizens?	14. # of co-created initiatives boosting social innovation/total # of initiatives
9. To what extent the new supported initiative were relevant to the needs of citizens?	15. # of co-created initiatives boosting social innovation/total # of SI initiatives
10. To what extent the intervention boosts the trust of citizens in public administration?	16. Quantity of funding stemming from co-created social innovation initiatives/Quantity of funding stemming from non-co-created social innovation initiatives
11. To what extent co-created initiatives are more effective?	17. Quantity of external funding accruing to the beneficiary initiatives
12. To what extent co-created initiatives embody more social innovation elements?	18. Quantity of investment carried out by the beneficiaries of initiatives
13. To what extent the intervention triggers behavioural change in citizens?	19. Quantity of business seeding funding collected by the beneficiary initiatives
14. To what extent the intervention triggers behavioural change in policy makers?	20. General increase in social innovation investment in the city
15. To what extent the intervention boost the acceptance of SI initiatives by citizens?	21. Quantity of new patents developed by the beneficiaries of initiatives
16. To what extent the intervention boost the trust of citizens in public administration?	22. Energy Savings from SI initiatives and supported by co-creation
	23. t/CO2 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 25 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 25: Evaluation Questions and Indicators of Efficiency (own elaboration)

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?	1. # of beneficiaries who completed the programme/ initial # of beneficiaries
	2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality?	2. # of beneficiaries who completed the programme/ material and human resources allocated
	3. How can the benefits associated with the intervention be achieved more	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



	efficiently and at lower costs?	6. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated 7. % of beneficiaries with a favorable 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 taxpayers money is used for the initiative/material and human resources allocated 10. % of expert with a favorable 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/CO2 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 26 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 26: Indicators from Existing Frameworks

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)	SIMRA
<ul style="list-style-type: none"> • 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 	



<ul style="list-style-type: none"> Indicator SIE3. Participation of actors in network meetings Indicator SIE4. Civic society engagement in the Social Innovation network 	
<p>Composite indicator X8.2 “New attitudes” (Eb1, Eb2)</p> <ul style="list-style-type: none"> 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
<p>Composite indicator X8.1 “New networks” (Ea1, Ea2, Ea3, Ea4, Ea5, Ea6, Ea7, Ea8, Ea9, Ea10, Ea11, Ea12, Ea13)¹⁵²</p> <ul style="list-style-type: none"> 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
<p>Goal 4 - Enhancement of social cohesion and cultural particularity through ensuring sense of security and inclusion for all:</p> <ul style="list-style-type: none"> 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
<p>Goal 5 - Sense of place and place attachment among users:</p> <ul style="list-style-type: none"> 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
<p>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;</p> <ul style="list-style-type: none"> 6.1 Higher trust in local community members - (Introduce: Level and quality of communication in defining site requirements) 6.2 New forms of unneighborly exchange - neighborhood 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

4.2.6 Evaluation questions and indicators for category 5: Funding/supporting community-led initiatives and small-scale pilots/experimentations

Table 27 shows the input/output/outcome indicators elaborated by the research team.

Table 27: Input/Output/Outcome Indicators (own elaboration)



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

Table 28: Evaluation Questions and Indicators of Effectiveness (own elaboration)

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	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 favorable evaluation of the support (Likert scale) 5. % of expert with a favorable 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/CO2 savings from SI initiatives supported by the service



	<p>investments in systemic innovation?</p> <p>9. To what extent the intervention triggers behavioural change in civil servants?</p> <p>10. To what extent the intervention triggers an increase in empowerment of citizens?</p> <p>11. To what extent the new supported initiative were relevant to the needs of social innovators?</p> <p>12. To what extent the new supported initiative were relevant to the needs of citizens?</p> <p>13. To what extent the intervention triggers investments in social innovation initiatives?</p> <p>14. To what extent the intervention boosts the trust of citizens in public administration?</p>	<p>16. Renewable energy produced from SI initiatives supported by the service</p> <p>17. Elaboration of recommendations and lessons learnt on business seeding stemming from the evaluation of the initiative</p> <p>18. Extent of adoption of recommendations on business seeding in the initiative iteration</p>
--	--	--

Table 29 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 29: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<p>1. Was the intervention result worth the invested time and effort in implementing the actions?</p> <p>2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality?</p> <p>3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?</p>	<p>1. # of beneficiaries who completed the programme/ initial # of beneficiaries</p> <p>2. # of beneficiaries who completed the programme/ material and human resources allocated</p> <p>3. # of beneficiaries with increased knowledge of SI after participating to the initiative/ material and human resources allocated</p> <p>4. # of beneficiaries with increased businesses knowledge and able to start their SI business, after participating to the initiative/ material and human resources allocated</p> <p>5. # of beneficiaries able to use the business seeding to start their SI initiative, after participating to the initiative/ material and human resources allocated</p> <p>6. # of beneficiaries with increased capability to attract funding after participating to the initiative/ material and human resources allocated</p> <p>7. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated</p> <p>8. % of beneficiaries with a favorable evaluation of the support (Likert scale) /material and human resources allocated</p> <p>9. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated</p> <p>10. # of citizens that feel more empowered knowing that their taxpayers money is used for the</p>



		initiative/material and human resources allocated 11. % of expert with a favorable 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/CO2 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 30 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 30: Indicators from Existing Frameworks

Indicator	Framework
Degree of diversity in the sectors impacted by social projects	RESINDEX
Index X2 “Response to societal challenges” (SIS1, SIS2) <ul style="list-style-type: none"> 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

4.2.7 Evaluation questions and indicators for category 6: Enabling social innovation/entrepreneurship initiatives scale-up beyond pilots

Table 31 shows the input/output/outcome indicators elaborated by the research team.

Table 31: Input/Output/Outcome Indicators (own elaboration)

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	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	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



design and managing the interventions)	7. # number of acceleration training and workshops	7. # of beneficiaries matched with challenge-owners
3. Material Resources allocated (e.g. cost of venues, equipment, training material, marketing, cost for legal assistance, etc.)	8. # number of training/workshops/consultancies to businesses in order to enable scaling, replication or adaptation	
4. Number of potential beneficiaries of the intervention	9. # of matching activities	

Table 32 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 32: Evaluation Questions and Indicators of Effectiveness (own elaboration)

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	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/CO2 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



	investments in social innovation initiatives? 11. To what extent the intervention triggers investments in systemic innovation?	
--	---	--

Table 33 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 33: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<ol style="list-style-type: none"> 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? 	<ol style="list-style-type: none"> 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/CO2 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 34 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 34: Indicators from Existing Frameworks

Indicator	Framework
Composite indicator X9.3 Beneficiaries <ul style="list-style-type: none"> 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

4.2.8 Evaluation questions and indicators for category 7: Testing and prototyping new funding mechanisms

Table 35 shows the input/output/outcome indicators elaborated by the research team.

Table 35: Input/Output/Outcome Indicators (own elaboration)

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

Table 36: Evaluation Questions and Indicators of Effectiveness (own elaboration)

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?	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 favorable evaluation of the support (Likert scale) 4. % of expert with a favorable 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



	<ol style="list-style-type: none"> 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? 	<ol style="list-style-type: none"> 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 37 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 37: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<ol style="list-style-type: none"> 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? 	<ol style="list-style-type: none"> 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 favorable 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/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 taxpayers money is used for the initiative/material and human resources allocated



		<ol style="list-style-type: none"> 7. % of expert with a favorable 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 38 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 38: Indicators from Existing Frameworks

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

4.2.9 Evaluation questions and indicators for category 8: Public procurement of social innovation services for sustainability

Table 39 shows the input/output/outcome indicators elaborated by the research team.

Table 39: Input/Output/Outcome Indicators (own elaboration)

Input	Output	Intermediate Outcome
<ol style="list-style-type: none"> 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.) 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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



4. Number of potential beneficiaries of the intervention	7. # of civil servants taking part to the task forces	12. # of citizens feeling empowered
--	---	-------------------------------------

Table 40 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 40: Evaluation Questions and Indicators of Effectiveness (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
<p>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?</p>	1. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens?	1. # of beneficiaries with increased knowledge of SI/participants to the initiatives
	2. To what extent the intervention triggers behavioural change in citizens?	2. # of SI initiatives created and sustainable/initiatives beneficiaries
	3. To what extent the intervention triggers behavioural change in policy makers?	3. % of beneficiaries with a favorable evaluation of the public procurement mechanism (Likert scale)
	4. To what extent the intervention triggers an increase in empowerment of citizens?	4. % of expert with a favorable evaluation of the public procurement mechanism (Likert scale, benchmarking with other funding mechanisms – especially traditional)
	5. To what extent the intervention boosts the acceptance of new public services by citizens?	5. # of beneficiaries with increased capability to attract funding/participants to the initiatives
	6. To what extent the intervention increases the adherence of public services with respect to the needs of the citizens?	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. How many beneficiaries joined the public procurement mechanisms?	7. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative
	8. Were the new public procurement mechanisms more effective?	8. # of new approaches for public procurement related to SI/total # of new approaches for public procurement
	9. Were the new public procurement mechanisms more relevant to the needs of social innovators?	9. # of public services in line with citizens' needs/total # of public services procured
	10. How much money was provided to the beneficiaries? Under what conditions?	10. # of public services embedding SI procured by the city/# of total public services procured
	11. To what extent the intervention triggers the ability of beneficiaries to get funding?	11. # of public services stemming from the initiative related to SI/total # of public services
	12. To what extent the intervention triggers investments in social innovation initiatives?	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



	<p>13. To what extent the intervention boosts the trust of citizens in policy makers?</p> <p>14. To what extent the intervention boosts the development of new approaches for public procurement related to SI?</p> <p>15. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens?</p> <p>16. What is the impact of the latter?</p> <p>17. To what extent public services embedding SI are more effective for what concerns sustainability?</p>	<p>23. t/CO2 savings from SI initiatives and public services developed with the procurement procedure</p> <p>24. Renewable energy produced from the public services developed with the procurement procedure</p> <p>25. Elaboration of recommendations and lessons learnt on public procurement stemming from the evaluation of the initiative</p> <p>26. Extent of adoption of recommendations on public procurement in the initiative iteration</p>
--	--	---

Table 41 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 41: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<p>1. Was the intervention result worth the invested time and effort in implementing the actions?</p> <p>2. What is the return on investment in terms of social innovation activities created and therefore increase in carbon neutrality?</p> <p>3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?</p>	<p>1. # of beneficiaries with increased knowledge of SI after participants to the support/material and human resources allocated</p> <p>2. # of citizens with increased empowerment after participating to the initiative/ material and human resources allocated</p> <p>3. # of SI initiatives created and sustainable after participants to the support/material and human resources allocated</p> <p>4. % of beneficiaries with a favorable evaluation of the support (Likert scale) /material and human resources allocated</p> <p>5. # of beneficiaries with increased capability to attract funding after participants to the support after participants to the support/material and human resources allocated</p> <p>6. # of citizens more sensitive to SI themes (including changing their behaviour) after participants to the support/material and human resources allocated</p> <p>7. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative/material and human resources allocated</p> <p>8. % of expert with a favorable evaluation of the support in terms of efficiency (Likert scale, benchmarking with other funding mechanisms – especially traditional)</p> <p>9. # of public services stemming from the initiative related to SI/material and human resources allocated</p> <p>10. # of new approaches for public procurement related to SI/material and human resources allocated</p>



		<ol style="list-style-type: none"> 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/CO2 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 42 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 42: Indicators from Existing Frameworks

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) <ul style="list-style-type: none"> • 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

4.2.10 Evaluation questions and indicators for category 9: Urban planning for social innovation

Table 43 shows the input/output/outcome indicators elaborated by the research team.

Table 43: Input/Output/Outcome Indicators (own elaboration)

Input	Output	Intermediate Outcome
1. Cost of the intervention (per activity: promotion, design,	<ol style="list-style-type: none"> 1. # of citizens taking part to the online activities 2. # of citizens taking part to the offline activities 	1. Drafting of the new urban development plan



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

Table 44 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 44: Evaluation Questions and Indicators of Effectiveness (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
<p>To what extent the establishment of new public procurement mechanisms has been successful in boosting social innovation? How was it received by citizens?</p> <p>Did it have side effects in introducing the general population to social innovation?</p> <p>To what extent the establishment of public procurement task forces and pathfinders have been successful in boosting social innovation?</p>	<p>1. To what extent the intervention leads to decrease in energy consumption and in the reduction of pollution and CO2? To what extent it decreases traffic and congestion?</p> <p>2. To what extent the co-designed intervention is adopted by citizens?</p> <p>3. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens?</p> <p>4. To what extent the intervention boost the acceptance of Si initiatives by citizens?</p> <p>5. To what extent the intervention boost the trust of citizens in public administration?</p> <p>6. To what extent the intervention enables the development of new social innovation initiatives? Are the SI</p>	<p>1. # of citizens with increased knowledge of SI/participants to the initiatives</p> <p>2. # of beneficiaries with increased capability to attract funding/participants to the initiatives</p> <p>3. # of beneficiaries with increased knowledge of SI/participants to the initiatives</p> <p>4. # of citizens feeling empowered/participants to the initiatives</p> <p>5. # of citizens more sensitive to SI themes (including changing their behaviour)/citizens having had contact with the initiative and the new initiatives</p> <p>6. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative</p> <p>7. # of citizens with behavioural change towards SI/participants to the initiatives</p> <p>8. % of beneficiaries with a favorable evaluation of the support (Likert scale)</p> <p>9. % of citizens who feel that their needs are fulfilled by the initiative</p> <p>10. % of expert with a favorable evaluation of the support (Likert scale, benchmarking with other funding mechanisms – especially traditional)</p> <p>11. # of initiatives boosting social innovation enabled by the intervention/total # of SI initiatives in the city</p>



	<p>initiatives created or triggered by the interventions more effective than other types of support?</p> <p>7. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries?</p> <p>8. To what extent the intervention triggers an increase in empowerment of citizens?</p> <p>9. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens?</p> <p>10. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business?</p> <p>11. To what extent the intervention triggers behavioural change in citizens?</p> <p>12. To what extent the intervention triggers behavioural change in policy makers and civil servants?</p> <p>13. To what extent the intervention triggers investments in social innovation initiatives?</p> <p>14. To what extent the intervention triggers investments in systemic innovation?</p> <p>15. To what extent the new initiatives developed within the scope of the intervention are relevant to the needs of citizens?</p>	<p>12. # of initiatives boosting social innovation developed by PA within the scope of the intervention/total # of SI initiatives developed in the city</p> <p>13. # of policy makers with behavioural change towards SI/participants to the initiatives</p> <p>14. Quantity of external funding accruing to the beneficiary for carrying out initiatives within the scope of the intervention</p> <p>15. General increase in social innovation investment in the city</p> <p>16. Quantity of new patents developed by PA within the scope of the intervention</p> <p>17. Quantity of investment carried out by citizens taking part to the intervention</p> <p>18. Quantity of new patents developed by citizens taking part to the intervention</p> <p>19. Renewable energy produced from SI initiatives (both from citizens and public) supported by the initiative</p> <p>20. t/CO2 savings from SI initiatives (both from citizens and public) supported by the initiative</p> <p>21. Energy Savings from SI initiatives (both from citizens and public) supported by the initiative</p> <p>22. Decrease in traffic and congestion</p> <p>23. Elaboration of recommendations and lessons learnt on systemic innovation stemming from the evaluation of the initiative</p> <p>24. Extent of adoption of recommendations on systemic innovation in the initiative iteration</p>
--	--	--

Table 45 depicts the evaluation questions and indicators of Efficiency (own elaboration).

Table 45: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<p>1. Was the intervention result worth the invested time and effort in implementing the actions?</p> <p>2. What is the return on investment in terms of social innovation</p>	<p>1. # of beneficiaries who completed the programme/initial # of beneficiaries</p> <p>2. # of beneficiaries who completed the programme/material and human resources allocated</p> <p>3. # of citizens with increased knowledge of SI after participating to the initiative/material and human resources allocated</p>



	<p>activities created and therefore increase in carbon neutrality?</p> <p>3. How can the benefits associated with the intervention be achieved more efficiently and at lower costs?</p>	<p>4. # of beneficiaries with increased capability to attract funding after participating to the initiative/material and human resources allocated</p> <p>5. # of beneficiaries with increased knowledge of SI after participating to the initiative/material and human resources allocated</p> <p>6. # of citizens feeling empowered after participating to the initiative/material and human resources allocated</p> <p>7. # of citizens with behavioural change towards SI after participating to the initiative/material and human resources allocated</p> <p>8. # of initiatives boosting social innovation enabled by the intervention/material and human resources allocated</p> <p>9. # of initiatives boosting social innovation developed by PA within the scope of the intervention/material and human resources allocated</p> <p>10. # of citizens that feel more empowered knowing that their taxpayers money is used for the initiative/material and human resources allocated</p> <p>11. # of policy makers with behavioural change towards SI after participating to the initiative/material and human resources allocated</p> <p>12. # of citizens more sensitive to SI themes (including changing their behaviour) after participating to the initiative/material and human resources allocated</p> <p>13. % of beneficiaries with a favorable evaluation of the support (Likert scale) /material and human resources allocated</p> <p>14. % of citizens who feel that their needs are fulfilled by the initiative/material and human resources allocated</p> <p>15. % of expert with a favorable evaluation of the support (Likert scale, benchmarking with other funding mechanisms – especially traditional) /material and human resources allocated</p> <p>16. Quantity of external funding accruing to the beneficiary for carrying out initiatives within the scope of the intervention/material and human resources allocated</p> <p>17. General increase in social innovation investment in the city/material and human resources allocated</p> <p>18. Quantity of new patents developed by PA within the scope of the intervention/material and human resources allocated</p> <p>19. Quantity of investment carried out by citizens taking part to the intervention/material and human resources allocated</p> <p>20. Quantity of new patents developed by citizens taking part to the intervention/material and human resources allocated</p> <p>21. Renewable energy produced from SI initiatives (both from citizens and public) supported by the initiative/material and human resources allocated</p> <p>22. t/CO2 savings from SI initiatives (both from citizens and public) supported by the initiative /material and human resources allocated</p> <p>23. Energy Savings from SI initiatives (both from citizens and public) supported by the</p>
--	---	---



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

Table 46: Indicators from Existing Frameworks

Indicator	Framework
Composite indicator X10.1 “Feedback loops and multiplier effects” (Ha1, Ha2, Ha3, Ha4) <ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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



4.2.11 Evaluation questions and indicators for category 10: Resource circularity

Table 47 shows the input/output/outcome indicators elaborated by the research team.

Table 47: Input/Output/Outcome Indicators (own elaboration)

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

Table 48 depicts the evaluation questions and indicators of Effectiveness (own elaboration).

Table 48: Evaluation Questions and Indicators of Effectiveness (own elaboration)

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 CO2? To what extent the biomass is re-used and what is the value created?	1. # of citizens with increased knowledge of SI/participants to the initiatives
	2. To what extent the co-designed intervention is adopted by citizens?	2. # of beneficiaries with increased capability to attract funding/participants to the initiatives
	3. To what extent the innovation triggers an increase in knowledge related to social innovation of citizens?	3. # of beneficiaries with increased knowledge of SI/participants to the initiatives
	4. To what extent the intervention boost the acceptance of SI initiatives by citizens?	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 favorable evaluation of the initiative (Likert scale)
		9. % of citizens who feel that their needs are fulfilled by the initiative



	<p>5. To what extent the intervention boost the trust of citizens in public administration?</p> <p>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?</p> <p>7. To what extent the intervention triggers an increase in capacity related to social innovation of beneficiaries?</p> <p>8. To what extent the intervention triggers an increase in empowerment of citizens?</p> <p>9. To what extent the intervention triggers an increase in the public support of social innovation initiatives by citizens?</p> <p>10. To what extent the intervention triggers an increase of the ability beneficiaries to start their own social innovation business?</p> <p>11. To what extent the intervention triggers behavioural change in citizens?</p> <p>12. To what extent the intervention triggers behavioural change in policy makers and civil servants?</p> <p>13. To what extent the intervention triggers investments in social innovation initiatives?</p> <p>14. To what extent the intervention triggers investments in systemic innovation?</p> <p>15. To what extent the new initiatives developed within the scope of the intervention are relevant to the needs of citizens?</p>	<p>10. % of expert with a favorable evaluation of the initiative (Likert scale, benchmarking with other initiatives – especially traditional)</p> <p>11. # of services boosting social innovation enabled by the intervention/total # of SI initiatives in the city</p> <p>12. # of policy makers with behavioural change towards SI/participants to the initiatives</p> <p>13. Quantity of external funding accruing to the beneficiary for carrying out services/products within the scope of the intervention</p> <p>14. General increase in social innovation investment in the city</p> <p>15. Quantity of new patents developed by PA within the scope of the intervention</p> <p>16. Quantity of new patents developed by citizens taking part to the intervention</p> <p>17. Revenues and employment from new services and initiatives created</p> <p>18. Decrease in waste from the PA SI initiative and the supported initiatives by citizens</p> <p>19. t/CO2 savings from the PA SI initiative and the supported initiatives by citizens</p> <p>20. Energy Savings from the PA SI initiative and the supported initiatives by citizens</p> <p>21. Elaboration of recommendations and lessons learnt on systemic innovation stemming from the evaluation of the initiative Extent of adoption of recommendations on systemic innovation in the initiative iteration</p>
--	--	--

Table 49 depicts the evaluation questions and indicators of Efficiency (own elaboration).



Table 49: Evaluation Questions and Indicators of Efficiency (own elaboration)

General Evaluation Questions	Specific Evaluation Questions	Indicators
What is the cost/benefit ratio of the intervention?	<ol style="list-style-type: none"> 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? 	<ol style="list-style-type: none"> 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 favorable 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 favorable 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



		<ul style="list-style-type: none"> 20. Decrease in waste from the PA SI initiative and the supported initiatives by citizens /material and human resources allocated 21. t/CO2 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/CO2 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 50 depicts the indicators from existing frameworks mapped to the category, and mostly related to effectiveness/impact.

Table 50: Indicators from Existing Frameworks

Indicator	Framework
Composite indicator X10.1 Feedback loops and multiplier effects <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 1. E23 - Water reuse (on-site) 2. E24 – Waste reuse/management/recycle 	EU POLIS



4.2.12 Generic Indicators

This final subsection depicts a series of evaluation indicators for initiatives stemming in general from the plan and its categories of implementation (Table 51).

Table 51: General Evaluation for Initiatives

Indicator	Framework
Composite indicator X11.1 Relevance of the Social Innovation process <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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
Composite indicator X13.1 Effectiveness of the Social Innovation process <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Indicator F5. Level of satisfaction of beneficiaries with the results of the Social Innovation project 	SIMRA



<ul style="list-style-type: none"> 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 <p>Composite indicator X13.3 “Effectiveness of the Social Innovation initiative” (F9, F10, F11)</p> <ul style="list-style-type: none"> 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 	
<p>Composite indicator X14.1 Impact of the Social Innovation project</p> <ul style="list-style-type: none"> 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 <p>Composite indicator X14.2 Impact of the Social Innovation initiative</p> <ul style="list-style-type: none"> 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
<p>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)</p> <ul style="list-style-type: none"> 7.1 Microclimate improvement - (Introduce: Comprehensive and noticeably better quality microclimate compared to surroundings) 7.2 Energy saving in immediate neighborhood - (Introduce: Demonstration site urban components affecting energy consumption in the neighboring buildings) 7.3 Heat Island reduction - (Introduce: Demonstration site urban components affecting directly and indirectly Heat Island intensity at the site and at the neighboring buildings) 7.4 Enhance environment 7.5 Provide adequate infrastructure for water amenities 	EU POLIS
<p>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</p> <ul style="list-style-type: none"> 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) 	EU POLIS



<ul style="list-style-type: none"> 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 	
<p>Social Justice and Social Cohesion</p> <ul style="list-style-type: none"> 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
<p>Health and Well-being</p> <ul style="list-style-type: none"> 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
<p>New Economic Opportunities and Green Jobs</p> <ul style="list-style-type: none"> 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 € 	NBS



<ul style="list-style-type: none"> • 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 km2 • 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 €/km2 • 24.25 Innovation impact No. innovations • 24.26 Income per capita €/year per person • 24.27 Upskilling and related earnings increase 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 €/m3 • 24.31 Dissuasive cost of water abstraction €/m3 • 24.32 Average water productivity €/m3 • 24.33 New areas made available for traditional productive uses km2 • 24.34 Value of food produced in NBS • 24.35 Renewable energy produced in NBS 	
<p>Climate Resilience</p> <ul style="list-style-type: none"> 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 	NBS



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	
--	--

Finally, the research team presents a summary table of the number of indicators per category, per criteria (effectiveness - EFFE, efficiency EFFI, sustainability - SU, replicability - RE, scalability - SC), and distinguishing if own (O) or mapped (M) from an existing framework (Table 52).

Table 52: Summary Table on the number of Indicators

SI Category	Evaluation Criteria Indicators					Input/Output/Outcome	Total
	EFFE/Impact	EFFI	SU	RE	SC		
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



5 Conclusion

The deliverable presented the indicators and assessment methods of the social innovation categories of the of the action plan. In order to assess the impact of social innovation in the project, it is necessary to measure which project 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 10 categories of interventions and produced a set of intervention logics and indicators for the general case and for each related category. Further, the research team mapped to the general case and to each categories the indicators elaborated in existing evaluation frameworks. The next step of the work will be to select and adapt the indicators to the city cases, and to identify a subset of mandatory indicators (most probably from the indicators presented in Tables 4-9) to be included in D2.4.2. The mandatory indicators will be used to assess the progresses of the NZC project, in addition to informing cities on their performance on social innovation (through the visualization on the dashboard which will be developed by WP3). Currently, task 9.3 is developing a social innovation readiness assessment tool, which can further inform the selection of mandatory social innovation indicators based on cities' needs. Next, indicators will be tested with cities and adapted according to the feedback provided.

A sample of key indicators will be further detailed according to the template defined in WP2 and exemplified in the following table

Table 53: Exemplary application of the template

Indicator Description	
Indicator Name	# of platforms for co-creation of SI initiatives
Indicator Unit	Integer
Definition	Number of platforms used by stakeholders for co-creation
Calculation	Counting the platforms
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission domain is it linked to co-benefits?	
Does the indicator measure indirect impacts (i.e. co-benefits)?	No
If yes, which co-benefit does it measure?	
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	Social Innovation impact logic category 4
Is the indicator captured by the existing CDP / SCIS/Covenant of Mayors platforms?	No
Data requirements	
Expected data source	City officials
Expected availability	Available
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	Own elaboration
Other indicator systems using this indicator	no



Bibliography

- Agarwal, A., Perrin, N., Chhatre, A., Benson, C. S., & Kononen, M. (2012). Climate policy processes, local institutions, and adaptation actions: mechanisms of translation and influence. *Wiley Interdisciplinary Reviews: Climate Change*, 3(6), 565-579.
- Andion, C., Alperstedt, G. D., Graeff, J. F., & Ronconi, L. (2021). Social innovation ecosystems and sustainability in cities: a study in Florianópolis, Brazil. *Environment, Development and Sustainability*, 1-23.
- Angelidou, M., & Psaltoglou, A. (2017). An empirical investigation of social innovation initiatives for sustainable urban development. *Sustainable cities and society*, 33, 113-125.
- Arvidson, M., Lyon, F., McKay, S., & Moro, D. (2010). The ambitions and challenges of SROI.
- Baer, D., Loewen, B., Cheng, C., Thomsen, J., Wyckmans, A., Temeljotov-Salaj, A., & Ahlers, D. (2021). Approaches to Social Innovation in Positive Energy Districts (PEDs)—A Comparison of Norwegian Projects. *Sustainability*, 13(13), 7362.
- Bauwens and Defourny (2017) in Hewitt, R. J., Bradley, N., Baggio Compagnucci, A., Barlagne, C., Ceglaz, A., Cremades, R., ... & Slee, B. (2019). Social innovation in community energy in Europe: A review of the evidence. *Frontiers in Energy Research*, 7, 31.
- Bofylatos, S. (2022). Upcycling Systems Design, Developing a Methodology through Design. *Sustainability*, 14(2), 600.
- Cantafio, G. U., & Ryan, S. (2020). Incorporating innovation metrics in urban indices: the Sustain-LED Index. *Regional Studies, Regional Science*, 7(1), 133-163.
- Castro-Spila J., Cressey, P., Shondt, S., Kaderabkova, A., Luna, A., Moghadam Saman, S., Terstriep, J., van de Ven, A., van der Torre, W., Ziauberyte, R. (2016). Social Innovation Evaluation Toolbox. SIMPACT project, Germany. ISSN: 2365-1121.
- Ceschin, F.; Gaziulusoy, I. Evolution of design for sustainability: From product design to design for system innovations and transitions. *Des. Stud.* 2016, 47, 118–163.
- Chilvers, J., & Longhurst, N. (2016). Participation in transition (s): Reconceiving public engagements in energy transitions as co-produced, emergent and diverse. *Journal of Environmental Policy & Planning*, 18(5), 585-607.
- Creutzig, F., Niamir, L., Bai, X. et al. (2022). Demand-side solutions to climate change mitigation consistent with high levels of well-being. *Nat. Clim. Chang.* 12, 36–46.
- Dhondt, S., H. van de Ven, P. Cressey, A. Kaderabkova, Á. Luna, S. Moghadam Saman, J. Castro Spila, R. Ziauberyte, W. van der Torre, and J. Terstriep. "Evaluation Toolbox: Ex-Ante Impact Assessment and Value Network Analysis for SI." (2016).
- Diepenmaat, H., Kemp, R., & Velter, M. (2020). Why sustainable development requires societal innovation and cannot be achieved without this. *Sustainability*, 12(3), 1270.
- Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Kadner, S., Minx, J.C., Brunner, S., Agrawala, S., Baiocchi, G., et al. (2014). *Technical summary*. In: *Climate Change 2014: Mitigation of Climate Change*. IPCC Working Group III Contribution to AR5. Cambridge University Press.



- Engelbrecht, H.-J. (2018). The (social) innovation – subjective wellbeing nexus: subjective well-being impacts as an additional assessment metric of technological and social innovations, *Innovation: The European Journal of Social Science Research*, 31:3, 317-332
- EU-Polis (2021) D3.2 – Baseline status and indicators identification. Project deliverable.
- European Commission (2021) Evaluating the impact of nature-based solutions: appendix of methods, Dumitru, A.(editor), Wendling, L.(editor), Publications Office of the European Union, 2021, <https://data.europa.eu/doi/10.2777/11361>
- Geels, F. W. (2020). Micro-foundations of the multi-level perspective on socio-technical transitions: developing a multi-dimensional model of agency through crossovers between social constructivism, evolutionary economics and neo-institutional theory. *Technological Forecasting and Social Change*, 152, 119894.
- Geels, F. W., Hekkert, M. P., & Jacobsson, S. (2008). The dynamics of sustainable innovation journeys. *Technology Analysis & Strategic Management*, 20 (5), 521-536.
- Geels, F. W., Sovacool, B. K., Schwanen, T., & Sorrell, S. (2017). Sociotechnical transitions for deep decarbonization. *Science*, 357(6357), 1242-1244.
- Gregg, J. S., Nyborg, S., Hansen, M., Schwanitz, V. J., Wierling, A., Zeiss, J. P., ... & Padovan, D. (2020). Collective action and social innovation in the energy sector: A mobilization model perspective. *Energies*, 13(3), 651.
- Grottera, C. Lèbre La Rovere E., Wills W. & Olímpio Pereira A. Jr (2020) The role of lifestyle changes in low-emissions development strategies: an economy-wide assessment for Brazil, *Climate Policy*, 20:2, 217-233.
- Haskell, L., Bonnedahl, K. J., & Stål, H. I. (2021). Social innovation related to ecological crises: A systematic literature review and a research agenda for strong sustainability. *Journal of Cleaner Production*, 325, 129316.
- Hewitt, R. J., Bradley, N., Baggio Compagnucci, A., Barlagne, C., Ceglarz, A., Cremades, R., ... & Slee, B. (2019). Social innovation in community energy in Europe: A review of the evidence. *Frontiers in Energy Research*, 7, 31.
- Hoppe, T., & De Vries, G. (2019). Social innovation and the energy transition. *Sustainability*, 11(1), 141
- Howaldt, J., Hochgerner, J., 2017. Concepts and understanding of social innovation. In: Howaldt, J., Schröder, A., Butzin, A., Rehfeld, D. (Eds.), *Towards a General Theory And Typology Of Social Innovation*. Deliverable D1.6 of the Project: "Social Innovation: Driving Force of Social Change" (SI-DRIVE). Dortmund: Sozialforschungstelle. Howaldt, J., Schröder, S., Kaletka,
- Howaldt, J., Schröder, A., Butzin, A., & Rehfeld, D. (2017). Towards a general theory and typology of social innovation. *SI-DRIVE Deliverable*, 1.
- Knowlton, L. W., & Phillips, C. C. (2012). *The logic model guidebook: Better strategies for great results*. Sage.
- Krlev, G., Bund, E., & Mildenerger, G. (2014). Measuring what matters—Indicators of social innovativeness on the national level. *Information Systems Management*, 31(3), 200-224.
- Loyarte-López, E., Barral, M., & Morla, J. C. (2020). Methodology for carbon footprint calculation towards sustainable innovation in intangible assets. *Sustainability*, 12(4), 1629.



- Lukesch, R., Ludvig, A., Slee, B., Weiss, G., & Živojinović, I. (2020). Social innovation, societal change, and the role of policies. *Sustainability*, 12(18), 7407.
- Millar, R., & Hall, K. (2013). Social return on investment (SROI) and performance measurement: The opportunities and barriers for social enterprises in health and social care. *Public Management Review*, 15(6), 923-941.
- Mukai, T., Nishio, K. I., Komatsu, H., & Sasaki, M. (2022). What effect does feedback have on energy conservation? Comparing previous household usage, neighbourhood usage, and social norms in Japan. *Energy Research & Social Science*, 86, 102430.
- Murray, R., Caulier-Grice, J., & Mulgan, G. (2010). *The open book of social innovation* (Vol. 24). London: Nesta.
- Nakano, R., Miwa, T., & Morikawa, T. (2018). Comparative analysis on citizen's subjective responses related to their willingness to pay for renewable energy in Japan using latent variables. *Sustainability*, 10(7), 2423.
- Ostfeld, R., & Reiner, D. M. (2020). Public views of Scotland's path to decarbonization: Evidence from citizens' juries and focus groups. *Energy Policy*, 140, 111332
- Rizzo, F., Deserti, A., & Komatsu, T. (2020). Implementing social innovation in real contexts. *International Journal of Knowledge-Based Development*, 11(1), 45-67.
- Rosenbloom, D., Berton, H., & Meadowcroft, J. (2016). Framing the sun: A discursive approach to understanding multi-dimensional interactions within socio-technical transitions through the case of solar electricity in Ontario, Canada. *Research Policy*, 45(6), 1275-1290.
- Schanes, K., Giljum, S., & Hertwich, E. (2016). Low carbon lifestyles: A framework to structure consumption strategies and options to reduce carbon footprints. *Journal of Cleaner Production*, 139, 1033-1043.
- Schartinger, D., Wepner, B., Andersson, T., Abbas, Q., Asenova, D., Damianova, Z., Zirngiebl, M., 2017. *Social innovation in environment and climate change: summary report*.
- Schönwälder, G. (2021). Engaging citizens to boost climate neutrality and greater circularity: opportunities and challenges for research and innovation. *Clean Technologies and Environmental Policy*, 23(2), 483-489.
- Scott, W.R., 1995. *Institutions and Organizations*. Sage Publications, Thousand Oaks, CA.
- Secco, L., Pisani, E., Burlando, C., Da Re, R., Gatto, P., Pettenella, D., Vassilopoulos, A., Akinsete, E., Koundouri, P., Lopolito, A. and Prosperi, M., (2017). Set of methods to assess SI implications at different levels. SIMRA project deliverable.
- Secco, L., Pisani, E., Da Re, R., Rogelja, T., Burlando, C., Vicentini, K., ... & Nijnjk, M. (2019). Towards a method of evaluating social innovation in forest-dependent rural communities: First suggestions from a science-stakeholder collaboration. *Forest Policy and Economics*, 104, 9-22.
- Sinnergiak Social Innovation (2013): *Regional Social Innovation Index*. A regional index to measure social innovation Basque Innovation Agency, Bilbao.
- Sörgel, B., Kriegler, E., Weindl, I., Rauner, S., Dirnaichner, A., Ruhe, C., ... & Popp, A. (2021). A sustainable development pathway for climate action within the UN 2030 Agenda. *Nature Climate Change*, 11(8), 656-664.



- Stocco, N.; Gardona, F.; Biddau, F.; Cottone, P.F. Learning Processes and Agency in the Decarbonization Context: A Systematic Review through a Cultural Psychology Point of View. *Sustainability* 2021, 13, 10425.
- Terstriep, J., Rehfeld, D., & Kleverbeck, M. (2020). Favourable social innovation ecosystem (s)?—An explorative approach. *European Planning Studies*, 28(5), 881-905.
- Unceta, A., Castro-Spila, J., & Garcia Fronti, J. (2016). Social innovation indicators. *Innovation: The European Journal of Social Science Research*, 29(2), 192-204.
- Unceta, A., Luna, Á., Castro, J., & Wintjes, R. (2020). Social Innovation Regime: an integrated approach to measure social innovation. *European Planning Studies*, 28(5), 906-924.
- Wuebben, D., Romero-Luis, J., & Gertrudix, M. (2020). Citizen science and citizen energy communities: a systematic review and potential alliances for SDGs. *Sustainability*, 12(23), 10096.

