

100 climate neutral cities by 2030

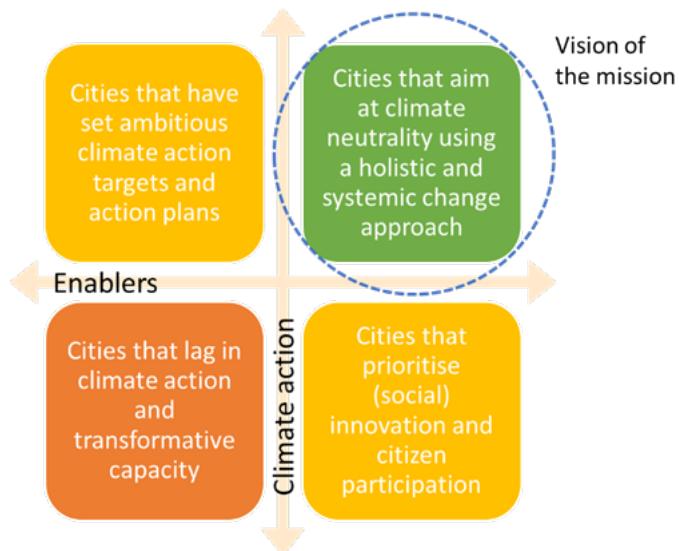
by and for the citizens

The Mission Board for *climate neutral and smart cities* proposes that the EU Commission should:

- Establish a mission that will support and promote 100 European cities in their systemic transformation towards climate-neutrality by 2030

The mission will:

- Build a multi-level, co-creative process - formalised through a Climate City Contract - that is adjusted to the realities of each city while contributing to the overall goal of the mission;
- Promote these cities as national, European and global frontrunners in addressing the European Green Deal and its headline goal of climate neutrality in Europe by 2050, inspiring many more cities in doing so;
- Bring about a just transition by helping to deliver on the UN's Agenda 2030 and its Sustainable Development Goals to improve citizens' wellbeing;
- Bring associated benefits such as improve air quality, creating jobs, promoting healthier lifestyles, improving mobility in cities.
- Identify policy gaps and priority areas for EU policy measures and research and innovation funding to contribute to the goals of the European Green Deal;
- Support the development of drivers of transition in the five key enablers to:
 - o Plan a transformative agenda to become innovation hubs;
 - o Develop new forms of participative governance;
 - o Develop a new economic model for climate action;
 - o Put in place an integrated urban planning model;
 - o Deploy and use smart systems and data platforms;
- Create synergies with and between existing European climate initiatives and stakeholders – such as the Covenant of Mayors, the European Institute of Innovation and Technology and its relevant Knowledge and Innovation Communities, the Green City Accord, the European Green Capital Cities, the Strategic Energy Technology Plan and its '100 Positive Energy Districts' initiative and the European Innovation Partnership on Smart Cities.
- Align with other Horizon Europe missions and EU initiatives in support of the Green Deal, in particular with the mission on *climate adaptation* with its key goal of helping Europe – and its urban areas – adapt to new climate conditions and its effects;
- Collaborate with the European business and contribute to innovation and thus to the competitiveness of the industry on global markets competitiveness excellence.



1. Why cities?

Cities cover about 3% of the Earth's land, yet they produce around 72% of its greenhouse gas emissions. On top of that, cities are growing fast. In Europe, it is estimated that by 2050 almost 85% of Europeans will be living in urban areasⁱ. However, cities are where initiatives to cut the carbon footprint of energy, transport, buildings (and even industry and agriculture) can play a highly visible and coordinated role. The higher density of use and infrastructure in cities offers a greater potential for cross-sectoral integration and complex infrastructure such as smart gridsⁱⁱ. Cities, with their reservoirs of capital and know-how, can more easily create the economies of scale which are necessary for piloting and scaling up new ideas and concepts.

As a result, the climate emergency has to be tackled within cities and by their citizens. As one city mayor has said: "*When it comes to climate action, no one is doing more than cities, but no one is doing enough. We are entering a make-or-break decade for the preservation of our planet and environmental justice for every community*"ⁱⁱⁱ.

The European Commission has already presented a strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050. The recent EC Communication on The European Green Deal^{iv}, using the "man to the moon example", has made the case in favour of a *mission-oriented* R&I component in the next Horizon Europe programme. In this frame the question is "**How can cities take Europe to the moon?**" or "**How can cities help getting Europe Climate Neutral as fast as possible?**"

2. The mission board's mandate

Our mandate is to propose a mission on climate neutral and smart cities that will maximise the impact of EU support to research and innovation - and demonstrate its relevance for society and citizens – in this crucial area.

We identify an endpoint against which success is measured, namely *climate neutrality*. And we propose a systemic approach for this transition, one which combines new knowledge and technology with business model, finance, regulatory, governance, skills and social innovation.

The proposed mission will align EU, national, regional and local policy priorities in order to overcome barriers and maximise synergies in publicly financed programmes. That includes combining financing from different European, national and local resources, covering the whole "value chain" from R&I to planning, investment and implementation. We also emphasise the key role of digital support and citizens as drivers of climate action.

3. The mission for climate neutral cities

To achieve in 10 years what Europe plans to achieve in 30 years is a huge challenge. This requires a systemic transformation of our cities.

But we believe that this is both necessary and feasible. It is necessary due to the current climate emergency and as the associated benefits will heavily impact on citizens' wellbeing – whether improving air quality, creating jobs, or promoting healthier lifestyles. It is feasible because technology and innovative solutions for sustainable energy, transport, food, water and material systems are available – and more options will become available thanks to support from Horizon Europe and national research and innovation initiatives^v.

Green technology prices and market conditions^{vi} are moving in directions that favour climate-friendly investments. This will continue to strengthen incentives to make this transition. The European Green Deal, which prioritises a revision of EU climate legislation and targets for 2030 and foresees the European Investment Bank as a Climate Bank, will further strengthen this trend.

We propose the following objectives for the mission on climate neutral cities:

- **Support, promote and showcase 100 European cities to make a systemic transformation towards climate neutrality by 2030**, and to make these cities experimentation and innovation hubs **for all cities in the run to 2050**;
- **Offer cities financial means to achieve the mission** goals through Horizon Europe, the European Structural and Investment funds, the Just Transition Fund, the Important Projects of Common European Interest, Invest EU and other EU instruments;
- **Build a multi-level, co-creative process, formalised through a Climate City Contract**, to turn key barriers - in particular innovation; governance; funding, financing and economic models; integrated urban planning; smart technologies and data - into drivers;
- This mission will be carried out by and for citizens, with **a new role as change agents through bottom-up** initiatives and innovation, in particular through new forms of governance;
- Promote a **just transition by helping to deliver the UN's Agenda 2030** and its Sustainable Development Goals to improve citizens' wellbeing; by improving air quality, creating jobs, promoting healthier lifestyles, and reducing the negative effects of mobility;
- **Capitalise on existing European climate initiatives and stakeholders** – such as the Covenant of Mayors, the European Institute of Innovation and Technology and its relevant Knowledge and Innovation Communities, the Green City Accord, the European Green Capital Cities, the Strategic Energy Technology Plan and its '100 Positive Energy Districts' initiative, the European Innovation Partnership on Smart Cities;
- **Collaborate with European businesses** in order to contribute to innovation and improve their global competitiveness.

Climate neutral cities must also address **climate adaptation and resilience** through assessment of risks and vulnerabilities, as a basis for their adaptation plans. The inclusion of adaptation in the Climate City Contracts will be further developed with the Climate Adaptation mission.

4. "By and for the citizens"

The main message of this proposal is that the current climate emergency must be tackled in cities and by their citizens, thus the subtitle "by and for the citizens". In this process, citizens have different functions. They are not only political actors in a governance structure, they are also users, producers, consumers and owners.

In this way, citizens can have a huge impact on the environment and take an active role in their local urban areas, in associations and their own homes, to drive climate transition - thereby improving the economy and the environment. For this mission to be successful, citizens and civil society must have a primary role and be able to use appropriate resources to drive this systemic transition.

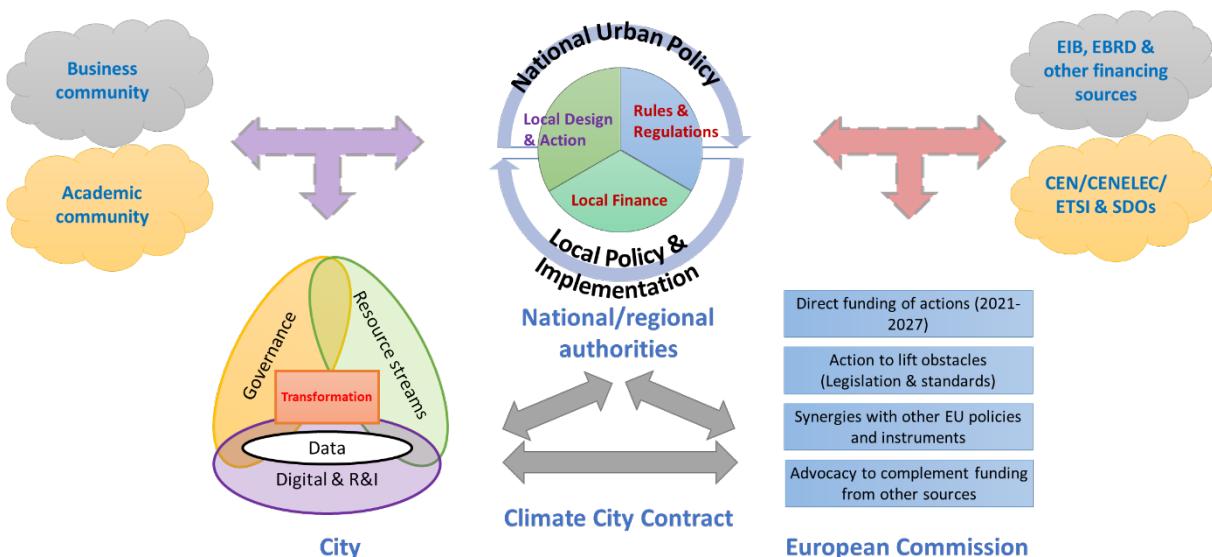
5. A new way of working: *A Climate City Contract*

With framework conditions on a positive path, the big challenge remains the lack of capacity and commitment so that cities to make these transformative changes. To

address that, the mission board proposes a **multi-level co-creation process** through the introduction of a **Climate City Contract**. Its purpose is to:

- identify the policy and implementation gaps as a basis to inform a roadmap for transition;
- coordinate all stakeholders within the city towards a common climate goal;
- coordinate national and EU authorities to deliver the necessary legal, governance and financial framework conditions necessary to give each city the means to achieve climate neutrality;
- create a one-stop-shop for multi-level negotiations in order to facilitate city activities to make the transition reality.

Adapted to the specific circumstances of each city, a Climate City Contract will include goals and targets, strategies and the roadmap for achieving the transition, while mapping out involved stakeholders and responsibilities. This will be driven by demand, thus putting the cities at the centre of the transformation process and allowing them to determine the scope, activities and timeline of the Contract.



A central part of a Climate City Contract will be commitments to overcome key barriers and turn them into drivers. We prioritise five such barriers: forms of governance, economic models, integrated urban planning, digital technologies and innovation management. These are outlined in further detail in the next section.

A Climate City Contract should be a binding document that covers all the ingredients of the mission. It will be signed by the local government, the Commission and the respective national or regional authorities. Other city stakeholders like business, academia and the civil society will be encouraged to be part of it, as the elements of the strong governance needed to design and deliver the Contract in and for the city.

6. Systemic transformation: turning barriers to drivers

The largest climate policy challenge is the lack of capacity to bring all urban area stakeholders together in a coordinated way, using financial resources and technological innovations in order to create systemic transformation. As a result, we have given priority to the following five barriers, which have to be overcome and turned into drivers: the management of innovation by cities, the forms of governance, the economic model for climate action, the urban planning model and the introduction of digital technologies and data platforms. These will be included as basic elements in the Climate City Contracts.

6.1. Models for the transformation of cities to innovation hubs

Alongside traditional supply- or demand-driven approaches, the mission will take a challenge/objective-driven approach to city innovation. This means that the desired objectives and the challenges would be put at the centre of innovation activities, and determine which kind of innovation to achieve climate neutrality in that city are needed.

In this way, it will be ensured that the activities of the mission are in line with its overall aims on how to achieve climate neutrality. In addition, city innovation should not be considered exclusively from the perspective of advancing only technological, but also the social, creative, organisational and financial innovations needed to transform cities must play an integral part. A key ambition of this mission is to support activities that go beyond traditional R&I calls for proposals, engaging a wider public and enabling faster replication and dissemination of innovations.

At the same time, cities will test new ideas, technologies, solutions and methodologies. In this sense, cities will be encouraged to introduce management roles or structures that will act as catalysts of innovation across departments and traditional organisational ‘silos’.

6.2. New forms of governance

Modern urban development is a complex process involving many stakeholders with individual, and often not easily compatible, interests as well as multiplying ambitions. We propose a systemic transformation that goes beyond the usual top-down approach, privileging on-the-ground coordination with stakeholders to jointly agree upon a vision, targets and measures and finding synergies to share and reduce their climate impact. This process is particularly important for the shaping and implementation of climate policies.

The involvement of citizens is pivotal for the success of the mission. Citizens – or people – have different functions and capacities, as political actors, users, producers, consumers or visitors. In all these roles, they have a huge impact on the environment and can take an active role in driving the transition to climate neutrality as co-designers, co-creators, co-implementors and co-beneficiaries. The Climate City Contract will give citizens and civil society an active role, new platforms to act from, and resources to design and implement climate actions.

A new governance model must feature a public administration that can evolve from its traditional siloed working methods to a more cross-cutting, integrated and citizen-driven way of working. Without this clear evolution, a systemic transformation towards climate neutrality will not be possible. It is important that these new forms of governance are developed and adapted to the particular circumstances and traditions of each city.

6.3. A new economic model for climate action

The present system for funding and financing climate-related innovation at city level is too fragmented and risk-averse. A new approach that features a coordinated array of funding for innovation and infrastructure is needed.

The new Commission’s commitment to introduce a Sustainable Europe Investment Plan offers a new ambitious framework, with a strengthened role for the European Investment Bank as a provider of climate-related investments. The upcoming 7-year EU budget can also enable and accelerate the required shift. Accordingly, the Commission is seeking to align policy priorities across different levels of the EU’s governance systems in order to overcome barriers and maximise synergies in publicly financed programmes. That includes combining financing from different European,

national and local resources, across the whole “value chain” from R&I to planning, investment and implementation.

With this in mind, we propose that all relevant EU funding programmes should be designed with a “window” to allocate resources to the mission for climate neutral cities. To this end, the proposed Climate City Contract will be the instrument for bringing priorities, resources and financing from different sources together.

We understand the risk that gains made towards climate neutrality are cancelled out by “rebound effects”, due to behavioural or other systemic reasons. We also recognise the transformation of behavioural and social norms needed to make the transition to a circular economy or decoupling of economic growth from the use of resources^{vii}.

Cities including citizens, research and academia will need to research, experiment and develop ideas and proofs of concept of how behavioural change and new economic models will not inhibit the road to climate neutrality and a circular economy.

6.4. A model for integrated urban planning and operations

To achieve the mission, a paradigm shift will be required. Integrated planning approaches the city in a holistic way and promotes the development of solutions that have multiple benefits, breaking the traditional silos in urban projects. Approaching urban development and projects using an integrated urban system can result in solutions that make efficient use of resources and provide significant benefits for cities, their citizens and the economy.

A common perspective to how we plan, build and run this integrated urban system still needs to be developed and implemented for all cities in Europe. The intersection of clean and sustainable urban mobility, near zero or positive energy buildings and green energy production can be a starting point.

6.5. Smart technologies, data platforms and urban system modelling

Smart and digital technologies and data use can improve the efficient use of resources and better decision making, including by making use of urban systems modelling - such as for mobility, energy consumption in buildings or urban metabolism (resource use and emissions by different economic sectors).

This will only be achieved through use of world-class modern digital infrastructure, deployment of the Internet of Things and related applications at scale. The same applies for open and interoperable datasets, which are linked and shared across the city ecosystem to break down silos and generate practical insights through big data analytics and Artificial Intelligence.

To drive an exponential use of digital technology for climate neutrality, we need to incentivise private investments, promote voluntary data sharing, establish digital twins, ensure open platforms and put in place a harmonised approach to public procurement on the supply-side. This must of course take account of Europe's world leading data protection rules, and make use of new digital security guidelines at EU level to ensure privacy and security by design (See Annex 1).

7. Defining and measuring success

The Commission has asked the mission board to identify an end-point against which success will be measured. Climate neutrality, namely mitigating and offsetting all GHG (in CO₂-eq) within a city, is the key target of the mission^{viii}. The timelines of participating

cities should converge to achieve this target by 2030, thus paving the way for a wider transformation in European urban areas and Europe in general by 2050.

Apart from the measurement of CO₂-eq, indicators selected from frameworks on climate change mitigation and adaptation, other anthropogenic impact to the climate, environment, energy transition, resilient cities and smart cities will be part of a monitoring and reporting framework for participating cities. *Creation of impact* and *leverage of funding* should, among others, be measured and reported during the implementation of the mission. Given that the mission wants to help cities move from “business-as-usual” to a “transformative” mindset, activities that are replicable and scalable - thus with an exponential impact - will be brought forward.

Reporting should follow a biennial cycle of reports of progress. One way to work on the baseline and progress reporting is to use the “deep decarbonisation pathways” approach that combines transformative and objective-oriented solutions, collaborative approaches, and transparent reporting with the local context^{ix}. The biennial reporting cycles will offer the opportunity for technology-neutral pathways that, each time and for each city, can take stock of all developments in policy, research and market conditions areas.

In an era of globalisation, the path to climate neutrality includes moving from production-based (Scope 1 and 2 emissions) to consumption-based carbon accounting^x (inclusion of Scope 3 emissions in the measurement). The mission will contribute in a way that, by 2030, all participating cities should have started working with or adopted a consumption-based carbon accounting system.



8. Cities, city districts and urban areas

In this report, we speak of a “city” with three different geographical scopes: a city district, a city or an urban area. This plurality has been chosen to invite an open process in the shaping and implementation of the mission in each “city”.

This can therefore refer to a:

- City district, neighbourhood or zone of special interest^{xi} of a city administered or governed by a type of “district council”;
- City represented by a government unit (e.g. municipality);
- Conglomeration or a functional area consisting of many neighbouring cities or government units, represented by the respective government units;

Considering the diversity of European cities (e.g. conditions, budget and ability to mobilize the necessary financing or the current level of decarbonisation, etc.), the mission will ensure that *any city with enough ambition may successfully bid* to be among the first 100 selected cities.

With the aim of leaving no one behind, the 100 cities will be encouraged to include in their Climate City Contracts partner cities with significant structural challenges, who, under the mission, will be supported in achieving climate neutrality later than 2030.

9. Global knowledge centre

The design of this mission and of Climate City Contracts will benefit from research and innovation activities supported by Horizon Europe instruments, and from ambitious climate goals and initiatives that are set by individual cities and initiatives (including innovation projects and investments).

It should become common sense that no positive result or knowledge will be wasted or must be re-invented. Under the mission, scaling-up and replicating European good practices and technologies should be strongly encouraged but also measured and evaluated.

We propose that the Commission should link and create synergies between existing European climate initiatives and stakeholders to the mission with the aim of building a global knowledge centre, serving cities as well as citizens, academia and business.

10. European industrial competitiveness

The cities that will participate in this mission will act as innovation hubs and as national, European and global forerunners. They will inspire other urban areas to embark on the same process, inspiring Europe to accelerate their policies for climate action and transition. It will also strengthen markets for new technologies, adoption of research and innovation results and create new business opportunities. Thus, under the European Green Deal, the mission on climate neutral cities acts as a strategy for climate action, for cities' development and for economic progress.

There is significant potential across global markets for low-emission technologies, sustainable products and services. Similarly, the circular economy offers great potential to stimulate new activities and new jobs. However, the transformation is currently taking place at a slow pace. A central aim of the European Green Deal is to support and accelerate EU's industry transition to a sustainable model of inclusive growth.

In putting this mission into practice, new technologies and innovation will be brought together in testbeds and urban living labs, and in upgrading existing residential areas and in the construction of new city districts.

11. Next steps

We propose the creation of a "100 climate neutral cities by 2030 - by and for the citizens" mission. While the Horizon Europe programme is being finalised and established during 2020, the Board proposes that the Commission could take some first steps to start the clock ticking:

- We will work, during 2020, with the Commission and other experts (such as the members of the mission assembly), to identify policy gaps between the "business-as-usual" scenario on what it takes to achieve the "climate neutral" aim of the mission, in order to measure and strengthen strategies, policies and implementation. Work will also take place to select indicators and start formulating the measurement and reporting framework of the mission based on existing frameworks and methodologies;
- We will also work to define and propose requirements and criteria for the selection of specific cities that will be part of the mission;
- In parallel, the Commission could support an "early delivery" package of

activities to be performed in 2020 and 2021:

- This could include both a more general consultation process on the mission with European cities, business and academia and a coordination and support action that the Commission is considering launching in order to develop the operational aspects of the city contracts by establishing a focus group of cities, e.g. on the governance, the monitoring system, etc. The board should play an advisory role within this early delivery package;
- The Commission and the Board will meet with representatives of other EU funding instruments and present the mission as an opportunity to align with and deliver the European Green Deal. These instruments could include the European Structural and Investment funds, the Just Transition Fund, Important Projects of Common European Interest, Invest EU and possibly other instruments.
- Facilitate a joint meeting of the Climate neutral cities and Climate adaptation Mission Boards;
- The mission should be promoted internationally and highlighted as a unique European strength in creating new market possibilities and solutions for clean and sustainable business models and technologies. It should help to create new market possibilities for European organisations and serve as a novel approach for inviting and partnering with international public entities, businesses and academic communities.

Annex 1: Enabling technologies and innovative solutions for climate neutrality

Achieving climate neutrality in cities will require the development and deployment of a vast array of technologies and solutions in all sectors responsible for GHG emissions in the city. The Mission will be underpinned by a sound targeted strategic Research and Innovation agenda that will be co-created with the European cities. This strategic Research and Innovation agenda could be structured around the seven strategic priority areas for joint action to accomplish decarbonisation, as identified by the European Commission in 2018^{xii}.

Energy efficiency, aiming at zero emission buildings

In order to reach the full potential of energy efficiency - especially in the buildings sector, which currently accounts for 40% of energy demand, stakeholders should engage in actions capitalizing on the existing technologies, in particular those developed within the framework of Horizon 2020 and should identify the areas where innovative solutions, such as smart digital solutions, innovative materials and nature-based solutions are still to be developed.

Taking account of the financial needs related to buildings energy refurbishing – up to several trillion of Euros - new business models should be encouraged in order to help cities accessing to the financial means unlocked by EIB, in its function of “Bank of climate”.

Deployment of renewables and use of electricity to fully decarbonise Europe's energy supply

As calculated by the Commission, an electricity supply that is fully decarbonised by 2050 must come to approximately 80% from renewable generation.

The energy transition of the European continent requires on one hand to work on renewable energy production. It requires also to work on energy networks management, in particular, smart grids at the level of cities. More R&I will be needed for the development of new solutions in all stages of the electricity system.

It requires finally to work on “Power-to-X” solutions, namely production of artificial fuel, like methane, by using renewable energies. There is urgent need to assess and to improve the efficiency of these promising technologies

An efficient mobility for all, clean, safe and connected

Mobility revolution is probably the main challenge of the Mission, since it delivers a visible result, it solves the problem of traffic jams, source of stress and of inefficiency, and fulfils the right of the citizens to live in clean and healthy cities.

That problem can be solved only with a systemic approach of the municipalities. Nevertheless, it requires to develop some knowledge, technologies and services which will inspire the citizens in collaborating to the smart and clean transport revolution in Europe.

This includes:

- Carbon free propulsion systems and new energy efficient vehicle concepts (all modes)
- Mobility as a Service and a mobility purpose oriented “societal sector coupling” regarding new service oriented and carbon neutral business models
- Promotion of public transport and active modes of mobility
- Carbon free X2X energy-ecosystems for transport (e.g. hydrogen, biogas, ...)
- Smart multimodal and integrated transport systems and solutions

Climate City Contracts should include agglomerations and have a link with stakeholders in charge of regional infrastructure developments. The governance should allow a coordination between smart transport transition inside the cities and smart transport transition in the connected rural areas.

Integration of the circular economy approach

A circular economy employs reuse, sharing, repair, refurbishment, remanufacturing and recycling to create a close-loop system, minimising the use of resource inputs and the creation of waste, pollution and carbon emissions. With regard to the mission's objectives, the board believes that new economic models and participation of citizens are essential ingredients for the implementation of circularity, thus a strong positive correlation with the other elements of the Climate City Contract is expected.

Smart city as an enabler of climate-neutral city

Due to renewable energy volatility, as well as consumption volatility, smart grids are key to optimize the use of all kind of energies necessary to turn a city into a climate-neutral city.

Attention should be payed to systemic integration of smart city projects in the scope of work of decarbonisation.

Optimizing the carbon footprint of Gigabit society

The European Commission aims at making "Europe fit for the digital age".

This agenda, within the framework of digital single market, encompasses 5G, IoT, AI, big data in general and other technologies.

Urban planning and stakeholders should analyse "digital single market carbon footprint" and together with R&I stakeholders look for solutions to mitigate this carbon footprint. As new tools for urban planning, like BIM, make possible to create "digital twins" of building and districts, it would be wise to integrate in the digital twin the algorithm calculating carbon footprint, not only of heating, cooling, or transportation, but also of digital economy.

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- i https://ec.europa.eu/knowledge4policy/foresight/topic/continuing-urbanisation/developments-and-forecasts-on-continuing-urbanisation_en
 - ii Final report of the High-Level Panel of the European Decarbonisation Pathways Initiative, p.112: https://ri-links2ua.eu/object/document/667/attach/ec-18-002-decarbonisation_booklet_27112018.pdf
 - iii Eric Garcetti, C40 Chair & Mayor of Los Angeles
 - iv https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
 - v https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme_en
 - vi for example, interest rates and CO₂-related cost
 - vii https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF
 - viii The European Covenant of Mayors is an example of this approach
 - ix Examples of deep decarbonisation pathways at the national level can be found on <http://deepdecarbonization.org/countries/visualization-of-country-scenarios/>
 - x Examples of the former include the 2006 IPCC guidelines and the 2013 European Air Pollutant Emission Inventory Guidebook. The second approach can be met in the guidelines of the British Specification for the Measurement of GHG Emissions of a City (PAS2070:2013) or the Global Protocol for Community-Scale GHG Emission Inventories
 - xi Examples include airports, ports, university towns, business districts, etc.
 - xii (COM(2018) 773 final)