



**NET
ZERO
CITIES**

NetZeroCities Pilot Cities Programme Guidebook

Version N°0.1

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Disclaimer

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Abbreviations and acronyms

Acronym	Description
CCC	Climate City Contracts
CESF	City Expert Support Facility
CINEA	The European Climate, Infrastructure and Environment Executive Agency
CoP	Community of Practice
DNSH	Do No Significant Harm [principle]
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EIB	European Investment Bank
ESCOs	Energy Service Companies
EU	European Union
EGD	European Green Deal
FAQ	Frequently Asked Questions
GHG	Greenhouse gases
GPC	Global Protocol for Community-Scale
H2020	Horizon 2020
JRC	Joint Research Centre (European Commission)
M&E	Monitoring and Evaluation
MEL	Monitoring, Evaluation, and Learning
MOOC	Massive Open Online Courses
NEB	New European Bauhaus
NZC	NetZeroCities
OECD	The Organisation for Economic Co-operation and Development
P2P	Peer-to-Peer
PB	Participatory Budgeting
SDGs	Sustainable Development Goals
SME	Small and Medium Enterprises
ToC	Theory of Change
UNDP	United Nations Development Programme

Summary

The Pilot Cities Guidebook is a deliverable under Work Package 4 (WP4) of the NetZeroCities (NZC) project, that covers the design and implementation of a Pilot Cities Programme via an open Call for proposals and subsequent granting programme.

The objective of the Guidebook is to support cities in preparing proposals for submission to the open Call, providing guidance on the scope, aims, and objectives of the Pilot Cities Programme and wider NZC project methodology, introducing key concepts and terminology, and references to useful resources, tools, and case studies related to these.



Introduction

The Pilot Cities Guidebook is a resource to be published to provide support and guidance to cities intending to apply to the NZC Pilot Cities programme.

It contains support and guidance relating to the context for and focus of the NZC Pilot Cities programme (and includes a Call timeline), introducing key concepts, terminology, and components of the programme; and, where applicable, additional resources, links, case studies, and examples for cities to utilise in the preparation of their application.

The Guidebook may be updated, as any supporting information changes and/or becomes available. A frequently asked questions (FAQ) will be made available where enquiries and subsequent responses are relevant to all potential applicants.

In addition to this Guidebook, the Call Guidelines will be published for the opening of the Call (as per the timeline under section 2.1) which will contain the Call to Action, assessment and selection criteria, and technical information related to the application process.

The Guidebook has been compiled to ensure the objective of the Guidebook being both informative and generative for cities considering and application to the NZC Pilot Cities Programme, and is framed around the following questions:

- Why is this [section/topic] relevant to NZC and the Pilot Cities Call?
- How is this useful or relevant to cities while preparing their proposal?
- Are there any relevant illustrative examples and case studies?
- What resources and/or future NZC Platform resources/services cities should look out for?
- Recap: What questions should cities ask themselves, in relation to this section/topic?
- What are key terms that should be covered in a glossary?
- Are there any formal References that should be included?

How to read this Guidebook:

- The guidebook is broadly structured in alignment with the Call guidelines and assessment criteria, though the primary design principle has been to support cities' ideation and thinking in advance of submitting an application.
- Key terms and concepts, highlighted in **bold and blue**, are defined for the purpose of NZC Pilot Cities Programme, and can be found in the Glossary.
- As per the **Call Guidelines**, in the case of a **multi-city application** to the Pilot Cities call, please note that references in this document to "city" will imply the group of cities or each city involved in that group.



1 NetZeroCities: Pilot Cities Programme

1.1 The problems and potential of emissions in cities

Cities are the centres of economic activity, knowledge generation, innovation, and new technologies, and influence the quality of life of citizens who live or work in them, contributing substantially to the well-being of European communities. They play a pivotal role in achieving the European Green Deal (EGD) target of reducing **emissions** by 55% by 2030 and of climate neutrality by 2050. Cities take up only 4% of the EU's land area yet are home to 75% of EU citizens. Furthermore, cities consume over 65% of the world's energy and account for more than 70% of global **CO2 emissions**. Three out of four EU citizens were living in urban areas in 2014 and this number is expected to rise to approximately 83.7% by 2050¹.

Climate mitigation is therefore heavily dependent on urban action through green and digital transformation. Mission cities are expected to lead this transformation by achieving climate neutrality before 2030, as well as to offer cleaner air, safer transport, and less congestion and noise to their citizens. The objectives of the EU Mission on Climate-neutral and Smart Cities (**'Cities Mission'**) are to achieve 100 climate-neutral and smart European cities by 2030 and to ensure that these cities act as experimentation and innovation hubs to enable all European cities to follow suit by 2050.

This level of ambition is an extraordinary undertaking and will require profound and **systemic** changes. Government leadership will be critical, as will actions by industry, education and research institutions, and civic organisations, requiring alignment in terms of policies, governance, and how we arrange for the needed capital investments.

To meet its goals, the **Cities Mission** will also need to help overcome the substantial challenges that currently prevent the objective of climate neutrality in 2030 from being achieved by a large group of cities. Many cities and city organisations have stated that, while they want to go further and faster, they face barriers in doing so, such as their operational capacity and capability; the availability of funding and finance; and the need to develop political support both with their voters and within their individual countries. These are concrete examples of the many difficulties faced by cities on their journey to climate neutrality, though not necessarily the only ones.

In areas such as urban mobility and energy efficiency of buildings, the characteristics of cities - such as high levels of population density and geographic focus - lend themselves to innovation opportunities that can have a large impact on climate neutrality. Cities represent a major share of Europe's building stock, where renovation is a must to save energy on the way to climate neutrality. This can bring massive (and visible) "**co-benefits**" such as better outdoor and indoor air quality, less road congestion, healthier active mobility, and healthier, more climate-proof and comfortable buildings; fewer road deaths, less noise, and a cleaner, more beautiful; and a more valuable urban environment. In other words, there is a strong and positive "spill-over" effect from policy measures to reduce greenhouse gases (GHG) in cities which will help them build support for such measures amongst citizens.

Smart city solutions and data-sharing at scale are offering opportunities to plan, implement, and monitor reductions in **emissions** across a range of sectors, such as urban mobility, energy efficiency in buildings, **monitoring** of air pollution, water and waste management.

Recognising that the majority of investment to achieve carbon neutrality will need to be made, directly or indirectly, by citizens, property owners, utilities, infrastructure developers, businesses, and other stakeholders (indeed, it is estimated in this work by Material Economics² that only 17% of investment

¹ Developments and Forecasts on Continuing Urbanisation, European Commission, accessed 15 June 2022: https://knowledge4policy.ec.europa.eu/foresight/topic/continuing-urbanisation/developments-and-forecasts-on-continuing-urbanisation_en

² Material Economics (2020). Understanding the Economic Case for Decarbonising Cities - Why Economic Case Analysis for City Decarbonisation is Crucial (available at <https://materialeconomics.com/latest-updates/understanding-the-economic-case-for-decarbonizing-cities>)



will be made by cities directly), cities will play a key role in mobilising other stakeholders through use of their planning powers, their role as shareholders of utilities, through initiatives targeting citizens, through use of incentives, and through catalysing investment targeting multiple stakeholders.

Resources and other initiatives

- The NZC **Mission Platform** will have a Knowledge Repository containing case studies and example for inspiration and orientation and a Dashboard for cities to monitor and compare progress. In addition, it will have an Innovation Ecosystems Map of Europe-based clusters, incubators, and support programmes, that support technology companies providing sustainable solutions to urban climate strategies.
- The Living-in.EU movement seeks to accelerate the digital transformation in a way that assists cities and communities to address a range of societal challenges; in particular those resulting from climate change.
- European Climate Pact.
- The New European Bauhaus (NEB) initiative for climate-neutral urban quality transformations.
- Mannheim Declaration, promoted by ICLEI, to support cities in developing and implementing “Local Green Deals”, as well as the New Leipzig Charter adopted in November 2020 which placed particular emphasis on green, just, and productive sustainable city development.
- National Energy and Climate Plans.
- EU Cohesion Policy.
- Urban Agenda for the EU.
- EU Pact for Skills
- [Recovery and Resilience facility and plans](#)
- [REPowerEU Plan](#)
- [EU Mission: Climate-Neutral and Smart Cities: Implementation Plan](#)

Useful links and references

- ❖ [Discover the 100 cities selected for the Cities Mission](#)
- ❖ [Developments and Forecasts on Continuing Urbanisation](#)
- ❖ Material Economics (2020). Understanding the Economic Case for Decarbonising Cities - Why Economic Case Analysis for City Decarbonisation is Crucial (available at <https://materialeconomics.com/latest-updates/understanding-the-economic-case-for-decarbonizing-cities>)

1.2 NZC Pilot Cities Programme

The NZC Pilot Cities Programme will identify and support European cities³ to test and implement innovative approaches to rapid decarbonisation over a **two-year** pilot programme, working across thematic areas and functional silos in support of **systemic** transformation. The selection of pilots will seek to address all urban **systems** contributing to climate-neutrality, including mobility, energy systems and the built environment, material and resource flows, natural areas, cultural/social/financial/institutional systems, and accessible public spaces. Any one pilot might target all, or a combination of, these urban systems, depending on their context and the scale of the proposed pilot.

The Pilot Cities are expected to test and implement innovative solutions, or groups of solutions, at city or district level over the duration of the pilot project, surfacing explicit lessons learnt from the innovative trajectories, with knowledge, capacity and capabilities developed at city level. A clear set of innovative solutions ready to be implemented, scaled and/or replicated should be identified by the end of the pilot

³ or districts if thoroughly justified why the entire city cannot be considered and that this would not affect the impact of pilot activities



project. This could include new business models, policy initiatives, **governance innovation**, funding or financing models, and replication or scaling strategies.

Selected pilot cities will receive funding and hands-on support from City Advisors and NZC Consortium partners to refine their pilot activities before starting implementation to address compliance and feedback from the selection process. As cities and/or local communities participating in pilots work to leverage additional resources, the **Mission Platform** will assist them in building funding and financing for full implementation and subsequent replication and scaling efforts.

Finally, numerous activities will be organised to advance **learning** among Pilot cities as a key component for building capabilities, replicating successful innovations, and deepening relationships. A twinning programme (City Learning Programme) will link each Pilot City with two or three twin cities from across EU member states and (H2020) Associated Countries. The twinning effort aims at building inclusive participation in effective climate action, nurturing just transitions, and building social cohesion.

The coordination of and across selected pilots is a necessity both at the city scale and the EU scale in order to build a diversity of proof-points showing **pathways** for further and far-reaching transformation in European cities and across the European Union. The pilot selection process therefore aims to construct a strategic portfolio where each pilot has the potential to test and demonstrate the viability of a pathway to change in a particular context. Together, Pilot Cities are complementary in painting the picture of what **systemic** change could look like.

1.2.1 What does a good pilot look like?

Good pilots:

- start from the recognition that, in the words of the [EU Mission Climate-Neutral and Smart Cities Implementation Plan](#),
“The main obstacle to climate transition is not a lack of climate-friendly and smart technologies, but the capacity to implement them. The present silo-based form of governance, designed and developed for traditional city operations and services, cannot drive an ambitious climate transition. Therefore, a systemic transformation is urgent.”
- aim for systemic transformation by purposefully combining multiple **levers** of change to build capacity for accelerating impact. This effort could focus on one or several key **emissions domains**
- are rooted in a local understanding and collaborative self-assessment of key barriers or opportunities for accelerating the climate transition that a city is facing. Hence the pilot cities focus on the key next steps (i.e., interventions leading to **breakthroughs** and/or **tipping points**) a city should explore to reduce its harmful **emissions**, with input from multiple actors across society
- test a combination of innovations across different levers of change within one **emissions domain** or by bringing together different **emissions domains** in e.g., a district-based holistic proposition, or new city-wide governance arrangements that build systemic capacity for accelerated change
- reinforce an organizational dimension to cultivate a culture of ‘**radical collaboration**’ to sustain and scale shared action towards climate neutrality across society.

In addition, the **Mission Platform** will support Pilot Cities to:

- unlock internal change at city councils creating stable cross-departmental structures connected with the top management of the cities
- foster solid bonds among city stakeholders: other public administrations (regional/national), private sector, academia, civil society and citizens, and mass media



- reinforce urban climate neutrality endeavour at the national/country level, through a 'snowball effect' connecting the pilots with the transformation of other cities in the same country

The Pilot Cities will:

- accelerate their own learning about how to achieve **breakthroughs** and overcome **systemic** barriers, and
- show a diversity of **pathways** towards transition that other cities across Europe can learn from and adapt to their own context.

Where available, Pilot Cities' effort will build on their past and/or current innovation efforts, paying attention to what has/is being learned, and to set out what is needed to enable accelerated change.

Illustrative examples

- A Pilot City focuses on an integrated mobility transition, leveraging the city government's role across technology, finance, regulation, participation, and contract types.
- A Pilot City focuses on 'whole-district' energy transition, connecting built environment with energy **systems** through the exploration of new financial instruments, urban planning policies and digitally enhanced governance models.
- A Pilot City focuses on exploring new data handling capacity in combination with outcomes-based regulation and procurement reform, working with representatives from across the city's emission domains to better align existing resources and unlock new sources of finance.



2 Applying to the Call

2.1 Timeline

Date / Time (CET)	Item	Link applicable (if applicable)
March 2022	Early announcement of the call timeline on the project website	NZN Website
June 2022	<p>Publication: Guidebook for participants A Pilot Cities Guidebook will be launched at the NZC Conference in June 2022, to support cities in preparing proposals for submission to the open Call.</p> <p>Publication: Call Guidelines The guidelines for the Call, including eligibility, assessment, and selection criteria, will be published both to the NZC website, Mission Portal, and EU Funding and Tenders Opportunities Portal under the type of grants “Cascade Funding Calls”</p>	NZC Platform EU Mission: Climate-Neutral and Smart Cities European Commission Funding & tenders (europa.eu)
27 June 2022 4 July 2022 5 September	<p>Information sessions:</p> <ul style="list-style-type: none"> NZC Pilot Cities Programme: Ambition, approach, application NZC Pilot Cities Programme: Criteria for selection and the selection process Technical information session Open forum 	<p>Registration links</p> <p>27 June: https://us06web.zoom.us/webinar/register/WN_q0NfsSfmTeWPWm0D_I-MgT</p> <p>4 July: https://us06web.zoom.us/webinar/register/WN_SJLwJ2pnTRKlb29tyW5acc</p> <p>5 September: tbc</p>
Monday 5 September 2022 (12.00 CEST)	<p>Call Opens At 12.00 CEST hrs on Monday 5 September, the NZC Call, and Grant Management module will go live. Cities will be able to register themselves with the module through the NZC Mission portal and create a proposal with headline information. Cities will be able to save and return to this proposal at any time up until the submission deadline as stated below.</p>	NZC Platform
June – October 2022	<p>Publication: Frequently Asked Questions (FAQs) Between June and October 2022, a Frequently Asked Questions (FAQ) file will be created and updated.</p>	NZC Platform
Friday 4 November 2022 (23.59 CET)	<p>Call deadline Formal deadline for full submission. Proposals received after this date will not be accepted. No extensions can be granted and modification of your proposal after submission is not possible. We suggest setting your own internal deadline ahead of this date.</p>	NZC Platform
November 2022 – January 2023	<p>Review and selection Proposals will be checked against eligibility criteria (Stage 1) and eligible proposals reviewed by independent external experts (Stage 2). Proposals reaching a minimum scoring threshold against specified criteria will proceed to final selection (Stage 3). More information about these Stages will be published with the Call Guidelines when the Call is launched.</p>	N/A
28 February 2023	<p>Decision Communication Formal outcomes will be sent to applicants, along with feedback.</p>	N/A
March 2023	<p>Contract development Applications amended to address compliance and selection feedback. Due diligence checks and finalisation of revised project plans.</p>	N/A
March 2023	<p>Publication of Call outcomes and selected Pilot Cities Parallel to the contracting process, a list of successful Pilot Cities will be published to the NZC Platform and disseminated through NZC communications channels. This will include a description to illustrate the portfolio selected.</p>	NZC Platform



2.2 Support

Proponents to the NZC Pilot Cities Programme will have at their disposal a range of support and guidance for preparing and submitting a proposal to the Call, such as:

1. The NZC Pilot Cities Programme Guidebook

This Guidebook is intended to introduce proponents to the NZC Pilot Cities Programme and covers a detailed overview of the framing for the programme, its intended approach and anticipated outcomes, and key concepts and terminology.

Proponents are encouraged to use the content of this Guidebook as inspiration for developing their pilot activities' ideas and aligning it to the NZC Pilot Cities Programme, including its assessment and selection criteria.

2. Information sessions

With the launch of this guidebook the NZC Consortium have also scheduled a series of information sessions to support and guide cities in developing their pilot activities' ideas and putting together a proposal. The information sessions will cover:

- NZC Pilot Cities Programme: Ambition, approach, application
- Criteria for selection and the selection process
- Technical information session
- Open forum (Q&A)

3. Mission Portal

Proponents will be required to register with the NZC Mission portal in advance of applying to the NZC Pilot Cities Programme, which will give them access to various resources but also the Call application module itself.

The Mission portal will provide cities with access to:

- ❖ An NZC onboarding module
- ❖ Case studies
- ❖ A peer-to-peer collaboration space
- ❖ A Knowledge Repository
- ❖ The Call and grant management module
- ❖ System technical guidance (Call and grant management module)
- ❖ Future iterations of this Guidebook
- ❖ Contact points to City Advisors and City Expert Support Facility

Besides this Guidebook, a series of documents and/or supporting materials associated with the Call (such as Guidelines, Annexes, FAQ, and other relevant documents) will be made available on the Mission portal. Proponents are requested to consult them regularly for potential updates while working on their applications. Specific questions that are not addressed either by this Guidebook or through the Mission Portal should be direct to: pilotcities@netzerocities.eu



3 NZC Platform services and programme

3.1 City Learning Programme

The NZC City **Learning** Programme is a multi-month programme that aims to transfer knowledge and build capacities across Pilot and Twin Cities [Twins] engaged in the programme. At its core stands the strategy of impact through peer learning. Peer learning is an educational approach that couples two or more learners with a similar background and allows them to actively shape each other's development through knowledge exchange and collaborative problem-solving.

In NZC, we are deploying this principle by pairing each Pilot City (or in the case of multi-city application, the group of cities) with two or three Twins. Those Twins will be cities with a similar background as the Pilot Cities and might face similar challenges. These could be based on geography, national context, socio-economic or similar. Through that, NZC aims to extend the impact of the work of Pilot Cities beyond its initial cohort. For the duration of the programme, NZC will guide those cities through a series of online and in-person meetings. These meetings aim to create a clear understanding of each other's challenges and exchange or generate potential solutions. It is foreseen that each Pilot City visits their Twins once with a small delegation, and the Twins will also visit the Pilot City once.

This programme is a mandatory part of the Pilot Cities Programme. Therefore, a certain percentage of staff commitment will need to be assigned within the Pilot City budget. The programme team will approach Pilot Cities to develop tailored city profiles to ensure a high-quality match in the selection of the Twins. The current timeline foresees the Call for Twins for June 2023 and the programme's start for September 2023. This way, Pilot Cities have time to develop their activities and gather initial insights. More information will be made available to the Pilot Cities at a later date.

3.2 City Advisors

Ten Climate-Neutral Cities Advisors will be appointed from amongst the NZC consortium partner organisations to help Mission, Pilot and Twin Cities strategically advance **systemic** change and pursue Mission ambition. Activities will include helping cities access the Platform for use of tools and resources, facilitating exchanges among cities and linking them with project partners and experts, building meaningful cooperation between cities involved in the Pilot Cities Programme and the City Learning Programme, and ongoing support and **systems** change guidance and advice, including identifying needs for, and assisting with the application process to, the City Expert Support Facility (more on this service below).

Why is this relevant to NZC and the Pilot Cities Call?

Each City Advisor will be responsible for around three Pilot Cities plus the twinned cities under the City Learning Programme (around 12 cities in total).

Each Advisor works with Pilots to:

- Identify needs for City Expert Support Facility allocation and assist with the application process,
- Support the identification and coaching of city change makers,
- Support the implementation of the pilot activities,
- Support the planning and the delivery of the **sensemaking** / MEL activities,
- Support with the planning and delivery of the City Learning programme.



3.3 City Expert Support Facility

A City Expert Support Facility (CESF) will be developed to support Pilot Cities with direct expert support tailored to the scope of the pilot activities. The CESF will service Pilot Cities' expertise needs on targeted activities that require either non-NZC business capabilities or levels of effort beyond the initial allocation to an existing NZC partner. The Facility will be launched immediately following the Pilot Cities selection process. City Advisors will work with their Pilot Cities to scope out support and expertise requirements to submit to the Facility via a dedicated application form.

Support will be provided by both NZC consortium partners and, where expertise is not available from within the consortium itself but is critical to a proper development and implementation of pilot activities, external parties and/or local partners will be engaged, including from within the NZC Community of Practice (CoP). Local partners will be engaged where limited capacity is needed for context, culture, and/or language capabilities, or where more intensive local capacity is needed.

The NZC CoP acts as an advocate for NZC methodologies beyond the project, and a place to connect cities to experts. It is a virtual space for cities to post their needs and a repository where practitioners can organize in groups based on geography and specialties, and participate in events, podcasts, webinars, trainings, certifications based on the NZC knowledge repository.

How is this useful for preparing your proposal?

Cities should consider ahead of time where they may have gaps in expertise and/or capabilities in relation to their planned pilot activities, as part of their proposal. Therefore, and as a result of this analysis, cities can then consider the assistance of and application(s) to the CESF.

Please note, cities will not be required to apply for expert support via their Pilot Cities Programme proposal – the process for applying to the City Expert Support Facility is subsequent to Pilot Cities selection, and cities will work with their assigned City Advisor to scope these requirements before applying to the Facility.

3.4 Peer-to-Peer collaboration & Knowledge Repository (Portal)

Peer-to-Peer (P2P) collaboration

The P2P Social Network and Collaboration Space is the key module within the Mission portal for interactions between users, including cities, the NZC consortium, and the wider NZC Community of Practice. Pilot Cities will use this for:

- Meeting, networking, and engaging with other NetZeroCities cities on activities, ideas, insights, and innovations
- Providing online space for virtual sense-making sessions
- Joining and forming groups of cities working on thematic topics
- Working with their Twin Cities and developing the Twinning Relationships
- Sharing their city's activities, ideas, insights, and innovations
- Learning and posting about events hosted by peer cities/ events of interest
- Forming consortia of cities for external funding opportunities
- Having private, bilateral conversations

The **social network** element of the module provides an open network visible to all, providing a site for open discussion and posting across the NZC community. It will also be the initial landing page of the



portal following log-in, with links to key content in other modules such as the Knowledge Repository and the data reporting capability in the City Dashboard.

The **groups pages** provide the space for more structured ongoing interactions, with facilities for document sharing, online meetings, and collaborative working. Users can determine the privacy settings, so there will be a range of 'open' and 'closed' features, for which the users can determine the privacy settings. Groups pages will be established both for thematic working and for the City Learning Programme ('twin') working groups.

The **meetings and events** pages provide functionality for webinars/**sensemaking** sessions/**learning** events.

Knowledge Repository

The Knowledge Repository of the NZC/**Mission Platform** will include a very complete overview of best practice examples from cities across Europe. The Knowledge Repository aims to inspire cities to take concrete actions towards climate neutrality in each stage of the value chains and affecting all the **city systems** to achieve a broader impact.

It will include:

- ❖ State-of-the-Art solutions (structured in main thematic areas where to take action in the different **city systems** in which **emissions** need to be reduced)
- ❖ H2020 projects solutions review (structured under the same basis)
- ❖ Multimedia case studies (on climate actions)
- ❖ **Social Innovation** case studies
- ❖ Case studies on citizens' and stakeholders' **engagement** methodologies
- ❖ Policy framework database
- ❖ Knowledge tool on funding sources

Besides the Knowledge Repository resource, the NZC/Mission Platform will offer **tailored expert support** to cities to further investigate specific solutions, concepts, barriers, **co-benefits**, through the City Expert Support Facility (section 3.2 of this Guidebook).



4 Mandate to Act

Working on **system transformation** requires a strong political and public mandate. It entails large scale change in conditions of uncertainty. It will inevitably lead to disruption and displacement that will be noticeable in people's day to day lives. To make that change stick, it will be important to embrace new forms of governance that emphasise collaboration, participation, and experimentation.

To make **systems transformation** possible at city-scale means developing a deep understanding of **co-benefits** and entangled value. If the positive effects of the climate transition on e.g. health, wellbeing/quality of life, local economy, and education are not recognised, it will always be harder to show that it represents value for money. Moving away from only recognising benefits that are quantifiable and monetisable means cities can be bold in laying out a positive and holistic vision for the future that recognises the multiple interdependencies between departments.

4.1 Understanding the problem

A fundamental principle of the NZC Pilot Cities Programme is to first understand the *problem(s)* in scope the pilot activities, both in terms of GHG **emissions** and in terms of the structural, technical, institutional, socioeconomic, and cultural barriers to change.

In their proposal for the NZC Pilot Cities Programme, cities will therefore first be asked to identify the **city systems** they will work on, the **emissions domains** relevant to those city systems, and the **current barriers** to transformative change, and then the **potential systemic solutions or innovations** to deploy and learn from over the two years of the initiative.

4.1.1 City Systems and emissions domains

Reaching zero **emissions**⁴ from cities will require strong reductions and offsetting measures across all **city systems** e.g.: energy, transport, buildings, food, water, material use, **and related emissions domains**, e.g.: grid-supplied energy, industry and manufacturing, agriculture and forestry, waste treatment, etc. Technologies and innovative solutions should be implemented and deployed for this purpose.

Action will be required across the city, focusing on the following priorities (taken from the [EU Info Kit for Cities from the Cities Mission](#)):

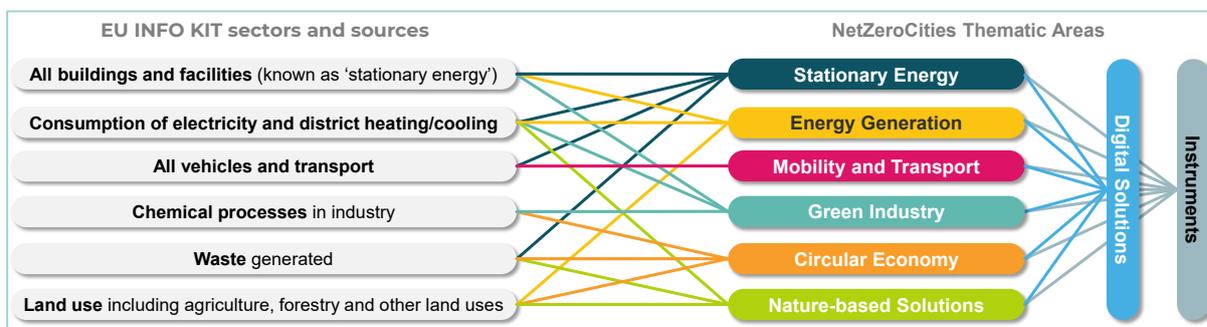
- ❖ Cutting emissions from combustion of fossil fuels in all buildings and facilities (**stationary energy**) since buildings are responsible for 40% energy consumption in cities. Promotion of zero carbon buildings, decreasing energy use in buildings, improving building stock energy performance, electrification, and switch to renewable power sources.
- ❖ Cutting emissions from the consumption of electricity and from district heating/cooling (**energy generation**) through promotion of more sustainable energy production: low-carbon energy, green energy, development of renewables and use of renewably sourced electricity to fully decarbonise the energy supply.
- ❖ Cutting emissions from combustion of fossil fuels from **all vehicles and transport**, while promoting cleaner and safer transport modes, public transport, walking and cycling, and including carbon free and alternative fuels.
- ❖ Cutting emissions from **waste** generated within the city boundary, integrating the **circular economy** approach to minimise the use of resources and the creation of waste, pollution, and carbon emissions.

⁴ In this report, we widely use the terms 'emissions' and 'carbon emissions'. These are considered to be synonymous with 'GHG emissions' or 'carbon-equivalent emissions', considering both CO₂ and non-CO₂ GHG emissions.



- ❖ Cutting emissions from, and by way of, **changes in land use**, including agriculture, forestry, and other land uses. In this line, the implementation of **nature-based solutions** is also key to deal with residual emissions, such as the creation carbon sinks.
- ❖ Cutting **emissions** from **chemical processes in industry**, making industry greener and more sustainable.

Digital connectivity in cities is also a key cross-cutting priority to improve and support moving forward



all urban processes and decision-making of both municipalities and inhabitants. Digital connectivity and tools can help to combine and analyse data, underpinning more effective and sustainable policymaking and urban planning by providing information and insights. Digitalisation, digital connectivity and tools can help to combine and analyse data, underpinning more effective and sustainable policy-making, urban planning and operation of urban energy **systems** (among others), by providing information and insights. Digitalization can improve cities' liveability in multiple domains (security, healthcare, mobility,

Why is this relevant to NZC and the Pilot Cities Call?

The NZC/ Mission platform will support cities to overcome the barriers and challenges within **the main emissions domains** they have identified. For the Pilot Cities Call, cities intending to apply will need to have identified the emissions domains their pilot activities will target and the potential intervention and leverage points to address through the programme.

How is this useful for preparing your proposal?

Pilot Cities need to reflect on the functioning of their city systems, identify their main emissions domains, and then assess the best way to reduce city GHG emissions.

etc.)⁵ such as supporting data-informed decisions that will create benefits for citizens, and potentially, reduce energy consumption.

4.1.2 Barriers and problem areas

City transitioning towards net zero carbon **emissions** are fraught with **structural, technical, institutional, socioeconomic, and cultural barriers**. Large parts of their overall greenhouse **emissions** are locked in complex domains that represent no single problem but instead a web of entangled problems. Worse yet, they are often conflicting. Therefore, a problem for one city stakeholder can be an opportunity for another.

If cities are to accelerate towards their climate neutrality goals, in addition to their **emissions domains**, they need to deeply understand their **barriers problem areas**, with the aim of going beyond single-point solutions towards more integrated and holistic 'portfolio' approaches capable of catalysing **systemic** transformation. That means:

⁵ Global Enabling Sustainability Initiative, "Digital solutions for climate action." <https://www.gesi.org/events/report-launch-digital-solutions-for-climate-action> (accessed May 31, 2022)

- ❖ Understanding the gap between current **emissions** and a Paris-aligned reduction pathway,
- ❖ building a full picture of the cross-sectoral and interdisciplinary key problems/ barriers preventing the desired pathway to be developed, and
- ❖ co-creating the different possible multi-stakeholder portfolio of interventions for addressing the barriers.

Illustrative examples and case studies

Common barriers can relate to skills gaps and data system deficiencies, political misalignment, problematic governance structures, lack of financial incentives, or unproductive cultural and behavioural patterns - all of which can affect any urban systems and related emissions domains, such as mobility, energy, and buildings. Here are some examples / case studies of how deeply understanding interrelated barriers and problem areas helped create a new pathway:

- **Energy Service Companies (ESCOs)** are successful examples of combining cross-sectoral barriers into one solution by capitalizing on expert knowledge of interfacing systems to solve many problems at once, including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management.
- **‘One-Stop-Shops’ can help provide homeowners and building owners with a single point of entry to access low-cost, whole-home retrofits.** This program model has been administered in a wide variety of European countries, as documented in the European Commission’s collation of case studies [One-stop-shops for energy renovations in buildings](#). A “one-stop shop” retrofit program for deep energy retrofits is akin to walking into a car dealership and picking your make and model, features and aesthetic specifications, and financing and maintenance plan all at once. Applied to whole-home retrofits, this model allows residents and building owners to determine their retrofit needs, access contractors, and leverage multiple streams of funding from various sources to ensure all measures are available at low or no cost to eligible participants. In their step by step guide [How to set up a one-stop-shop for integrated home energy renovation](#), Innovate identify 7 core services of a one-stop-shop: Long term & affordable housing; Engagement processes; Tailor made products; Energy renovation & financial plan; Communication & marketing tools; Coordination of the process; and Guarantee of results. They also identify three potential service levels, from facilitation to coordination to 'all inclusive.

Here are **examples / case studies** of how a technical solution might fail because the correlation between barriers and problems was not deeply understood:

- **institutional inertia and path dependency:** for example, changing to a smart (digital) power grid might entail a negative environmental impact because of the energy required for computation to manage the data. Therefore, an important question to ask is whether more **emissions** are caused by an inefficient grid or by a data-enabled efficient grid supported but large computational power. **To date, there are no conclusive studies that could assist with conclusions in this area.**
- **Lack of consumer acceptance/ adoption:** for example, the adoption of active or shared mobility options can be hindered by cultural aspects such as the consideration of the car as a status symbol. Cars are still perceived as a valuable and desirable asset. These perceptions can be a barrier to achieve a change in behaviour and hamper the uptake of walking, cycling or shared mobility.
- **Market power and political clout of incumbents: Access to and cost of capital** is a central determinant for the initiation of **system** innovation. Beyond incentivising investments through tax policies or subsidies, financial innovations will be needed to help to cut the cost of funds raised for investment and to raise funds more securely and quickly. For example, building in timber coupled with a circular economy approach can drastically lower Scope 3 **emissions** in a city, which, though as yet unregulated, are often the largest part of **emissions** a city is responsible for. However, the



market for timber construction must be created from zero. Cities have a role to play in lowering adoption risks for the players involved to enable the transition.

- **Technological trajectories and lock-in:** For example, too often investment is drawn towards traditional infrastructures in transport and energy due to large sunk capital investments and technology and institutional lock-in.

Why is this relevant to NZC and the Pilot Cities Call?

The NZC **Mission platform** will support cities to identify and **overcome the barriers and root causes that hinder their climate action** at scale, across key emission domains. By understanding their problem areas and the interconnectedness of **levers** of change, cities will be able to pursue **systems innovation** more deeply.

Cities engaged in transformation towards climate neutrality are likely to be experiencing similar sets of barriers and problem areas. Therefore, having a shared understanding of these challenges helps to communicate effectively about them.

How is this useful for preparing your proposal?

A city's ability to identify and understand their "problem areas" and barriers to transformation is crucial in preparing a proposal for pilot activities that will identify breakthroughs and **tipping points** to create change.

Prospective Pilot Cities will be assessed on their understanding of specific problem areas as much as their ideas for reducing the associated emissions.

Recap: Questions to ask yourself

- ❖ Are you willing to engage deeply with the problem area(s) as much as the possible solutions/interventions you are putting forward?
- ❖ Have you identified a problem area(s) that represent deep-rooted issues that are holding you back for achieving your climate goals?
- ❖ Do you have sufficient information and data to identify to your potential barriers and problem areas?
- ❖ Do you have an understanding of intersections and potential conflicts of your problem area with other areas or sectors?
- ❖ How have the limitations or failings of past efforts to make change been used to inform your understanding of the problem(s)? Are you willing to engage regional/national or other cities to collaboratively address barriers and learn from each other?

4.2 Orienting to systemic solutions

As seen in the previous sections, the problems that cities face in addressing climate change are rooted in multiple complex **systems** made up of different elements - natural, technological, social, cultural, relational, institutional - that are deeply entangled. Most approaches to climate action try to deal with this complexity by breaking the problem down into smaller pieces and focusing on each individual piece separately. This often overlooks both the connections between the problems, and the underlying causes. Hence, NZC Pilot Cities Programme will approach cities' climate challenges through **systems innovation for systems change**.

4.2.1 Systems innovation: systems change

Pilot Cities will be supported to address problem areas with the highest potential for the creation of new **transition pathways**. They will grapple with the often unique and complex dynamics of one or multiple emission domains (e.g. mobility, energy systems, etc.) while exploring combinatorial **levers** of



change (e.g. data and technology, governance and policy, finance, culture and participation as well as **social innovation**) with the explicit goal of **identifying breakthroughs and tipping points**. These holistic approaches, with a series of aligned actions that will almost certainly involve collaboration across multiple stakeholders, can explicitly generate **co-benefits** and spark multiple positive cascades of change.

This approach is called ‘systems thinking’: understanding and analysing problems focusing on how the parts of a **system** relate to each other. The aim of it is to pursue ‘systems innovation’: whole **system transformation** addressing complex problems by acting on the interdependence between multiple *levers of change* – such as capacity and capability building; culture, participation, and social innovation; governance, policy and regulation; finance and business models; technology.

Systems innovation is problem-oriented, takes time, and can be thought of as periods of transition. A core role of public policy is to explore and define those **transition pathways** - which is what the pilot activities will help enable cities to do.

An example for multiple cascades of change are subsidies of solar energy that have led to the growth of the industry. This in turn has led to a rapid fall in the costs of solar energy, and thus further growth - with the result being that solar energy is now the cheapest form of energy in history ([Carbon Brief](#)). **Breakthroughs** may also refer to overcoming and/or unlocking a deep barrier to change - for example, changing the way that the city government engages with citizens, or manages data, or quantifies the benefits of its programmes, and may open up myriad other opportunities for change.

Illustrative examples and case studies

Examples of systems innovation tools and practice

- The Future Stewards publication [10 Tools for Systems Change to a Zero Carbon World](#) has short explanations of a range of system change methods and case studies for each one.
- The UNDP have been developing a methodology based on taking a portfolio approach – their recent publication [System Change: A Guidebook for Adopting Portfolio Approaches](#) details what they’ve learnt and provides examples of their work.
- [Viable Cities](#) in Sweden has been working with 23 municipalities to embed a systems approach to climate transition, with the aim of reaching climate neutrality by 2030. Viable Cities is a strategic innovation programme in Sweden focusing on the transition to climate-neutral and sustainable cities. The programme’s mission is climate neutral cities 2030 with a good life for all within planetary boundaries. Viable Cities is a catalyst for new forms of cooperation between cities, industry, academia, research institutes and civil society. The aim is to change the way Swedish cities operate in line with national, environmental, and climate goals as well as international commitments linked to the Global Sustainability Goals – Agenda 2030 – and the Paris Agreement. The programme’s timeframe is 2017-2030 and it is implemented with support by Vinnova, the Swedish Energy Agency and Formas, with the Swedish Energy Agency as the responsible authority.
- Multiple case studies from the OECD are available from page 76 of their Multiple case studies from the OECD are available from page 76 of their [report Systems Innovation: Synthesis Report⁶](#), covering sustainable housing, retrofitting, smart cities, e-mobility, green growth, long term care, and cluster policies.
- Looking beyond European cases, there are a range of examples analysed in the *American Journal of Community Psychology* [Special Edition on Systems Change](#), covering a process for addressing institutional racism in the health care system; a strategy for eliciting and altering the mental models used by members of interagency teams; efforts to create a health competent community in a rural

⁶ Systems Innovation: Synthesis Report (2015), OECD, https://www.innovationpolicyplatform.org/www.innovationpolicyplatform.org/sites/default/files/general/SYSTEMINNOVATION_FINALREPORT_0/index.pdf (Accessed 6 June 2022)



South Africa community plagued by HIV/AIDS; action research efforts with a police department to support the transformation to community policing and more.

- [Demonstration of systemic solutions for the territorial deployment of the circular economy](#)

Examples of failing to adopt a systems innovation approach

- A classic example is the case of housing markets. Governments often intervene on the supply side (i.e., building social housing or facilitating private market access to lower income groups through rent controls) but they also intervene on the demand side through fiscal and tax policy to stimulate property ownership which may lead to rent seeking and bidding-up of prices. In turn this can lead to additional supply-side interventions with unintended consequences and the persistence of the initial problem (lack of affordable housing) together with the creation of new ones (housing bubbles, urban sprawl) (OECD, 2015).

How is this useful for preparing your proposal?

Demonstrating that the proposed pilot is taking a systems approach will be critical to a successful application - it is one of the conditions that the application will be scored against.

Why is this relevant to NZC and the Pilot Cities Call?

Designing a pilot with a systems approach will both align it with NZC **Mission Platform** services, resources, and intervention support and also enhance the replicability and scalability of successful interventions within and beyond the Pilot City.

Recap: Questions to ask yourself

- Have I analysed the root cause(s) of the problem I am trying to solve?
- Have I explored/mapped/shown (in the Pilot Cities proposal) how the different parts of the system(s) in focus are connected?
- Have I (planned to, or already) engaged deeply with affected communities, especially those whose voices are less often heard?
- Have I thought about the knock-on effects of my plans?
- Have I considered different leverage points?
- Have I represented the system visually?
- Have I laid out how I plan to learn from the experience, and share the learnings?
- Have I analysed how I can create quick(er) feedback loops (e.g., early field testing) to learn, adapt and scale quicker?

4.2.2 Levers and intervention points

There is no silver bullet for a city to reach net-zero. This means the intentional combination of multiple interventions is a necessary ingredient to unlock climate neutrality. The intention of pilot activities is thus to create and implement **portfolios acting on multiple levers of change**, in other words acting on several distinct but connected elements of a problem at the same time, through multiple but complementary interventions. Pilot activities that open **pathways** towards **breakthroughs** in emission reduction are ones triggering several mutually reinforcing dynamics across technology; governance and policy; finance and business models; culture, participation, **social innovation** and just transition; capacity and capability building, to accelerate transformative change in one or several emission domains.



NetZeroCities categorises levers of change in:

- **Technology:** the tools, utilities, or infrastructures, whether material or immaterial, used to solve practical problems. Examples (non-exhaustive): vehicles such as bike or trains; information technologies such as software, fibre optic cables or artificial intelligence⁷, energy production, storage, or distribution equipment; stationary energy such as heat pumps, building technologies
- **Governance and policy:** the processes by which authority is conferred, decisions are made, and rules are agreed, enforced, and modified, as well as the rules themselves in the form of laws, norms, and regulations.
- **Finance and business models:** the means by which funding is provided as well as the ways in which value creation is conceptualised and described for organisations.
- **Culture, participation, and social innovation:** social behaviour and norms, including those which define how people, individually or in group, participate in democratic decision-making, as well as the ways through which they design and implement solutions to improve individual and collective welfare and wellbeing and a just transition.
- **Capacity and capability building:** the enhancement of organisational resources (manpower, equipment, money, individuals' time, and energy) and of skills, knowledge, mindsets, and behaviours to deliver impact.

Illustrative examples and case studies

- **Retrofit** is one of the promising areas of intervention for emission reduction, yet it presents us with a number of challenges. The technology exists but barriers remain in building business cases that capture retrofit's economic multiplier effects. Homeowners often lack motivation to participate in retrofitting programmes, the difficulty of including wider **co-benefits** may make retrofit seem less attractive and actor-coordination and governance mechanisms, whether community visioning or performance contracting, can block the process. Plenty of experiments address only one of these barriers, and therefore rarely manage to scale impact. The failure of the UK's Green Homes Scheme was a recent example of the limits of this approach. NZC Pilot Cities need to act on multiple levers of change. In the case of retrofit, that would mean experimenting with finance and business model actions that unlock the creation of a business case including co-benefits and multiplier effects, combined with culture, participation and social innovation interventions that work with homeowners to build acceptance and create buy-in for retrofit at a district or city level.
- Another example, from a 2015 OECD report on Systemic Innovation⁷, is that ageing societies can lead to a reduced labour force, increases in health care costs and a reduction in the tax base. Short term policies to limit labour migration may aggravate ageing-induced labour force reductions in the longer term. Innovation and technology are clearly part of the solution, but they are not, in and of themselves, sufficient. In fact, technology must go hand-in-hand with other levers for change for addressing economic and social challenges and will require complementary innovations in organisations and institutions to implement them, as well as acceptance by consumers/citizens.

⁷*Innovation policy platform*. (n.d.). Retrieved June 9, 2022, from https://www.innovationpolicyplatform.org/www.innovationpolicyplatform.org/sites/default/files/general/SYSTEMINNOVATION_FINALREPORT_0/index.pdf



Why is this relevant to NZC and the Pilot Cities Call?

The smart considered and strategic combination of multiple interventions playing with several levers for change is at the heart of what makes promising pilot activities. It is NetZeroCities' intention to encourage cities, whether Pilots or not, to avoid planning single-lever interventions but to combine the interventions across a/the system - in technology, but also governance and policy; finance and business models; culture, participation, and **social innovation**; capacity and capability building - that are necessary to create promising **pathways** towards reducing emissions.

How is this useful for preparing your proposal?

Cities can use the typology of levers used in NetZeroCities to assess their situation in a comprehensive manner. It can be a starting point for them to formulate their gaps and needs in strategic terms, showing a good understanding of the local barriers to net-zero, their interconnectedness, and ways in which synergies could be created to unlock breakthroughs in emission reductions.

Recap: Questions to ask yourself

- ❖ Do the pilot activities show awareness of the role of multiple (if not all) lever types in accelerating emissions reduction?
- ❖ Do the pilot activities show the interdependence of problems across multiple lever types in the city context?
- ❖ Do the pilot activities identify opportunities for synergistic actions in the city context?

4.2.3 Social innovation

Social Innovation has many definitions but, in its essence, is a form of innovation that is social in its ends and its means (Murray et al., 2010): this means developing new ideas, services and models that better address social challenges (EC, 2020). In broad terms, this means that it is innovation that is "social" in its objectives, its process, and its outcomes. As such, it holds opportunities for cities to:

- (1) provide solutions to local, unmet social needs;
- (2) engage system actors in the co-design and **co-production** of the solutions (and by default work to de-risk innovation);
- (3) create long-term, positive, social impact on multiple scales (geographic, challenge scope); and

Why is this relevant to NZC and the Pilot Cities Call?

Achieving net zero will require the concerted effort of all actors to align themselves to decarbonization goals. Such paradigmatic changes also present high risks that some groups remain excluded and marginalized from the transition. Integrating **social innovation** in a city's climate strategy is important and strategic for two primary reasons: (1) its ability to mobilize and capacitate actors in the process of co-designing and co-producing solutions that respond to big societal challenges, while also taking care of unmet social needs; and (2) its capacity to support the broader cultural and behavioural changes needed to accomplish goals by catering to specific needs and building the context for different ways of living.

- (4) contribute – by engaging multiple actors in its development process and building capacity – to cultural and behavioural changes that support the development of resilient and responsive innovation ecosystems able to bring actors and resources around missions.



Social Innovation can be a strategic asset to NZC and the Pilot Cities Call in the following ways:

- provide a **pathway** for customised solutions, taking into account local needs and resources, and mobilise actors in the city's climate neutrality goals (See City Lab Bristol – please see below for links to all case studies mentioned);
- create solutions that build the context for different models of consumption in support of long-term objectives (See Cse Nappi Naapuri; Real Junk Food Berlin; Paris 15 minutes);
- provide ways for different actors to work with and become part of providing services (**co-production**) that support decarbonization directly or indirectly (See Cloughjordan Ecovillage); and
- serve as an innovation paradigm with the potential to connect bottom-up and top-down approaches, or more specifically capable of linking local grassroots initiatives with larger policies or political framework/objectives (See Bologna Citizen Pacts)

How is this useful for preparing your proposal?

- ❖ Understand actors to engage and roles/commitments
- ❖ Typology of solutions, approaches, and resources available in support of objectives
- ❖ How to build an ecosystem for a just transformation

Social innovation approaches can help cities to adopt different models for participatory and inclusive development to solve specific challenges (See City Studio; City lab Mannheim; the Gendered Innovation project); and mobilise ecosystem actors around the Mission (See Local Energy Communities (Mission's Valencia));

Furthermore, they can help build the context for innovation (capacity through **engagement**; mobilise networks around challenges) (See Superblocks in Vitoria-Gasteiz (and the Citizen Pact for Sustainable Mobility)) and support the scaling-up and -out of existing solutions for decarbonization.

At a more fundamental level, social innovation can contribute to changing social practices and building a resilient and responsive innovation ecosystem through capacity-building and learning-by-doing (See Viable Cities Program; Cloughjordan Ecovillage).

Additionally for the Pilot Cities Call, social innovation provides modes to engage territorial/urban actors in the action plan (e.g., designing and producing the portfolio of solutions for the Mission, whether that be by amplifying existing solutions or building new ones) and building up capacity in new approaches to development and new methods/tools that involve actors, particularly beneficiaries, in the solution-building and its implementation.

Gender dimension: In 2020, the EC published "[Gendered Innovation 2](#)", a report on how inclusive analysis contributes to research and innovation. The publication contains definitions of terms and methods relating to sex, gender, and intersectional analysis, and provides interdisciplinary case studies, displaying how to integrate the gender dimension into various fields of research and innovation, including climate change and urban design. The Gendered Innovation Project – co-funded by the EC – also developed checklists to support inclusive [engineering, urban planning and design](#), as well as methods to [engineer innovation processes](#).

Illustrative examples and case studies

- [City Lab Bristol](#)
- [Nappi Naapuri](#)
- [Real Junk Food Berlin](#)
- [Paris 15 minutes](#) (Click [here](#) for a concept card)
- [Cloughjordan Ecovillage](#)
- [Bologna Citizen Pacts](#) (Click [here](#) for more on the participatory budget.)
- [City Studio](#)
- [City lab Mannheim](#)
- [Local Energy Communities](#) (Missions Valencia)



- [Superblocks in Vitoria-Gasteiz](#) (and the Citizen Pact for Sustainable Mobility)
- [Viable Cities Program](#)
- [The Gendered Innovation Project](#)

Resources and/or future Platform resources/services cities should look out for

- NZC Social Innovation Quick Reads
- NZC Social Innovation Video
- NZC Knowledge Repository
- Social Innovation Learning Materials (MOOC)
- [Siscode Learning Hub](#)

Recap: Questions to ask yourself

- 1 What experience does my city already have with Social Innovation?
- 2 How can Social Innovation initiatives be funded in my city?
- 3 How can local Social Innovation initiatives support my decarbonization goals?
- 4 Are there specific Social Innovation policies in place that can frame these initiatives?
- 5 What kind of competences do we have, or do we need to start a Social Innovation program or project?
- 6 What resources are available in my city for Social Innovation (e.g., social innovation accelerators, Hubs, foundations, research centres, think tanks, etc.)?

Useful links and references

Social Innovation. Social innovation - Employment, Social Affairs & Inclusion - European Commission. (n.d.). Retrieved June 9, 2022, from <https://ec.europa.eu/social/main.jsp?catId=1022&langId=en>

The open book of social innovation. nesta. (n.d.). Retrieved June 7, 2022, from <https://www.nesta.org.uk/report/the-open-book-of-social-innovation/>



5 Capacity to Act

Climate change is complex and intractable, extends beyond political cycles and boundaries, and occurs over long-time frames. The climate crisis is both a test of our democracies' endurance and an opportunity, amidst significant challenges, for their renewal in response to our current needs and technological capacities. Effective responses to match the scale of the challenges ahead requires becoming more democratic, collaborative, and collectively action-oriented, and requires more than just technological advancement in order to co-create solutions that have tangible effects on people's everyday lives and leave no one behind.

The climate crisis poses a need for a **systems**-level transformation in the society and in our cities. That calls for a larger ecosystem, including city residents, businesses, innovation actors (like universities and other research, development and innovation actors), NGOs and civic society, and not just local city governments, to take part in the transformation process.

The following sections under Capacity to Act are all, by their nature, variations on the same theme: ***building critical mass through engagement and collaboration to drive meaningful, long-lasting change.***

5.1 Reflexive governance

Collaboration within the city administration is crucial. The climate transition will cut across all departments: housing, transport, health, education, urban planning, energy, economy. Where primarily seen as the responsibility of the environment team, climate transition often struggles to gain traction. Building strong horizontal teams with the ability to shape policy and access budgets across departments is a critical factor in success.

However, collaboration should not be confined to the walls of the municipality – others also need to be able to participate. Many other actors, such as hospitals, universities, schools, private companies (both large corporates and SMEs), and civil society can support the Mission through changing their policies and the way they spend their money. Building cross-organisational teams that jointly steward the Mission enables the city government to accelerate its work. It's also important to look up, as well as out – connecting with regional and national governments to create strong multi-level governance partnerships.

Finally, cities will need to work in an experimental, iterative way. The problems that they are dealing with are complex and without any clear boundaries. Attempts to address them will inevitably lead to responses from within the system. Taking the standard approach of 'analyse, plan, deliver' harbours the risk that cities invest both time and money in solutions that are not viable under real-life conditions. Taking a reflexive approach to governance of 'plan, test, iterate' instead helps to build confidence in the direction of travel, as well as enabling others to shape the work as it develops. This is why accelerating learning has emerged as such a critical driver of the transition (for example, in Viable Cities' approach). Where they don't already exist, cities will need to establish processes for extracting rapid learnings from small experiments and using them to inform policy making.

Recap: Questions to ask yourself – Governance & participatory approaches

- To what extent are you open to change of approaches to local governance?
- Who should you open this approach or process to?
- How will this **engagement** happen? What formal and/or informal structures will support this engagement?
- What resources, structures, processes, etc., will be required to do this successfully?
- Do you have any previous experience in such approaches / processes?



5.2 Collaboration and coalition for change

Each Pilot City will build its own coalition for change as befits the type of pilot activities they are undertaking – related to key stakeholders, affected community and citizen groups, key ecosystems actors and delivery/implementation partners. Analysing the challenge, the city has chosen to address, cities can use **system(s)** mapping to identify actors, city services and processes (i.e., value chains), to define who the city needs to engage and to build a coalition for change with.

How is this useful for preparing your proposal?

It is an essential part of pilot activities planning to be able to identify and engage the actors that need to be part of the transformation process.

Why is this relevant to NZC and the Pilot Cities Call?

Systems consist of a larger group of actors and actions than the city government alone. **Systems innovation** is at the centre of the NZC approach and, therefore, coalition building within the larger ecosystem in the city is a key enabler for **systems transformation**.

Illustrative examples and case studies

Globally, there are organisations that are building collaboration models and coalitions for climate solutions between city governments, local businesses, innovation ecosystems, and citizens.

Here are some examples:

- ❖ Leuven 2030 www.leuven2030.be
- ❖ Valencia Mission <https://www.missionsvalencia.eu/?lang=en>
- ❖ Glasgow City Region (Glasgow Green Deal): <https://www.glasgow.gov.uk/glasgowgreendeal>
- ❖ Climate Lab in Vienna: <https://climatelab.at/>
- ❖ Boston Green Ribbon Foundation <https://www.greenribboncommission.org/>
- ❖ San Francisco Business Council for Climate Change <https://www.bc3sfbay.org/>
- ❖ C40 City Business Climate Alliance <https://www.city-businessclimatealliance.org/>
- ❖ Vancouver Green Economy model <https://www.vancouvereconomic.com/focus/green-economy/>
- ❖ Helsinki Smart & Clean Foundation <https://smartclean.fi/en/helsinki-metropolitan-smart-clean-foundation/>

Many cities have engaged a large group of stakeholders when building a roadmap towards a more sustainable future; for example, the London Circular Economy roadmap <https://relondon.gov.uk/resources/londons-circular-economy-route-map>

Recap: Questions to ask yourself

- ❖ Who should be involved in the city – both in terms of municipal and organisational structures, and the external communities and stakeholders it engages? What stakeholders and/or communities outside of the city could be involved (i.e., regional, national, European levels)?
- ❖ How should people be engaged to create a shared vision and commitment to process and outcomes?



5.3 Engaging Citizens and Urban Stakeholders

Democratic decision-making and agency are critical to achieve climate-neutrality in the most ambitious cities by 2030, and a climate-neutral Europe by 2050. Therefore, it is essential for cities to engage citizens and **urban stakeholders** in meaningful and inclusive participation to contribute towards this goal. The aim is to challenge and inspire cities to reimagine the role of **citizen engagement** in their climate neutrality journeys.

Why is this relevant to NZC and the Pilot Cities Call?

An ability to substantially multiply the number of actors able to instigate and contribute to change is integral to reach net-zero by 2030. As such, NetZeroCities encourages Pilot (and non-Pilot Cities) to create and strengthen institutional settings and tools that enable citizens, communities, and other actors to participate in high-quality sense-making and decision-making to enable rapid learning and the testing of **pathways** to change.

Over the past years, there have been many examples of democratic governments making difficult decisions quickly, explaining the rationale clearly despite the complexity, building trust and leading with empathy. Evidence shows that social movements and affected communities can effectively increase governmental responsiveness. Global civil society and social movements have demonstrated an appetite for greater

participation in democratic governance through protests, volunteering, and collective action initiatives on the most challenging issues, including climate change. However, existing democratic institutions, infrastructure and processes were designed and established to deal with confined problems that have immediate impacts, not complex and long-term issues.

For cities' transition towards climate neutrality, diverse and sometimes opposing views, knowledge, and practices need to be brought together, to achieve a deeper understanding of the urban systems and to build upon existing assets in cities. Increasing democratic vitality, inclusive participation in municipal processes, and cross-sector communication and collaboration can lead to better decision making, accountability and **co-benefits**. This may require investing in the settings, skills, and institutions to support this. The effectiveness of many cities interventions and policies depends on the response of citizens and communities. If citizens and other **urban stakeholders** sense they have not been properly included or feel powerless to effect decisions which impact their lives, they can be disempowered and disengage to take part in any intervention. In contrast, when citizens are actively involved in decision-making and implementation, it changes both their view of these processes, potentially leading to greater legitimacy, and their relationship with the city. This approach is more likely to win over hearts and minds, and to foster the needed behavioural change across all parts of the **system**, because processes and their outcomes are co-created, and trusted. This creates strong, vibrant, and healthier communities which can tackle challenges head on.

The NZC Pilot Cities programme implementation is a good opportunity to engage, test and learn from citizens and urban stakeholder approaches, and new democratic innovation, and for improving and strengthening the culture of participation in the city. Durable change requires democratic approaches that are people-centred, committed to community and climate resilience, and respond to the local context. Community voices and knowledge, connected by collaboration that comes also from the bottom up not only the top down, must be the foundation of the action that governments and civil society take. Where appropriate, inclusive approaches should be promoted, considering the intersections of social categories - such as ethnicity, age, or disability - and the relevance of the gender dimension.



How is this useful for preparing your proposal?

- ❖ **Engage deeply:** open-up decision making, policymaking, and climate action. Approaches that engage citizens deeply take their input into policy seriously and enable meaningful, diverse participation in all other stages of climate action; from problem framing to implementation, assessment, and learning, in order to create meaningful impact.
- ❖ **Trust:** In order to engage deeply, there needs to be mutual trust among governments, citizens, and **urban stakeholders**. Participation is most effective when participants trust in the process in which they are participating, and in the impact that their participation will have.
- ❖ **Be ambitious and reimagine:** The nature of the climate neutrality challenge necessitates **citizen engagement** approaches to be ambitious. This means pursuing not only citizen engagement to strengthen existing democratic or policy processes, but also approaches that challenge and reimagine those processes, creating new institutional infrastructure where needed, to tackle the barriers that democracies face in addressing the climate crisis.
- ❖ **Build Democratic Infrastructure:** Too often, citizen engagement begins and ends as a series of events. Take a long-term, sustainable view of citizen engagement as democratic infrastructure: built to last. This approach goes beyond one-off citizen engagement to ongoing, embedded processes and procedures that become part of the fabric of a city.
- ❖ **Focus on Fit for purpose:** Citizen engagement methods do not work without an understanding of broader

Here are some examples:

- ❖ [Lisboa Participa](#) | Green Participatory Budgeting in Lisbon
[Participatory budgeting](#) (PB) processes empower communities to make decisions on a city's budget and spending. PB can be combined with [deliberation](#) to ensure a [robust, inclusive process](#). Developed in Latin America with the aim of enabling the empowerment and control of communities over government spending. PB has been conducted all over the world. In Lisbon it was initiated by the City Council and has been running for many years. The benefits of PB include community building and increased trust in city governments as a result of community ownership over spending. However, PB is less well placed to deal with long term or complex issues as they tend to deal with short term projects. In recent years, some PB processes have been criticised at having [lost their focus on empowerment](#). In addition, [PB at the city level may be constrained by national level control of budgets](#).
<https://op.lisboapartici>
- ❖ Vision for Scotland | How the Recommendations Could Shape our Future | Scotland's Climate Assembly
As part of [Scotland's Climate Assembly](#), participants' visions for their future were brought to life through storytelling and narrative building. The aim was to make citizens' draft recommendations for the assembly tangible for the broader public, and to illustrate longer term policy solutions and their impact on people's lives.
[Vision for Scotland | How the Recommendations Could Shape our Future | Scotland's Climate Assembly](#)
- ❖ Community-driven Technology Assessment | Countering technocracy and algocracy
Participatory approaches to technology assessment grounds the process in the lived experience of those most affected by it, working symbiotically with experts and stakeholders who usually dominate assessments of technology. This approach recognises that experts alone cannot tackle complex technological issues, and that citizens and communities make important contributions to democratising expert dominated approaches.
[The Danish Board of Technology](#) pioneered this approach as far back as the 1960s. Participatory approaches to technology assessment support the long-term viability of new technologies by ensuring that [their impacts are assessed in a holistic and democratic way](#), and



that sufficient public deliberation takes place before the introduction of new and impactful technologies. Currently however, [technology assessments are dominated by experts and vested industry interests.](#)

[EXP8 | Fighting Back Algorocracy: The need for new participatory approaches to technology assessment](#)

Governance & participatory approaches

Some good case studies of 'communities vs climate change' can be found here: <https://www.newlocal.org.uk/wp-content/uploads/2021/10/Communities-Vs-Climate-Change1.pdf>

Resources and/or future Platform resources/services cities should look out for

- NZC Citizens and **Urban Stakeholders** Quick Read
- NZC Citizens and Urban Stakeholders Video
- Ecosystem of methods and case studies of citizens and urban stakeholder **engagement**, and democratic innovations
- Action Learning Programme
- Civic Environment Mapping Tool
- Consistent City "Engagements" Journey

Recap: Questions to ask yourself

- ❖ How can **citizen engagement and participation** be used to catalyse and orchestrate an **ecosystem of change**?
- ❖ How can engagement and participation support the implementation of radical and rapid transformations towards climate neutrality?
- ❖ How can engagement and participation support the design of pilot activities?
- ❖ How can citizens engagement and participation feature in the governance of pilot activities implementation process?
- ❖ How can marginalised communities be heard and engaged?
- ❖ How could your **citizen engagement and participation** strategy be informed by a reflexive and carefully designed process for pilot activities?

Useful links and references

A NZC call to action for a participative transition to carbon neutrality and beyond, (n.d.). Retrieved June 8, 2022, from

[https://www.demsoc.org/uploads/store/mediaupload/744/file/NetZeroCities_CitizensEngagement%20\(1\).pdf](https://www.demsoc.org/uploads/store/mediaupload/744/file/NetZeroCities_CitizensEngagement%20(1).pdf)

[Wanted: Governance to accomplish the net zero mission](#)

5.4 Alternative financing, funding, and business models

Mission cities face a substantial need for capital for both funding their transformation processes and to implement the projects, using both public and private resources. Their success will depend on identifying and securing these resources. The needs include sufficient funding for developing projects and portfolios able to achieve climate neutrality, as well as public and private capital funding and financing those projects based on their needs. They are likely to require a range of resources, whether public sector co-



funding, private sector finance, redirection of public and private sector budgets, philanthropic funding, or funding from local liability holders (e.g., utility companies).

Mission Cities will be producing 'investment plans' as part of the **Climate City Contract (CCC)** process. We note the scope encompasses not just *investment* activities, but the full spectrum of capital – funding, public and private capital for project financing.

These plans are built on a framework that has several elements:

- Assess the total capital needs for the transition towards climate neutrality by 2030;
- Assess and address needs for capacity and capabilities among key actors, such as city and regional government leaders and staff, key stakeholders, capital institutions, and citizens;
- Understand what type of interventions require which forms of capital and financing mechanisms;
- Foster an 'enabling environment' for large-scale capital formation and deployment that includes data review and needs assessment, climate, and related policies (city, region, nation), consideration of appropriate and necessary capital structures, capital, and financial risk analysis with mitigation strategies;
- Build robust mechanisms for capital and finance governance and impact **monitoring** that are aligned with the broader Mission impact framework to ensure transparency and accountability among all actors and avoid any risks of 'greenwashing'.

A Mission Cities' Investment Plan will provide a breakdown of capital needs corresponding to **impact pathways** to reach climate neutrality. It will outline several risks that could impact the allocation of finance in support to needed decarbonisation actions and help to identify enabling actions/requirements that support the flow of different sources of capital. These actions will include policy changes to enable scaled actions, the design of effective institutional arrangements, such as dedicated city funds, and measures to limit and manage risks across all sources of public and private capital.

Early **engagement** is crucial, therefore pilot activities must be developed in partnership with funders and other capital sources to ensure the needed resource are available. NetZeroCities will provide guidance and support to cities on their capital planning efforts. Support will encompass tools and training, coaching, and mentoring, and direct support designing capital structures, engaging with diverse sources suitable to the needs, guidance on risk mitigation and accountability mechanisms. This support will promote alignment with the EU Sustainable Finance Taxonomy, seek to effectively connect Pilot Cities to financing institutions such as the EIB (European Investment Bank), EBRD (European Bank for Reconstruction and Development), respective national and regional funding and finance entities, and others as appropriate.

As part of their pilot activities, Pilot Cities will work on acquiring and testing capabilities necessary to ensure the sustainability and the replication of these activities, as well as a better, practical understanding of the concept of the Investment Plan.

In particular, in the Pilot City Programme will provide cities with support in:

- Building policy coherence to effectively mobilise capital

Why is this relevant to NZC and the Pilot Cities Call?

Pilot Cities shall aim to ensure the financial sustainability and potential scalability of the work that will be implemented through pilot activities. Furthermore, cities' ability to sustainably finance large-scale transformation endeavours across the city – to achieve net-carbon neutrality – will require enhancing skills and capabilities in identify, secure, and intelligently deploy capital and other sources of funding.

How is this useful for preparing your proposal?

All cities applying to the Call will be asked to dedicate time and resource to developing their capabilities and capacity in this space, given the importance of financing as a lever to achieving Mission ambitions.



- Determining and putting in place needed capital structures at city (or regional/national) level for organising various capital sources for funding and financing
- Build capabilities for cities to deploy capital effectively along the spectrum of needs

Recap: Questions to ask yourself

- ❖ What financing and funding needs does the city have in terms of the sustainability and scalability of pilot activities?
- ❖ What financial tools and instruments do you have at your disposal?
- ❖ What current understanding do you have of financial challenges and barriers as related to implementing large-scale solution(s)?
- ❖ What financial experience and capabilities does the city currently have? What are the gaps?



6 Impact

6.1 Impact; Monitoring, Evaluation, and Learning (MEL); and Theory of Change

Monitoring, Evaluation, and Learning (MEL) for NZC Pilot Cities are interlinked activities that support measuring progress towards climate-neutrality through respective pilot activities, as well as build synergies amongst Pilot Cities based on collective learnings for impacts. **Monitoring** relates to the development and application of quantitative indicators to track and analyse cities' progress towards direct impacts (like net-zero GHG **emissions**) and indirect impacts (**co-benefits**), as well as the setup, management and maintenance of data collection tools and infrastructure. **Evaluation** denotes the analysis and assessment of monitoring information against set goals, targets, and benchmarks, with the aim of determining the degrees to which critical milestones, intermediate outcomes, and final impacts have been achieved. **Learning** implies a structured and continuous process of stock-taking and synthesis to generate real-time insights help cities understand which solutions are working, in what contexts, for whom and why. In doing so, these activities will generate evidence and knowledge to enable reflexive governance and correct/refine the course of action. Finally, MEL is essential to the scalability and transferability of pilot activities across multiple climate-neutrality domains and city contexts within NZC.

Why is this relevant to NZC and the Pilot Cities Call?

- ❖ In addition to quantitative GHG emissions baseline/inventories and related data analysis, it is essential to describe complementary or supportive changes essential for climate-neutrality. These comprise of behavioural changes, mindsets and organisational learning, capability building, knowledge transfer and adoption, as well as medium and long-term progress on **citizen engagement**, democratisation, and **social innovation** interventions. It is beneficial in the early stage to ensure clear articulation of transformation within the chosen emission domains and transversal 'levers' within the pilot activities.
- ❖ Since qualitative impacts are highly subjective, based on the perception of local actors involved, it is essential to establish a baseline of systems-wide impacts that works for most stakeholders. Impact Logic for Pilot Cities will establish a co-created, shared, and consensus-based impact narrative as a basis for integrating both qualitative and quantitative evaluations, including the framing of several hard-to-measure or hard-to-define co-benefits of decarbonisation, which are important criteria for selection of pilot activities
- ❖ For expected impacts to be disseminated internally (within relevant city departments) and externally (citizens, communities, innovation ecosystems), cities' Impact Logic should ideally be connected to a communication strategy and clear decision-making processes. This will ensure that data and insights feed into project management, policy adaptation, as well as decision making about new climate actions/solutions. Additionally, the knowledge/data generated from MEL activities will also serve as a basis for effective communication of envisioned impacts to a wide range on stakeholders and audience, which is one of NZC's objectives.

Ensuring that multi-dimensional and **systemic** impacts from NZC pilot activities are envisioned at an early stage, and learnings from later interventions are continuously captured, measured, and fed into **MEL** processes, is a challenging effort for cities. This task is compounded when expected transformations for climate-neutrality are foreseen to occur through non-linear and complex **pathways**. To address this, building cities' understanding and clarity on their expected '**impact pathways**' as an evolving process will help cities effectively operationalising their MEL processes through both quantitative and qualitative indicators.



Pilot Cities shall be supported to clearly articulate their impact **pathways** through their **Impact Logic** or **Theory of Change** (TOC) to make explicit the fundamental mechanisms by which positive impacts will be produced across a timeline. These Impact Logics and the transformation narratives will connect Pilot Cities' proposed activities to short- and mid-term changes that can be observed/measured and are precursors to later long-term impacts to shift urban **systems**.

How is this useful for preparing your proposal?

- ❖ Designing and operationalising efficient MEL and 'sensemaking' (see definition below) and setting **impact pathways** for Pilot Cities requires dedicated capacity and human resources and data governance practices, which the applying cities would need to account and plan for.
- ❖ Cities already have their existing M&E and reporting mechanisms, which generate relevant data, which will require aggregation, analysis, and synthesis in the context of specific NZC MEL needs. Additionally, these reporting tools will need to be complemented by the NZC framework, tools, indicator sets. Therefore, having an in-depth understanding of the city's current reporting practices and infrastructure, emissions baselines and data governance is key to target to the most crucial emission domains and later demonstrate and optimise learning from pilot activities.
- ❖ Articulating impact pathways will aid the scoping of the NZC consortium's subsequent support to Pilot Cities to help them in setting evaluation criteria to measure progress towards envisioned impacts, determine the most-relevant indicator sets, assess evidence gaps, and how these gaps could potentially be addressed through the MEL processes.
- ❖ The Impact Logic-focussed aspects of the proposal will support the Pilot Cities in framing their strategic learning goals to later periodically assess their progress towards expected outcomes and inform the evaluation/reporting of the achievement of impacts. Such a continuous stock-taking and reflection process (also known as 'sensemaking') shall accelerate the learning/knowledge creation from the testing of **systemic** innovation solutions and relevant capacity building activities.

Illustrative examples and case studies

- **GPC:** The Global Protocol for Community-Scale GHG **Emissions** (GPC) requires cities to measure and disclose a comprehensive GHG inventory using two distinct but complementary approaches. One captures emissions from both production and consumption activities taking place within the city boundary, including some emissions released outside the city boundary. The other categorizes all emissions into "scopes," depending on where they physically occur. This approach requires separate accounting of emissions physically released within the city boundary for aggregation of multiple city inventories to avoid double counting. The scopes framework helps to differentiate emissions occurring physically within the city (scope 1), from those occurring outside the city (scope 3) and from the use of electricity, steam, and/or heating/cooling supplied by grids which may or may not cross city boundaries (scope 2).
- **Covenant of Mayors framework:** This methodological approach to the climate change mitigation and adaptation reporting (incl. local GHG accounting) is holistic in its nature. With respect to climate mitigation, this approach helps local authorities to address all the different consumers in their territory. The methodology on an integrated and inclusive climate and sustainable energy planning, in which local stakeholders have an active role to play.
- **Learning/sensemaking methods:** There have been innovative MEL processes developed and deployed through EIT Climate-KIC-funded initiatives such as MOTION project and Deep Demonstrations, which have operationalised real-time learning and sensemaking processes with EU cities and generated rapid evaluation cycles in a range of domains and explicitly focused on **systemic** transformation.

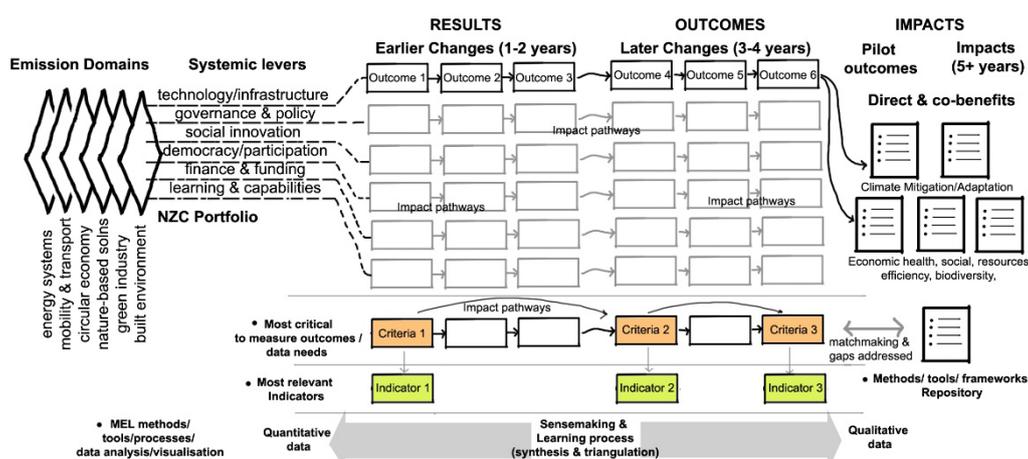


Resources and/or future Platform resources/services cities should look out for

- The **NZC Monitoring, Evaluation & Learning (MEL) Framework** is based on the MEL needs highlighted by cities, the CCC framework conditions, recommendations by the JRC, as well as the monitoring needs of the wider Mission implementation. Based on a comprehensive repository of existing methodologies, available tools, and frameworks which cities currently utilise in practice, the MEL Framework will develop critical indicator sets, measurement, and reporting processes for the evaluation of the NZC implementation, and by extension, the performance of the Mission (see Figure below with key components of the Framework).



- The **NZC TOC and TOC resources (canvas, toolkit)** will support the scoping of the MEL activities with a 'choice of menu' of expected outcomes/impacts (both direct and **co-benefits**) to critically assess the rationale for key outputs of their portfolio of emission domains and **levers**. Cities would be able to assess how pilot activities are contributing to envisioned outcomes and supported by any existing evidence in the form of metrics and indicators sets. This step will also help selecting what to measure based on envisioned change, determine the right evidence, and assess the evidence gaps and how these gaps could potentially be addressed through the NZC MEL Framework (see Figure below).



- **MEL features on the Portal:** The MEL Framework will also support Pilot Cities in quantifying the direct and co-benefits from their implementation, along with intermediate outcomes and long-term impacts. Additionally, this evaluation data will be integrated with the NZC Portal to visualise city-wide and sector-specific progress, aggregate and benchmark it against cities'



emission reduction potential, as well as create an interface to define reporting routine for progress monitoring.

Recap: Questions to ask yourself

- ❖ What are the short-term outputs, medium-term outcomes (end of the project), and long-term impacts of your proposed pilot activities?
- ❖ What are the most critical outcomes to measure through evidence in the form of evaluation criteria, indicator sets, and qualitative and quantitative data?
- ❖ What are the learning goals of your pilot activities? Or alternatively, which hypotheses and **impact pathways** are the pilot activities going to test?
- ❖ Which GHG emissions and reporting framework does your city currently use? Is this reporting, data infrastructure and MEL processes adequate to inform decision-making and policy directions towards climate-neutrality?
- ❖ Do your city's current MEL processes adequately cover both quantitative and qualitative data analysis/synthesis, as well as observing, assessing, or examining the data closely to generate actionable insights and learnings?
- ❖ What are your city's barriers for improving their monitoring, evaluation and learning practices, data governance, and exploring expected impacts, co-benefits, solutions towards climate neutrality and related support needs? How could these gaps be supported through the NZC MEL resources?

Useful links and references

- The covenant of mayors for climate and energy reporting guidelines.* (n.d.). Retrieved June 7, 2022, from https://www.covenantofmayors.eu/IMG/pdf/Covenant_ReportingGuidelines.pdf
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6.2 Direct and indirect impacts

Direct impacts and Indirect Impacts (Co-benefits and Do No Significant Harm principles):

For NZC Pilot Cities, **co-benefits** are implied as additional impacts or positive side-effects of, and integral to, climate mitigation or adaptation interventions. These impacts may be expected to be achieved in the short, medium, or long-term through their Pilot implementation, based on the emission

Why is this relevant to NZC and the Pilot Cities Call?

A clear articulation of key co-benefits would support cities in the following ways:

- Since pilot activities are expected to have a package of solutions that span multiple technological focus areas (like energy, mobility, nature-based solutions), a co-benefits-led approach would support cities to link their actions in a single emission domain to other related domains, thereby bringing more cohesion and connectedness within their overall activities.
- Indirect impacts can help identify larger groups of beneficiaries, like specific districts or marginalised communities within the city, beyond the ones targeted by specific pilot activities.
- Co-benefits can help build the effective narratives and advocacy for direct climate action by articulating its **systemic** and social impacts on the everyday lives of citizens (like less commuting time, reduced air-pollution, or increased jobs/investments). These arguments could potentially be utilised to communicate the pilot activities' impacts to a range of stakeholders, especially in a non-technical language.
- A co-benefits-driven approach could be utilised to build economic cases and business models for climate actions through the quantification of tangible and measurable impacts. Such an exercise could potentially help cities access climate finance from a range of non-conventional sources, as elaborated in the finance and funding-focussed sections of this Guidebook.

domains targeted and the portfolio of solutions designed by the cities. For example, low-carbon and active mobility solutions are known to have positive effects on public health and well-being. At the same time, some climate actions could also potentially lead to negative consequences or trade-offs to be avoided. For example, increased energy generation or heating from biomass sources could have negative effects on local air-quality and regional biodiversity. Such negative effects of actions on other sectors are outlined in the EU Taxonomy Regulation (Article 17) as Do No Significant Harm (DNSH) principles and applied to environmental objectives and corresponding activities. These principles also guide the NZC Taxonomy of technological solutions/services and the corresponding knowledge repositories and factsheets available on the NZC Portal.

Co-benefits could also be classified as direct and indirect based on how closely they are to an outcome of the intervention. For instance, improved air quality through renewable energy usage (reduction in nitrous oxide, Particulate Matter concentrations) is a direct co-benefit, while associated improvements in morbidity and mortality are indirect co-benefits derived from air-quality improvements. Therefore, having a clear and comprehensive understanding of potential co-benefits and how they are interconnected will help cities in identifying a broad range of indirect impacts and trade-offs for their specific activities. Furthermore, it is important to think about data needs to estimate co-benefits/impacts beforehand, and to include the data collection approach for MEL for proposed Pilots activities.

The following section will offer an exhaustive (but not definitive) 'menu' of co-benefits and their thematic categorisation for Pilot Cities to consider while developing their portfolios.



How is this useful for preparing your proposal?

- ❖ **Monitoring process and indicators:** Outlining co-benefits can support the Pilot Cities in assessing the most critical evidence gaps and identify their indicators to measure and report their results/progress of implemented solutions, while learning from the piloting experience.
- ❖ **Governance arrangements:** Co-benefits and indirect impacts often span the policy imperatives and priorities of several municipal departments within the city. Therefore, a meaningful integration of co-benefits into pilot activities' design and delivery can inherently build interdepartmental collaboration and wide-spread organisational learning.
- ❖ **Measurement and learning:** Consideration of a large array of indirect and co-benefits entails some outcomes that are critical yet hard to evaluate and measure – for e.g., social indicators like inclusion. This can lead the city to design and implement a range of measurement methods and integrate qualitative and quantitative data as a coherent MEL process. It is also expected that cities pick not only the easy-to-measure-and-report data, but also devise creative and mixed methods to evaluate and continuously learn

Illustrative examples and case studies

The mapping of potential impacts, **co-benefits**, synergies, and risks has begun for the different thematic actions, covering climate mitigation and adaptation/resilience, environment (water, land, and ecosystems), food supply and production, socio-economic and health co-benefits and ensuring a cross-sectoral integration. We acknowledge that these links are, however, complex, both in terms of conceptual understanding as well as contextual considerations in practice and implementation. These mutual interdependencies will be subsequently analysed more deeply and presented in forthcoming NZC Deliverables, such as the NZC **Impact Logic (Theory of Change)**, **MEL** resources, **emissions** data reporting mechanisms, analysis of the technological solutions and barriers to adoption, and other relevant project Work Packages. The table below provides an overview of the wide range of direct and indirect co-benefits and their categorisation being considered as a starting point in NZC for services and solutions design and MEL activities.

	Impacts (including co-benefits) and impact categories
Direct impacts	<u>Climate-neutrality</u> <u>Climate Mitigation</u> <ul style="list-style-type: none"> • Reduced GHG emissions • Increased energy efficiency or rate of retrofit (including district heating) • Reduced energy demand, needs, or consumption • Increased access to clean, stable, affordable energy • Reduced energy poverty • Increased modal shift to public transit, walking, cycling • Decreased modal share of private vehicles • Increased uptake of low-carbon technology vehicles for private, freight, public transport (EVs, e-bikes, hydrogen-fuelled etc.)
	<u>Climate Adaptation</u> <ul style="list-style-type: none"> • Increased carbon sequestration (for e.g., through NBS) • Enhanced stability of urban infrastructure • Reduced risk to natural/climate disasters or hazards • Increased preparedness to uncertainty of climate impacts
Indirect impacts	<u>Public Health & Environmental Impacts</u> <ul style="list-style-type: none"> • Improved air quality • Reduced noise pollution • Increased road safety • Reduced heat island effect • Enhanced physical & mental well-being • Enhanced liveability attractiveness/ aesthetics (align with New EU Bauhaus Goals)



	<ul style="list-style-type: none"> • Increased physical activity and active lifestyles • Equitable & affordable access to housing
	<p><u>Social Inclusion, Democracy & Cultural Impacts</u></p> <ul style="list-style-type: none"> • Enhanced citizen & communities' participation & social capacities for participation/engagement • Increased social justice • Improved social cohesion, gender equality, equity • improved functioning of democratic institutions • Increased awareness of social issues • Increased access to job/employment and skill development opportunities • Improved access to information, awareness & behaviour change
	<p><u>Economic Development Impacts</u></p> <ul style="list-style-type: none"> • Increased investments in R&I • Decreased future maintenance & capital costs • Increased number of skilled jobs & rate of employment • Increased economic thriving (quality of jobs, sustainable supply chains etc.) • Increased economic returns of natural capital • Increased technological readiness & rate of adoption • Local economic activity & global connectivity • Increased local entrepreneurship & local businesses/ventures • Increased visibility & knowledge/tech transfer for local businesses/ventures • Mainstreaming of new economic models like proximity & sharing economy
	<p><u>Resource Efficiency Impacts</u></p> <ul style="list-style-type: none"> • Improved waste management and efficiency • Increased deployment of material cycles & circular economy • Increased water quality • Enhanced water management process/implementation • Sustainable & resilient food production & supply systems • Decreased food waste • Increased production & consumption locally grown food • Improved land-use management practices (linked to biodiversity)
	<p><u>Biodiversity Impacts</u></p> <ul style="list-style-type: none"> • Increased urban forestry, plantation & improved plant health • Reduced harmful ecological footprint • Increased non-invasive species & pollinators • Improved soil-health • Reduced risk of disease outbreak/pandemic • Increased ecological awareness • Enhanced ecological habitat connectivity • Improved nature restoration

Resources and/or future Platform resources/services cities should look out for

- The NZC **Impact Logic** will be a key resource that will indicate the expected direct and co-benefits' interconnections with the intermediate outcomes mapped along cities' Pilot **Impact Pathways**.
- Resources provided to the cities for this topic will include a list/menu of co-benefits to be considered as short, mid to long-term outcomes expected to be achieved and measured for pilot activities. This list will build on the current work and resources being developed as part of the MEL Framework & Impact Logic and the NZC Taxonomy of technological solutions and services.
- Guidance from the NZC Platform on selecting technological solutions and services will support Pilot Cities on assessing externalities and identifying and tagging any risks of infringing upon the DNSH principles when deploying innovations.
- The MEL Framework and the Impact Logic elaborated in the previous section shall guide Pilot Cities to determine risks and unintended consequences of their interventions, while adhering to the climate and environmental priorities of the EU and cause no significant harm to them.



- Regarding the Platform, the Call & Grant Management Module will be used for operational management of all reporting for pilot activities, which will include metrics and visualisation of key co-benefits, based on the data procured from Pilot Cities."
- The library of technological and emission domain-specific solutions covered as a part of the Knowledge Repository shall be tagged with co-benefits for each solution mapped.

Recap: Questions to ask yourself

- Are you considering a wide range of co-benefits or indirect impacts expected to be achieved from the NZC pilot activities?
- What are the interactions or interconnections of the identified co-benefits with each other? Which are they complementarities or synergies? Are there any conflicts or negative consequences of indirect impacts? How could they be grouped or clustered?
- When along the pilot activities timeline are these co-benefits expected to emerge? (Think of short-term, mid-term and long-term co-benefits).
- How could you connect with other city departments based on relevant co-benefits to foster inter-departmental collaborations?
- How will the co-benefits measured and evaluated to enable learning from their integration or achievement? Which are the hard-to-measure indirect impact that require creative data collection, analysis, and synthesis methods?
- How are the envisioned co-benefits embedded as outcomes within the **Theory of Change** for your proposed pilot activities?

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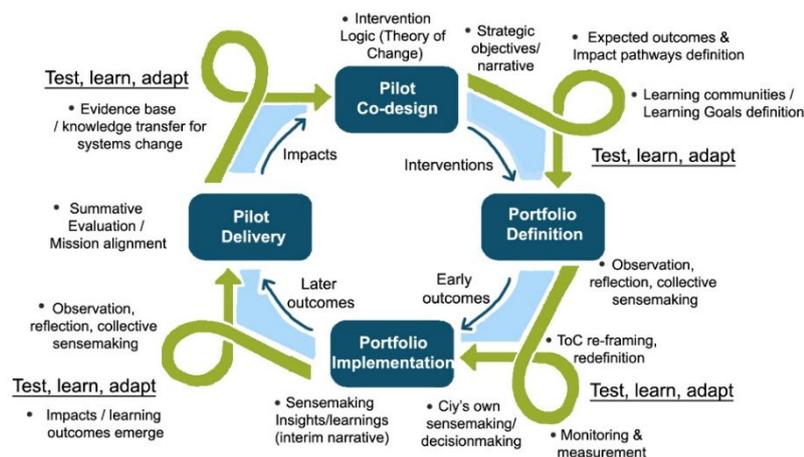
6.3 Emergent learning and learning loops

In business-as-usual **Monitoring** and **Evaluation**, with a linear point of view, learnings are assessed after a project or process has been completed and evaluated. Only from then on can learning lead to changes in the project itself or spread to other projects and contexts. However, this may not be sufficient for ambitious climate-neutrality targets within a compressed timeline. For **systemic** interventions where there are no predetermined single sector solutions to a challenge - as in the case of achieving climate-neutral cities - it is necessary to design and operationalise processes that generate rapid and tangible insights as well as feed these back into decision-making and policy directions and the planning/implementation of new actions not contemplated a priori. '**Emergent Learning Loop**' implies such an active gathering and continuous application of knowledge/learning. By doing so, Pilot Cities can deploy flexible models of learning and adaptation that allow them to accelerate impacts and become more resilient to internal and contextual changes (see Figure below).

The learning and '**sensemaking**' activities for NZC Pilot Cities shall comprise structured, facilitated, and continuous processes of observation, reflection, stock-taking, and synthesis to generate real-time insights. This practice aims at enabling 'reflexive governance' (also known as adaptive management) which helps cities understand which solutions are working, in what contexts, for whom and why. These sessions will also capture and consolidate evidence and knowledge on the scalability and transferability of NZC interventions across critical emission domains and city contexts. Additionally, these peer-learning workshops will help build trust and synergies to create a safe learning environment in which cities feel empowered to exchange insights on barriers and failures and encourage necessary course-correction of their respective **pathways**.

The knowledge/data generated from sensemaking & learning activities will support effective communication and dissemination of envisioned impacts for a wide range of stakeholders. They will establish co-created and consensus-based impact narratives as a basis for integrating qualitative and quantitative data evaluations (both interim and summative), including the framing of several hard-to-measure or hard-to-define **co-benefits** of decarbonisation. Further, this support will cover a range of learnings relevant for Pilot Cities – strategic and action-learning, social learning, organisational learning, process, and experiential learning etc. Furthermore, to ensure learnings are embedded, these processes will aim at disseminating learnings at multiple levels or scales, ranging from individuals, teams, city organisations, city clusters, and national networks.





How is this useful for preparing your proposal?

While preparing the proposal, cities should take into consideration that interdepartmental groups, and/or participatory governance across a wide group of stakeholders, can create an opportunity to embed learning-loops and facilitate emergent learning (**sensemaking**), supporting cities to take decisions based on these processes, and help them to connect this learning with other/future initiatives. In this sense, how the pilot designs its governance processes to involve a significant component of observation, reflection, and learning, with a wide group of stakeholders, can support future decision making and organisational learning

Why is this relevant to NZC and the Pilot Cities Call?

In dealing with complexity and uncertainty - which are characteristics of transition changing contexts - learning stands out as a cornerstone in the (reflexive) governance of transitions towards climate neutrality. For Pilot Cities, that are leaders towards climate neutrality, it is expected that they not only execute programmes from a **systemic** approach, but also that rapid learning is obtained. This will enable them to accelerate their own transformation and facilitate diffusion to other contexts.

It is important to take into account from the design of an intervention how learning will be addressed so that Pilot Cities can scale-up interventions and transfer learnings to other cities.

Illustrative examples and case studies

- The Healthy, Clean Cities Deep Demonstration orchestrated by EIT Climate-KIC supported a cohort of ambitious EU cities to establish a strategic learning practice. It co-developed an **impact logic** for place-based experimentation and deployed '**sensemaking**' cycles to generate actionable insights to inform design and implementation.
- UNDP Sensemaking practice set up for a network of Accelerator Labs in 115 countries designed and deployed complexity and systems thinking tools/methods to enable peer-learning models and accelerate learning across a global community of public sector practitioners towards 2030 Sustainable Development Goals (SDGs).
- Living Labs approach and its implementation through diverse EU initiatives provide a setting in which multi-actor coalitions have been able to test, develop and co-create innovative solutions to generate accelerated learning about urban challenges. For example: AMS Institute - Urban Living Labs.

Resources and/or future Platform resources/services cities should look out for

- Facilitated city-cluster workshops to co-create the cities' **impact pathways**, learning goals/strategy, **evaluation** methods, and to periodically share lessons with other Pilot Cities.



- NZC Impact Logic and supplementary material (canvases, methods, tools, case-studies etc.) provided by the Net Zero Cities Platform and the Portal.
- Synergies and connections with national Mission platforms to and disseminate the NZC Pilot Cities Programme's learnings at a national scale.

Recap: Questions to ask yourself

- ❖ How is learning currently being promoted in the city?
- ❖ What learning process should the city establish to obtain rapid learnings from the implementation of transformative actions?
- ❖ How is the city going to systematise learning outputs in real time to make them transferable?
- ❖ What process can the city follow to support learning diffusion within the city and across-cities?

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7 Appendix

7.1 NetZeroCities project & the Cities Mission

EU Missions are a new element of the **Horizon Europe** research and innovation programme for the years 2021-2027. They support the European Commission's priorities such as the [European Green Deal](#), [Europe fit for the Digital Age](#), [Beating Cancer](#), and the [New European Bauhaus](#). Five Mission Boards gathering leading experts were formed to help specify, design, and implement the Missions for Horizon Europe. In September 2020, the Mission Board handed over the final recommendations to the European Commission. In September 2021, the **EU Mission on 100 Climate Neutral and Smart Cities by 2030 (Cities Mission)** was officially launched, and the Implementation Plan was published.

NetZeroCities (NZC) is a four-year project that is funded by the Horizon 2020 Research and Innovation Programme, designed to help cities overcome the current structural, institutional, and cultural barriers they face, to enable them to achieve climate neutrality by 2030.

The NZC project offers advanced capabilities related to **systemic change**, **citizen engagement and participation**, participatory and innovative governance, capital and financial structuring, and social innovation, to ensure cities have access to expertise needed to address their challenges in becoming climate-neutral.

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, promoting, and integrating new and existing tools, resources, and expertise into a one-stop platform accessible to all cities through an online portal (**Mission Platform**). The **NZC Mission Platform** also provides support in the co-creation of **Climate City Contracts** with local stakeholders and citizens. Drawing up, signing, and implementing Climate City Contracts is a central feature of the EU Mission on 100 Climate Neutral and Smart Cities by 2030. While not legally binding, these contracts constitute a clear and highly visible political commitment not just to the European Commission and national and regional authorities, but also to citizens. They will set out plans for the city to achieve climate neutrality by 2030 and include an investment plan.

In addition, within the framework of the NZC project, an open call for Pilot Cities will be launched. Supported through the range of services, knowledge, and expertise provided by the NZC Mission Platform, Pilot Cities will commit to deploying interventions within and/or across one or multiple **emissions domains** that tests **pathways** to decarbonisation to overcome barriers to transformation and, ultimately, accelerate their journey to becoming a carbon-neutral city. Pilot Cities will receive grant funding to support implementation of their experiment with an emphasis on collaboration, reflection, and learning, and identifying both barriers to change and opportunities for multi-level, multi-lever interventions to overcome these.

Useful links and references

- ❖ NetZeroCities, available at <https://netzerocities.eu/>
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- ❖ [Additional documents](#), including Info Kit for Cities under the homepage of *EU Mission: Climate-Neutral and Smart Cities*

7.2 Green Deal & CINEA

The European Green Deal

The European Green Deal (**EU Green Deal**) is the European Union's response to the climate and environmental-related challenges that are this generation's defining task. It is a new growth strategy that



aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy where there are no net **emissions** of greenhouse gases in 2050, where the environment and health of citizens are protected, and where economic growth is decoupled from resource use.

In practice, the European Green Deal, approved in 2020, is a set of policy initiatives by the [European Commission](#) with the overarching aim of making the [European Union](#) (EU) climate neutral in 2050. An impact assessment plan will also be presented to increase the [EU's greenhouse gas emission](#) reductions target for 2030 to at least 50% and towards 55% compared with 1990 levels. The plan is to review each existing law on its climate merits and to introduce new legislation on the [circular economy](#), [building renovation](#), [biodiversity](#), farming, and [innovation](#).

The president of the European Commission, [Ursula von der Leyen](#), stated that the European Green Deal would be Europe's "[man on the moon moment](#)". Von der Leyen appointed [Frans Timmermans](#) as Executive Vice President of the European Commission for the European Green Deal.

The **Sustainable Europe Investment Plan** is the investment pillar of the European Green Deal. Reaching the 2030 climate and energy targets⁸ will require additional investments of EUR 260 billion a year by 2030. A framework is needed to bridge the gap between policy objectives and the significant private financial resources available. This framework will target climate, environmental, and social investments, the latter as far as they are related to the sustainable transition. The Sustainable Europe Investment Plan will mobilise through the EU budget and the associated instruments at least EUR 1 trillion of private and public sustainable investments over the upcoming decade.⁹

Figure 1. The Investment Plan within the European Green Deal



CINEA

The European Climate, Infrastructure and Environment Executive Agency (CINEA) is the successor organisation of the Innovation and Networks Executive Agency (INEA). [Officially established on 15 February 2021](#), it has started its activities on 1 April 2021 in order to implement parts of certain EU programmes. [CINEA](#) plays a key role in supporting the **EU Green Deal** through the efficient and effective implementation of elements of its delegated programmes: Connecting Europe Facility (CEF), **Horizon Europe**, Innovation Fund (IF), LIFE programme, EU Renewable Energy Financing Mechanism, Just Transition Mechanism, and the European Maritime, Fisheries and Aquaculture Fund. Its stated mission is to support stakeholders in delivering the European Green Deal through high-quality programme management that helps to implement projects contributing to decarbonisation and sustainable growth.

Horizon Europe

Horizon Europe is the largest transnational programme ever supporting research and innovation and will be implemented by the EU. This new EU research and innovation programme will have a budget

⁸ The key targets for 2030 are: at least 40% cuts in greenhouse gas emissions (from 1990 levels), at least 32% share for renewable energy and at least 32.5% improvement in energy efficiency.

⁹ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Sustainable Europe Investment Plan European Green Deal Investment Plan (Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0021>)



of around €95.5 billion for 2021-2027. CINEA will manage the Horizon Europe work programmes of cluster 5, which includes climate, energy, and transport areas. The climate action part of Horizon Europe's cluster 5 is responsible for developing mitigation and adaptation strategies and policies tackling the global climate crisis based on understanding its causes, evolution, and impact as well as three EU –Mission (Climate-neutral and smart Cities, Climate Adaptation, Oceans)

In total, it is expected that CINEA will manage a budget of up to €15 billion for Horizon Europe under the 2021-2027 Multi-annual Financial Framework (MFF).

Use links and references:

- A European Green Deal, available at https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
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- [EU Missions](#)



8 Glossary, Index, Bibliography

8.1 Glossary

Term	NZC Pilot Cities Programme definition
Breakthrough	Overcoming a deep barrier to change.
(Carbon) Emissions	'Emissions', and 'carbon emissions' are widely used. These are considered to be synonymous with 'GHG emissions' or 'carbon-equivalent emissions', encompassing both CO ₂ and non-CO ₂ GHG emissions.
CINEA	The European Climate Infrastructure and Environment Executive Agency
Cities Mission	The EU Mission on/for 100 Climate Neutral and Smart Cities by 2030.
Citizen engagement and participation	The wide range of ways in which people, on their own or as part of formal or informal groups, participate in democratic decision making, civic and public life to actively shape and implement, in this case, the transition to net zero.
City systems	Of or pertaining to the systems that make up a city's civic, social, infrastructural, financial, etc. functions.
Climate City Contract (CCC)	The Cities Mission <i>Climate City Contract</i> (CCC) is a governance innovation and tool to help cities collaboratively address their barriers to accelerating transformative action to reach climate neutrality by 2030. The CCC is the documented result of an iterative co-creation and commitment process. Systemic in nature, this process will be led by cities and involve multiple stakeholders at various governance levels, as well as the wider ecosystem of private and civic stakeholders. Together, they will identify key actions to achieve 2030 climate neutrality, and the ways and means to implement them.
Co-benefits	Ancillary impacts or positive side-effects of, and integral to, climate mitigation or adaptation interventions.
Co-production	Ways for different actors to work with and become part of providing services that supports decarbonization directly or indirectly.
Data Controller	The entity that determines the purposes, conditions, and means of the processing of personal data.
Data Processor	The entity that processes data on behalf of the Data Controller
Distributed agency	The recognition that agency - the capacity to act meaningfully - is not only the domain of individuals, but is interdependent, complex and can be collective.
Emergent learning	Learning that is observed, appearing, coming up, rather than summative, retrospective, formally end-of-process learning.
Emissions domains	The main emissions domains for cities include buildings, industry, transport, waste treatment (both solid waste and wastewater), agriculture, and forestry, as well as grid-supplied energy.
Engagement	Active and conscious empowerment, collaboration, and mobilization of a plurality of agents, in this case, to reach net zero.
EU Green Deal	The European Union's response to the climate and environmental-related challenges that are this generation's defining task.
EU Missions	A novelty of the Horizon Europe research and innovation programme for the years 2021-2027. They support the European Commission's priorities such as the European Green Deal, Europe fit for the Digital Age, Beating Cancer, and the New European Bauhaus.
General Data Protection Regulation (GDPR)	The General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679) is a regulation by which the European Parliament, the Council of the European Union and the European Commission intend to strengthen and unify data protection for all individuals within the European Union (EU). It also addresses the export of personal data outside the EU.
Governance innovation	'Novel rules, regulations and approaches that seek to address a public problem in more efficacious and effective ways, lead to better policy outcomes and enhance legitimacy'.



Horizon Europe	The largest transnational programme ever, supporting research and innovation, implemented by the EU.
Impact Logic (or Theory of Change)	Impact Logic (used interchangeably with Theory of Change) refers to co-created, shared, and consensus-based impact narrative(s) as a basis for integrating both qualitative and quantitative evaluations, including the rationale and assumptions for achieving several hard-to-measure or hard-to-define co-benefits of decarbonisation.
Impact Pathways	These are fundamental causal mechanisms by which positive impacts will be produced across a timeline and aligned assumptions and risks outlined by the Impact Logic. These pathways connect proposed interventions to short- and mid-term outcomes that can be observed/measured and are precursors to long-term impacts to shift urban systems.
Learning loops	Processes that generate rapid and tangible insights as well as feed these back into decision-making and policy directions and the planning/implementation of new actions not contemplated a priori.
Levers	Interventions that address distinct but connected elements of a problem, across a range of system characteristics or entry-points, such as (but not limited to): technology; governance and policy; finance and business models; culture, participation, and social innovation; capacity and capability building.
MEL	Monitoring, Evaluation and Learning
Monitoring	Co-development and application of quantitative indicators to track and analyse cities' progress towards direct impacts (like net-zero GHG emissions in critical sectors) and indirect impacts (co-benefits), as well as the setup, management and maintenance of data collection tools and infrastructure.
Evaluation	Analysis and assessment of monitoring information against set goals, targets, and benchmarks, with the aim of determining the degrees to which critical milestones, intermediate outcomes, and final impacts have been achieved.
Learning	Evidence and knowledge which is collected and reported through a structured and continuous process of stock-taking and synthesis. These insights generated in real-time help cities understand which solutions are working, in what contexts, for whom and why, as well as risks and barriers.
Mission Platform	A one-stop platform (accessible to all cities through an online portal) that will: develop, promote, and integrate new and existing tools, resources, and expertise; support in the co-creation of Climate City Contracts with local stakeholders and citizens; and support cities to develop specific strategies that are tailored to suit local and regional contexts.
Pathway	Emerging direction of travel towards a new system with clear and shared goals co-owned by a relevant coalition, well understood barriers to progress and the tools to address them.
Personal data	Any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural, or social identity of that natural person.
Radical collaboration	Collaboration that is built into decision making from the ground up, where stakeholders and citizens are seen as co-deciders and co-producers of outcomes rather than just as consultees. It needs a long-term commitment to building the culture of openness in government and other bodies, and a financial commitment to supporting the social and digital infrastructure that can underpin that long-term engagement.
Sensemaking	(Portfolio) Sensemaking is within a systems innovation approach to systems innovation to support decision making, implementation and scaling. It refers to a structured, facilitated, and continuous process of observation, reflection, synthesis, analysis, pattern finding and insight generation in order to produce intelligence that enables decision making.



Social Innovation	A form of innovation that is social in its ends and its means (Murray et al., 2010): this means developing new ideas, services and models that better address social challenges (EC, 2020). In broad terms, this means that it is innovation that is “social” in its objectives, its process, and its outcomes. As such, it holds opportunities for cities to: (1) provide solutions to local, unmet social needs; (2) engage system actors in the co-design and co-production of the solutions (and by default work to de-risk innovation); (3) create long-term, positive, social impact on multiple scales (geographic, challenge scope); and (4) contribute – by engaging multiple actors in its development process and building capacity – to cultural and behavioural changes that support the development of resilient and responsive innovation ecosystems able to bring actors and resources around missions.
Sustainable EU Investment Plan	The investment pillar of the European Green Deal
System	“A set of elements or parts that is coherently organized and interconnected in a pattern or structure that produces a characteristic set of behaviours, often classified as its “function” or “purpose”. (Meadows, D. H., 2008, <i>Thinking in Systems: A Primer</i> , Chelsea Green Publishing)
Systemic	The characteristic of an approach to a problem or solution that takes account of the interconnected elements or parts of a system in order to influence and transform a system’s behaviours, functions, and/or purposes.
System transformation	The evolving of a system from one operational, functional, and/or behavioural state to another (more desirable) state.
Systems innovation	Systems thinking is an approach to understanding and analysing problems that focuses on how the parts of a system relate to each other. Systems innovation aims to create whole system transformation by using the interdependence between multiple levers - such as technology, market mechanisms, regulations, and social innovations - to address complex problems
Theory of Change	(See “Impact Logic”)
Tipping points	Where one change leads to a positive cascade of self- reinforcing further changes.
Transition pathway	A suite of complimentary/synergistic actions (across levers) that enable significant emissions reduction
Urban stakeholders	The wide range of organised interests and groups who form part of a city’s ecosystem.



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