Draft proposal for a

European Partnership under Horizon Europe

Driving Urban Transitions to a sustainable future (DUT)

Version 25 May 2020

Summary

Our future relies on tackling complex grand challenges here and now, many of which must be addressed within cities and by urban communities. The DUT partnership addresses this complex set of urban challenges with an integrated approach to offer decision makers in municipalities, companies and society the means to act and enable the necessary urban transformations. The partnership will create a portfolio of measures and critical mass beyond joint calls to enhance its impact, build capacities in all stakeholder groups and contribute to the European mission on climate-neutral and smart cities.

About this draft

In autumn 2019 the Commission services asked potential partners to further elaborate proposals for the candidate European Partnerships identified during the strategic planning of Horizon Europe. These proposals have been developed by potential partners based on common guidance and template, taking into account the initial concepts developed by the Commission and feedback received from Member States during early consultation . The Commission Services have guided revisions during drafting to facilitate alignment with the overall EU political ambition and compliance with the criteria for Partnerships.

This document is a stable draft of the partnership proposal, released for the purpose of ensuring transparency of information on the current status of preparation (including on the process for developing the Strategic Research and Innovation Agenda). As such, it aims to contribute to further collaboration, synergies and alignment between partnership candidates, as well as more broadly with related R&I stakeholders in the EU, and beyond where relevant.

This informal document does not reflect the final views of the Commission, nor pre-empt the formal decision-making (comitology or legislative procedure) on the establishment of European Partnerships.

In the next steps of preparations, the Commission Services will further assess these proposals against the selection criteria for European Partnerships. The final decision on launching a Partnership will depend on progress in their preparation (incl. compliance with selection criteria) and the formal decisions on European Partnerships (linked with the adoption of Strategic Plan, work programmes, and legislative procedures, depending on the form). Key precondition is the existence of an agreed Strategic Research and Innovation Agenda / Roadmap. The launch of a Partnership is also conditional to partners signing up to final, commonly agreed objectives and committing the resources and investments needed from their side to achieve them.

The remaining issues will be addressed in the context of the development of the Strategic Research and Innovation Agendas/ Roadmaps, and as part of the overall policy (notably in the respective legal frameworks). In particular, it is important that all Partnerships further develop their framework of objectives. All Partnerships need to have a well-developed logical framework with concrete objectives and targets and with a set of Key Performance Indicators to monitor achievement of objectives and the resources that are invested.

Aspects related to implementation, programme design, monitoring and evaluation system will be streamlined and harmonised at a later stage across initiatives to ensure compliance with the implementation criteria, comparability across initiatives and to simplify the overall landscape.

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SRIA Process:
The DUT partnership is building upon the SRIA 2.0 of JPI Urban Europe (published in February 2019) and taking it further towards implementation. Towards a more detailed roadmap and implementation plan the following steps have been and will be taken:

- a public consultation was launched in March 2020 to reflect on the DUT concept and its priorities
- Stakeholder dialogues followed in May 2020 to support synthesis of the consultation and discuss the pillars and key measures
- The resulting outline will be presented to DUT partners in June
- Until October this outline is put forward to national reflections to align with national programmes and priorities.
- Consultations with key stakeholder networks, neighbouring partnerships, Urban Agenda for the EU partnerships, etc. will be organised to support alignment of topics and actions (June-October).
- It is planned to present the DUT partnership, its priorities and planned actions at the JPI Urban Europe Policy Conference on 12. Nov 2020.
- Until end of 2020 the roadmap and implementation plan will be elaborated for decision making among all partners.

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1 Context, objectives, expected impacts

1.1 Context and problem definition

"If we want to have a chance of achieving the SDGs, we need to get our cities right. "[1]

It stands without question that the challenges in urban areas are also crucial to solve the overarching grand societal and planetary challenges in the contemporary world. These challenges revolve around the transformation to cities, towns, and urban areas that are inclusive, safe, resilient, and sustainable. The wide variety of urban forms of life and how our societal cohesion to a large part have to be sustained by attractive and just urban built environs are crucial concerns: over 70% of the EU population lives and works in urban areas, and nearly a quarter (22.5%) of the EU population is still at risk of poverty and/or marginalisation.[2] Although urban areas generate about 85% of European GDP, they also account for 60-80% of the EU energy use and face common challenges in e.g. congestion, shortage of adequate housing, air pollution, declining infrastructures, and migratory pressures.[3]

Furthermore, these sectoral transitions require increased capacities in local public life and urban governance to drive the innovation needed. This can be achieved through a strong sense of qualities ('*baukultur*'), a people-centric sustainable approach, and increasingly circular urban economic growth in and through the built environment that anticipates trends in terms of construction and maintenance, and not the least suitable and well-functioning urban design, basic service provisions, urban manufacturing, and common political and democratic life in local government.

All these efforts have to be made in an integrated fashion from urban neighbourhoods over functional urban areas to transnational collaborations including the urban-rural continuum and taking into account urban effects across continents.

Hence, the transformation of our urban systems is needed to tackle pressing societal challenges. In particular just transitions toward sustainable mobility, urban climate neutrality and circular economies in terms of resource use; working, inclusive, gender equity standardised, and fair urban economies for SMEs and labour markets; suitable and empowering urban digitalisation; inclusive and safe urban commons and robust urban public spheres; increased internal and external European collaboration; and increasing democratic dynamics in urban governance.[4] These are transition pathways to tackle climate change and societal resource use while ensuring quality of life and economic prosperity for all. In turn, these efforts require concerted action and support to urban research and innovation communities, urban policy making on all levels, and local urban governance to co-create the way forward.

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[1] Maimunah Mohd Sharif, Executive Director of UN-Habitat in her opening speech at the World Urban Forum #9, Kuala Lumpur in February 2018

[2] EC (2019) 'Towards a sustainable Europe by 2030: Reflection paper', COM(2019)22 <https://ec.europa.eu/commission/sites/beta-political/files/rp_sustainable_europe_30-01_en_web.pdf >, pp. 11, 21, 52, 99.

[3] EC (2019) 'Towards a sustainable Europe by 2030: Reflection paper', COM(2019)22, <https://ec.europa.eu/commission/sites/beta-political/files/rp_sustainable_europe_30-01_en_web.pdf >, p. 21.

[4] Von der Leyen, U. (2019) 'A Union that strives for more: My agenda for Europe', Political guidelines for the next European Commission 2019–2024, <https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-next-commission_en.pdf >.

On the horizon, urban research and innovation already effervescently experiment with mobility innovation,[5] urban farming, water security, green roofs, ecosystem services and increasing circularity that renders the built environment potentially into a regenerative capacity for global and societal processes – rather than the more current wasteful modes. Urban policy, particularly on urban accessibility and housing, needs to pace these types of innovations to tackle gentrification, segregation, and secure affordability and inclusiveness; and urban local governance requires capacities and means for coordination and planning in the coming times of substantial change.

Urban areas are hence the nexus for these transitions. This role and importance of sustainable urbanisation for our national and global development is acknowledged in the UN-Habitat *New Urban Agenda* and by the United Nations by including an urban goal (SDG 11) in the *UN Agenda 2030* Sustainable Development Goals (SDGs) as well as by the *Urban Agenda for the EU* (UAEU). Furthermore, urban-related goals and issues are cross-cutting the 17 SDGs and clearly underline the importance of sustainable urban transformations for the future of humanity on the planet, with 90 out of the 169 indicators encompassing urban areas. While this on the one hand demonstrates the pertinent role urban areas – from villages and towns up to cities and metropolitan areas – play for our future development, it results, on the other hand, in an interrelated set of challenges and dilemmas urban areas have to face. T he localization of large-scale strategies to different urban contexts will determine if the transformative change outlined by the New Urban Agenda, the UN Agenda 2030 with its SDGs will be achieved.[6]

Transformative efforts are strengthened throughout all sectors and industries with the aim to create new solutions. However, to achieve urban sustainability it is not only a matter of individual sectoral solutions in the fields of energy, mobility, circular economy, greening of cities, etc. but equally a matter of how these solutions integrate into the urban system and how they affect each other. It is not merely a matter of simply providing solutions. These challenges require different approaches in how they are tackled in terms of processes and co-creative implementation where integrative sensibilities are required.

When dealing with urban transformations it becomes quite clear that the interrelatedness of sectors, systems, strategies, goals, rights, and interests has to be considered. In particular as the plurality of urban goals and related strategies leads to an interrelated set of ambitions and actions which might be in conflict with each other, where achieving one goal or strategy might hamper achieving another (Figure 1).

As has been exemplified by Nilsson et al.[7] attention has to be given to such critical policy areas to ensure that the overall sustainability targets can be met. The *relevance of carefully taking into account the interactions between goals and targets* to being able to achieve transformations is also taken up in the *Global Sustainable Development Report 2019*.[4] Furthermore, this report identifies six entry points for transformations for sustainable development, each of which intrinsically consider the interlinkages of various goals and strategies and thus support gaining *progress across multiple elements of the 2030 Agenda*.

[5] www.CIVITAS.EU

[6] UCLG (2019) The Localization of the Global Agendas. How local action is transforming territories and communities.

[7] Nilsson et al. (2016) 'Map the interactions between Sustainable Development Goals', in *Nature* 534, pp. 320–322 (16 June 2016), <https://www.nature.com/news/policy-map-the-interactions-between-sustainable-development-goals-1.20075 > ; UN (2019) 'The future is now: Science for achieving sustainable development', Global Sustainable Development Report 2019, < https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf >

Urban and peri-urban development is seen as one such entry point. The increasing consumption of land and natural resources and its consequences for urban biodiversity as well as wellbeing, the availability and accessibility of services and infrastructure for all people living and working in cities, the need to achieve carbon neutrality and mitigate climate change, combating poverty – the urban level is where these issues come together and result in an immensely high degree of complexity.

At the same time, cities are the places to address all these issues in an interrelated, effective way, making use of innovation and experimentation. At the same time digitalisation, new technological solutions as well as new partnerships across all stakeholder groups and societal engagement offer potential for re-designing and transforming our cities. All this calls for integrated and inclusive planning and development of our urban areas, considering the plurality of societal needs as well as business opportunities created by new technologies and science. This complexity of interrelations demands revolutionary new approaches to address the issues at hand sufficiently holistically, meet target and goals of sustainability strategies on various levels and to contribute to urban transition pathways at large.

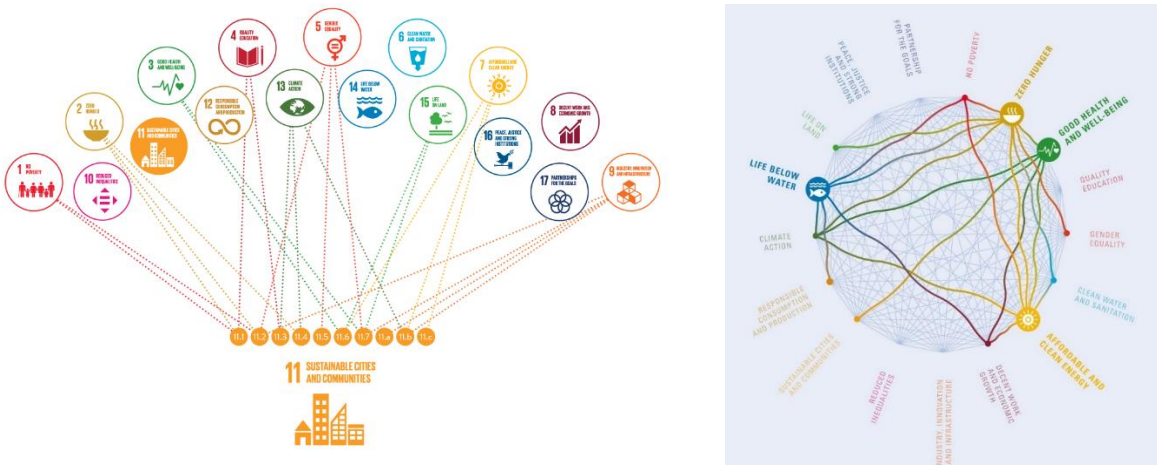

Figure 1: left: relations between SDG 11 and urban-related goals of other SDGs (based on analysis of the JPI Urban Europe Scientific Advisory Board); right: example of interrelated targets across SDGs (Source: International Science Council: SDGs Guide to Interactions, 2018).

"Transformational change will be local or will simply not be."[8]

While there is a common agreement on the challenges for sustainable urban development globally, we need to act locally and consider the particular European urban context to identify and develop appropriate processes and solutions. The dense urban pattern, with a large share of smaller and mid-sized cities, the historically grown urban structures and our European social and cultural characteristics define the urban systems we need to address and advance. Anticipating the UN Agenda 2030 in the European context, the model for integrated urban development needs to be reinforced. This is taken up in the ongoing process to update the *Leipzig Charter* and consequently prepare the Urban Agenda for the EU for the next phase.[9] While the Leipzig Charter 2020 will continue to promote integrated urban planning and development, the requirement to follow place-based approaches from neighbourhood scale up to functional urban areas, consider multi-level governance, foster participation and co-

[8] United Cities and Local Governments (2019:2) The Durban Political Declaration.

[9] The process to update the Leipzig Charter is coordinated by Germany in view of the German Presidency to the European Council in 2020. The new Leipzig Charter is planned to be signed by the Ministers responsible for Urban Matters in Dec 2020.

creation as well as create inclusive, affordable and accessible infrastructures and services as common goods is highlighted.

Summarizing all these strategies and ongoing discussions, it can be concluded that a more comprehensively integrated, interdisciplinary and cross-sectoral approach is needed that:

(1) creates evidence for urban transitions, through inter- and transdisciplinary research and innovation, involving all stakeholder groups and considering technological, social, economic, cultural, planning and governance aspects;
(2) addresses interrelationships between various goals, strategies and interests' urban dilemmas as they define key policy areas critical for achieving SDGs and urban strategies;
(3) offers an environment for urban experimentation, capitalising knowledge and science-policy cooperation beyond joint calls to more effectively achieve city authorities' strategies and strengthen exploitation and scaling-up of R&I results.

These requirements create various demands for the urban related research and innovation system:

- While research and innovation are called to continue co-creating knowledge, technologies and solutions for the various urban challenges at hand, this work has to be conducted with a sufficient inter- and transdisciplinary approach to strengthen relevance and impact of scientific results.[10] All forms of innovation – socio-technical, organisational, etc. – will be covered to strengthen the potential of the innovation eco-system.
- In this sense, challenge-driven formats are needed to align research and innovation with real-life problems and opportunities which calls for a strong role of problem owners in R&I projects from the beginning and requires improved framework conditions to support science-policy-society cooperation. This issue has also been taken up by the recently started *Cities Science Initiative*[11] which explicitly addresses the gap between research and policy and aims at taking better use of scientific achievements for urban policy making.
- In support of such co-design of solutions and approaches, local experimentation is an important element. Urban Living Labs or similar formats have shown promising results but have to advance to allow a wider uptake of such experiences in urban practice and daily business of city administration.
- Finally, an understanding and appropriate conditions are needed to support replication, scaling up and across and mainstreaming. According to the plurality of urban situations there is no simple transfer from one neighbourhood, municipality or city to another. Nevertheless, we need to take more advantage of research and innovation results across Europe and globally by facilitating the internalization into the different local contexts, in other words capacity building in urban public administrations as well as in urban innovation ecosystems. Making research results

[10] The necessity for inter- and transdisciplinary co-create knowledge to support urban transitions has been widely recognized by city and municipality networks and the R&I community, e.g. in: IPCC. (2019) Global Research and Action Agenda on Cities and Climate Change Science; JPI Urban Europe (2019) Strategic Research and Innovation Agenda 2.0; ICLEI (2018) The ICLEI Montréal Commitment and Strategic Vision 2018-2024; United Cities and Local Governments (2019) The Durban Political Declaration.

[11] The City Science Initiative is coordinated by JRC and the City of Amsterdam with more than 20 cities participating until now. For more details see https://ec.europa.eu/jrc/communities/en/community/city-science-initiative

available, transparent and accessible for all actors and creating learning formats that fit the various stakeholder needs is key to ensure that European and national R&I investments are boosting urban transformation.

"Municipalities must commit to a new kind of partnership with the scientific community – a partnership based on data, research and innovation – to guide investment and policy decisions."[12]

In this sense, the Driving Urban Transition to a Sustainable Future (DUT) partnership timely contributes to the implementation and localization of the UN Agenda 2030, the Green Deal as well as the Leipzig Charter and the Urban Agenda for the EU (UAEU). By picking up these policy requirements and building upon existing activities and experiences of Member States, municipalities and research communities the partnership will shape an urban innovation eco-system by addressing particularly challenging policy areas with an integrated approach.

With this ambition, the DUT partnership also builds upon the various efforts taken by the EU R&I Framework Programmes over the last two decades. These activities have focused mainly on individual sectors – urban mobility, energy in cities, nature-based solutions, circular economy, migration, etc. In many of these areas, first integrated approaches have followed, by combining different technologies or sectoral implementation measures. However, in terms of urban transition pathways and the wicked issues related to them, such approaches still fall short. Due to the complexity of urban development, the urban challenges cannot be solved by linear or sectoral innovation approaches, business innovation or innovative investments alone.

The energy sector, mobility sector, circular economy, biodiversity, etc. are strongly connected when it comes to implementing concrete actions. Technological, economic, environmental, social, planning issues have to be considered across these areas to ensure successfully take-up of new solutions and approaches. A transformation of the whole spectrum of urban systems is required, including integrated solutions for urban infrastructures, the implementation of new governance models, innovation in public sector, citizen participation and liveability aspects, socio-economic dynamics, etc.

In this sense, the DUT partnership will build upon and advance the activities of the existing Member States networks of JPI Urban Europe and the SET Plan Action 3.2 on Positive Energy Districts and Neighbourhoods[13]. In JPI Urban Europe, a portfolio of activities has been established since 2010, resulting in a network of more than 25 programme owners and funding agencies from 20 European countries. Issues related to smart cities, food-water-energy nexus, urban accessibility and connectivity, urban governance and public sector innovation have been addressed that feed well into this partnership. A portfolio of more than 80 projects was created that realised about 50 Urban Living Labs across Europe, a multi-stakeholder community comprising researchers from various disciplines, representatives of municipalities and cities, business, entrepreneurs, planners, infrastructure providers and societal initiatives. New European countries (in particular Widening Countries) were mobilised gradually as well as international relationships to China, USA, Brazil and Canada established (for more details on JPI Urban Europe see Annex 2).

[12] Don Iverson, Mayor of Edmonton in: World Climate Research Programme (2019). Global Research and Action Agenda on Cities and Climate Change Science - Full Version.

[13] A more extended definition of Positive Energy Districts is provided on page 23

A second Member States network started in 2018, focusing on the implementation of the SET Plan Action 3.2 with the ambition to initiate 100 Positive Energy Districts and Neighbourhoods to support the transition towards sustainable urban areas. This network is currently preparing first joint actions which are implemented jointly with JPI Urban Europe. Based on all these experiences, the partners of both networks aim to join forces in the DUT partnership, co-design the DUT partnership, establish a joint governance structure, and team up with other partners, city networks, interested cities and municipalities, etc. to strengthen and align the efforts towards sustainable neighbourhoods and urban areas. The priorities of both networks are taken up in the concept of the DUT partnership and the scope of activities will be widened to serve the entire urban community, from municipalities and public authorities to infrastructure providers, developers, industry, social entrepreneurs and of course society at large.

1.2 Common vision, objectives and expected impacts

The **Driving urban transitions to a sustainable future (DUT)** vision:

> The DUT partnership steps up the game to tackle urban challenges. We enable local authorities and municipalities, business and citizens to make global strategies into local action. We develop the skills and tools to make urban change happen and boost the urgently needed urban transformations.

The JPI Urban Europe *Strategic Research and Innovation Agenda* (SRIA) 2.0 identified a set of key dilemmas in the overall complexity and wicked issues entailed in sustainable urbanisation that are crucial to consider for transformations. At the same time these dilemmas are expressed and play out differently in the various contexts and sectoral strategies. In order to operationalise them and develop concrete approaches and support cities along their specific strategies, the partnership focuses on three prioritised sectors (and their interrelationships) along the Green Deal for sustainable urbanisation: urban energy through Positive Energy Districts, mobility and circular economies.

Urban use of energy, cities and urban mobility and transport planning, and a greatly increased circular use of resources are all vital to drive urban transformations to planetary sustainability. Particularly in order to reach the vision of European (and global) urban areas, going beyond mere sustainability to become regenerative hotbeds, to serve and help heal the planet the human species is now responsible stewards for.

As indicated in Table 1, with this vision the partnership aims to contribute to global and European policies.

Table 1: Contribution of the DUT Partnership to global and European policies.

Policy	Related policy issues	Partnership contribution
UN Agenda 2030* and UN-Habitat's *New Urban Agenda	SDG 11 and strong urban dimension cross-cutting the 17 SDGs; putting emphasis on the interrelation between related strategies, interests and actions to achieve sustainability at all. Urban and peri-urban development is seen as one of	The European hub to address the complexity of sustainable urban development, addressing the interfaces and interdependencies across sectoral policies and actions in the urban setting. Input and references for sustainable urbanisation will be created and the partnership will be open for international cooperation to drive urban transitions globally.

	the key entry points to deal with the complexity of transformation[14] UN-Habitat's New Urban Agenda complements Agenda 2030, in particular urban related issues in the document with more details, aims and priorities	
Strategic priorities of the European Commissions' *Strategic Plan for Horizon Europe,* with a special focus on the European Green Deal	The new strategic priorities of the European Commission including achieving climate-neutrality by 2050. Horizon Europe establishes urbanisation as a possible driver for strengthening the role of the cities as centres for innovation to improve quality of life for its inhabitants including them in the process. Due to its resources and organisation, Europe is seen as a possible global driver for change. This includes transitions of the energy and mobility sector, realising circular economy and utilising nature-based solutions. A European Climate Pact is planned that brings together regions, local communities, civil society and industry.	The partnership will collaborate closely with city authorities and local governance / municipalities on transforming urban challenges into opportunities – for more efficient and decarbonised use of energy in Positive Energy Districts, sustainable and people-friendly mobility systems, circular and environmental-friendly use of resources, to the benefit of well-being of citizens and preservation of biodiversity. The partnership will support and enable city authorities, local governance and municipalities in their efforts to be drivers for transformation and centres for innovation - through their high share in public procurement, their role in building and transforming vital infrastructures and systems, through their responsibility for inclusive and integrated urban development, involving inhabitants from all societal groups, offering environments for new, circular businesses, social innovations and exploiting digital opportunities. The partnership will contribute to such developments through challenge-driven R&I and alignment of national R&I investments. The domains of energy in Positive Energy Districts, mobility, circular economy and nature-based solutions will be given particular attention in the partnership programme, with the aim to create inclusive, sustainable, safe and attractive neighbourhoods, towns and cities. Through activities already developed and tested by JPI Urban Europe, the partnership will ensure uptake of and access to the results. Challenge-driven R&I will allow public authorities to co-design new solutions with

[14] Independent Group of Scientists appointed by the Secretary-General, Global Sustainable Development Report 2019: The Future is Now – Science for Achieving Sustainable Development, United Nations, New York, 2019. [cited above as: UN (2019) 'The future is now: Science for achieving sustainable development', Global Sustainable Development Report 2019, < https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf >]

		business, local initiatives, infrastructure providers, etc. Through Urban Living Labs, R&I will be brought into neighbourhoods to engage people to ensure that all benefit from the investments. The partnership will, building upon established collaborations and contacts, contribute to and benefit from the ongoing urban R&I and development on the global arena.
Paris Agreement	Agreement on the 2°C temperature increase compared to pre-industrial levels and increase climate resilience through appropriate actions on all levels. Long-term strategies for low GHG emission developments, mitigation measures are called for that follow participatory, inclusive and transparent approaches. The strong link between sustainable development and climate change mitigation/ adaptation is emphasised. The importance and role of science is highlighted in providing guidance for such actions and enable innovation, create references and synthesis.	Contribution to the Paris Agreement considering the urban context and exploiting the potential of urban transformation for the benefits of climate change mitigation and adaptation. Thus, the efforts of the partnership to create sustainable, inclusive, resilient, safe and attractive neighbourhoods, towns and cities pays in this ambition. Furthermore, it will not only create knowledge, technologies and evidence but make such research results widely available and accessible for policy, business and societal actors to act. Starting from the European hub, international cooperation is aimed at to ensure a global benefit of the related science, technological development and innovation.
Leipzig Charter and UAEU	Renewed urban policy framework for a sustainable future, calling for integrated as well as place-based approaches, participation and co-creation	Contribution from R&I to empower cities and build capacities to act. As transnational initiative particular support for small and medium sized cities can be offered. Evidence will be created regarding the three dimensions of European cities (green, just, productive) and the interrelationships between these three dimensions. A contribution to the implementation of the Leipzig Charter is planned and currently under discussion.
ERA – European Research Area	In its new approach, emphasis is given, among other objectives, to the importance of R&I contributions to the wider European policy objectives as well as ensuring relevance and visibility of R&I for society	With its objective to provide scientific evidence for policy makers on the one hand and the integrative approach across various sectors on the other, the partnership is in line with the new ERA priorities. It will help to mobilise capacities and stakeholders in the area of urban transitions.

1.2.1 Expected impacts

Addressing these policies, the partnership aims to create impact in three dimensions – in our cities and municipalities, on urban policies from local to international scale and on innovation policies and the European Research Area (Figure 2).

Impact in urban areas
The partnership will support liveable, inclusive and attractive neighbourhoods and urban areas by the mobilisation and inclusion of citizens (urban inhabitants, urban publics, and civil society) in the transition work. The stakeholder engagement model developed in the JPI Urban Europe AGORA will be a key implementation measure, together with the urban living labs in the local contexts for sociotechnical urban development.

By supporting spaces and approaches to urban experimentation in urban neighbourhoods and areas, while at the same time providing and supporting the exchange and translation of these types of approaches across urban settings, a transnational multi-stakeholder community of practice in urban living labs and integrated urban development is enabled in effect. This will support the exchange of knowledge and experiences for decision makers and local urban governance to create new transition pathways that correspond to the city authorities' needs, strategies, and priorities in urban transformations.

Crucial in this impact area is also to connect, by way of an open multi-stakeholder platform and adequate R&I funding instruments, business and industry in urban transitions and the transnational community of practice to ensure that new solutions and business models are developed to co-create and support urban transformations through innovative technologies, tools, methods, and services.

Impact on urban policy
Cross-sectoral and inter-silo connections and knowledge for integrated urban development will be developed out of the current sectoral specific land-winnings, specifically in and around the prioritised transition pathways of clean and efficient urban energy use in Positive Energy Districts, zero-emission urban mobility, and increased resource circularity including Nature-Based Solutions. Through this synthesis, policy makers receive adequate evidence and experience-based advice on urban energy in Positive Energy Districts, mobility and circularity.

Urban policy will become more effective, using solutions and processes for urban transitions and systemic change, achieved through disruptive innovation and putting available knowledge and solutions into practice. The DUT partnership will support the continuous dialogue between policy makers (local, regional, national, transnational), business and industry, civil society and the urban R&I actors. This dialogue will be on how to tackle wicked issues and dilemmas related to urban liveability, digitalisation, robustness, resilience, infrastructures and land-use in between domains and sectors. A key element in this support is to connect global ambitions with local action across levels and scales in urban policy, through establishing relationships, cooperation, and alignment between related and relevant partnerships and networks.

Impact on urban innovation and ERA
The DUT will foster inter- and transdisciplinary R&I that includes a diverse set of stakeholders in the process – from city authorities, civil society and entrepreneurs to commercial actors.

Building capacities this way, the partnership supports the planning processes of city administrations. Also, civil society's ownership is strengthened by citizens and urban entrepreneurs being included and given an active role in the development of new business models and in the innovation processes.

The partnership will safeguard an open approach in terms of welcoming new countries and partners. Emphasis will be given to align to widening countries' conditions and priorities. Furthermore, the partnership will act as a hub for transnational and international state of the art R&I for sustainable urbanisation in order to contribute to a strengthened European Research Area and create benefits for all EU countries and beyond.

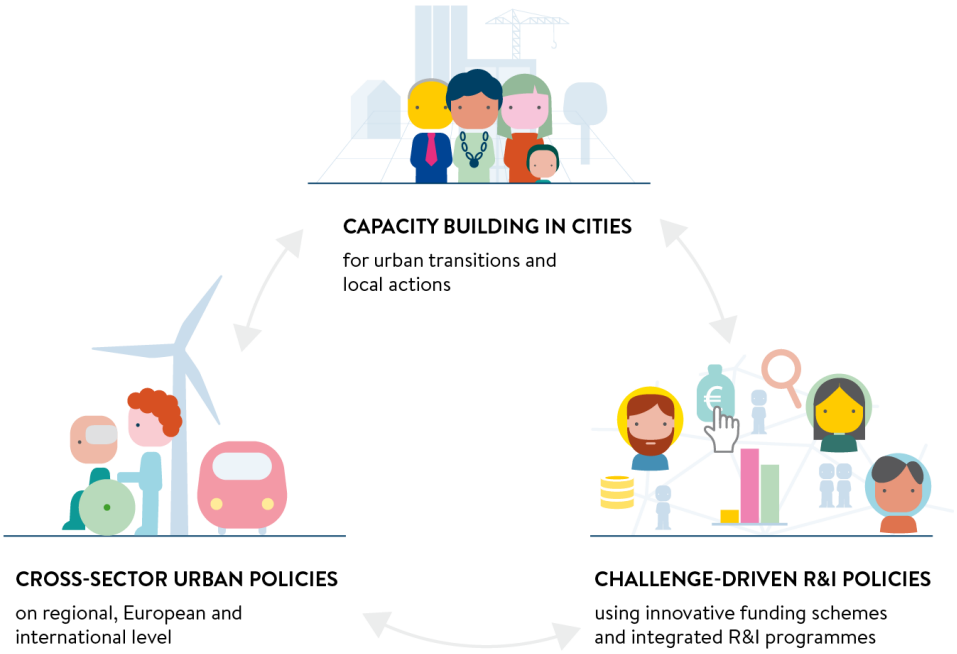

Figure 2: Impact dimensions of the DUT partnership.

These impacts require actions for capacity and community building to drive urban transformations, efforts towards integrated approaches to tackle the complex urban issues and joint forces to tap the full potential of urban R&I. Along these three dimensions, the objectives of the partnership are described and the overall intervention logic developed (Figure 3).

1.2.2 Partnership objectives

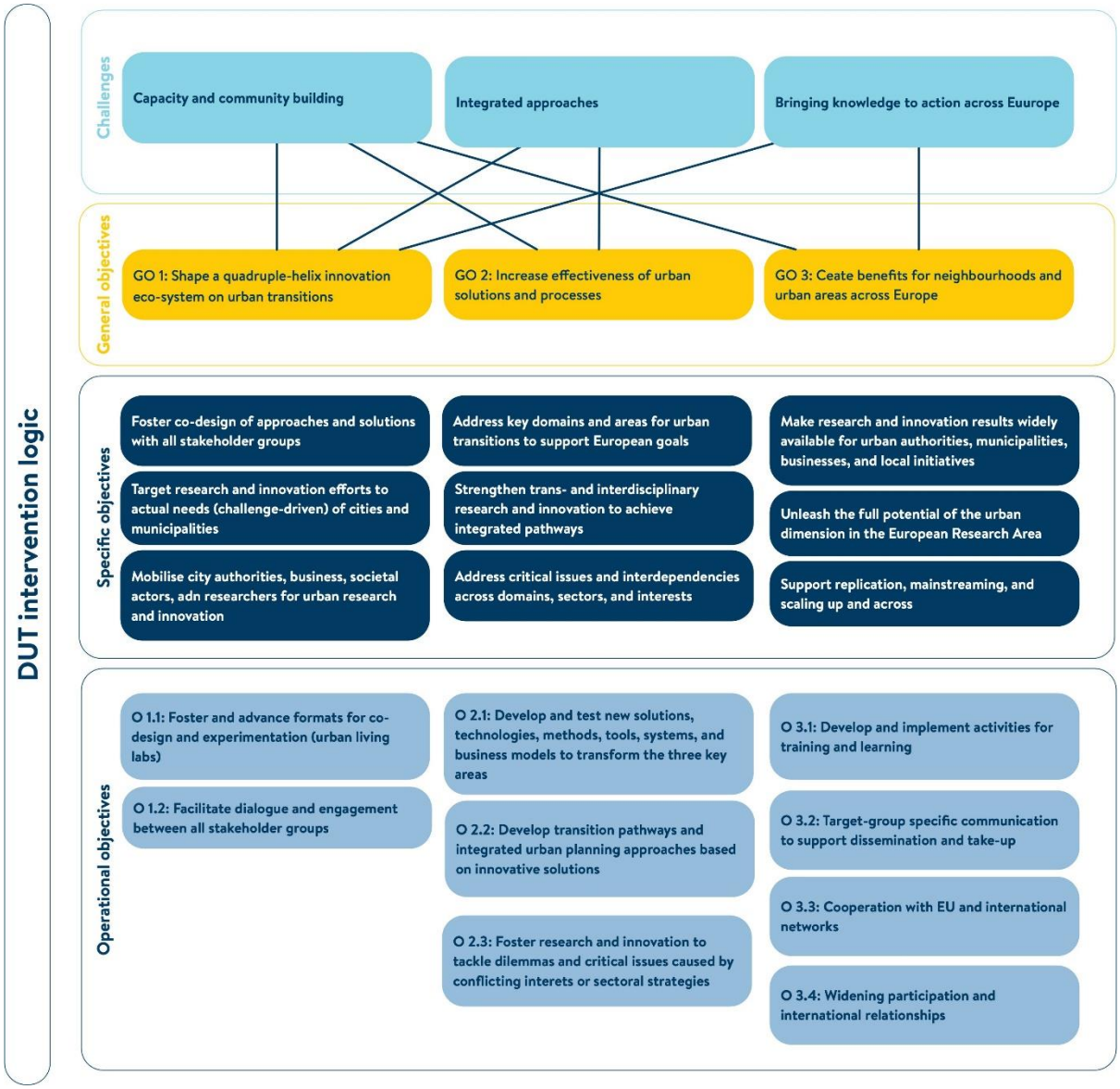

Figure 3: intervention logic of the DUT partnership.

In the following the challenges, drivers and objectives are described in more detail. The need for action has been identified together with stakeholders, through input from the JPI Urban Europe projects, in AGORA dialogues, exchanges with other networks, the Urban Agenda for the EU (UAEU) partnerships and consultations with city authorities. Although there are various cross-linkages of objectives to challenges, for better readability a linear structure is followed to describe the objectives and connect them to their main challenge.

Challenge 1: Capacity and community building for urban transformations

Science-policy cooperation is one of the key elements for transformative change, but practice shows that such cooperation is widely underdeveloped. This results in two effects, namely the utilisation of R&I for policy making as well as the research and innovation

efforts are not well enough responding to the actual needs of city authorities and urban communities. On the other hand, learnings, results and solutions from research and innovation projects and/or urban living labs are generally not available for urban decision makers and public administrations with similar challenges elsewhere. Due to the often-missed opportunity to assess different scenarios for investments and transformations, city authorities and municipalities many times procure and implement solutions that generate too many negative externalities.

Challenge drivers:

- The link between R&I communities working on urban issues and the city authorities and urban communities that need their knowledge and solutions is weak or non-existing.
- The relevance of R&I for city authorities and other urban actors is not always given, also due to missing opportunities or formats to directly engage in such projects and related activities.

General Objective 1: Shape a quadruple-helix innovation eco-system on urban transitions

The urban innovation eco-system should offer different ways of interaction between science, policy, business and society to ensure that research efforts better meet the needs of urban actors and society. This not only by mobilising urban stakeholders to join research projects, but to start with jointly identifying the issues at hand, letting urban stakeholders have a stronger say in the specification of research and innovation needs. In addition, formats are needed to strengthen the role of urban actors in research and innovation projects and offer settings to engage in all phases of the innovation cycle.

Specific objectives:

- Foster co-design of approaches and solutions with all stakeholder groups
- Target R&I efforts to actual needs (challenge-driven) of cities and municipalities
- Mobilise city authorities, business, societal actors, and researchers for urban R&I

Operational objectives:

- Foster and advance formats for co-design and experimentation (ULLs) of urban transition pathways
- Facilitate dialogue and engagement between all stakeholder groups to create a community of practice on integrated urban transformation

KPIs:

- City authorities and urban municipalities are mobilised in projects, urban living labs, and other partnership activities
- Urban living labs and similar formats are applied by consortia
- Multi-stakeholder engagement ensures knowledge, ideas and experience sharing throughout Europe and beyond

Challenge 2: Integrated approaches to tackle complex urban issues

The spheres of urban knowledge creation, expertise, and solution development are in most cases not working inter- and transdisciplinary, but take place in silos and disciplines, which may lead to the result that a solution of one problem hampers the solving of others.

Challenge drivers:
There is a lack of inter-, transdisciplinary and cross-sectoral collaboration on urban challenges and dilemmas.

General Objective 2: Increase effectiveness of urban solutions, approaches and processes

From the point of city administration, integrated approaches and planning is seen as one of the key elements towards urban transformation and sustainable urban development. This is why the SRIA has taken up the ambition to connect the dots and address in particular those issues that are created by conflicting or competing strategies, interests or policies. The research and innovation issues put forward for calls will be selected to ensure that various perspectives across disciplines, sectors or stakeholder needs are considered and connected. Conditions for such projects will be specified in a way to give room for the required inter- and transdisciplinary cooperation.

Specific objectives:
- Address key domains / areas for urban transitions to support European goals
- Strengthen trans- and interdisciplinary R&I to achieve integrated pathways
- Address critical issues and interdependencies across domains, sectors and interests

Operational objectives:
- Develop and test new solutions, technologies, methods, tools, systems and business models fit to transform the key areas
- Develop transition pathways and integrated urban planning approaches based on innovative solutions
- Foster dilemmas and critical issues caused by conflicting interests or sectoral strategies

KPIs
- R&I calls that are open for participation of all stakeholder groups to ensure results respond to actual urban needs (are challenge-driven)
- Urban research and innovation is a result of transdisciplinary collaboration considering urban dilemmas and engaging relevant stakeholders in the process

Challenge 3: Bringing knowledge to action across Europe

Many actors throughout Europe and beyond put a lot of efforts and resources in developing more sustainable and liveable urban areas. The potential of these competences, ideas and experiences should be exploited in a wider sense to take highest benefit in Europe, for all our city authorities and urban municipalities. Such cooperation is needed on all levels, from the local level to solve concrete issues in a neighbourhood up to transnational cooperation to transform our urban areas no matter of size or geographical location.

Challenge drivers:
- Reluctancy to join forces on transnational and national levels as well as in local urban settings due to barriers in the shape of linguistic and cultural differences, hampering mutual understanding and trust and thus the exploitation of research results and good practice.

- There is a lack of proven measures to scale-up and replicate as well as for peer-to-peer learning.
- Insufficient availability and accessibility of knowledge and evidence for policy and decision makers across Europe and worldwide, for towns and small cities up to metropolitan regions and national policy makers.

General Objective 3: Create benefits for neighbourhoods and urban areas across Europe

The partnership aims to bring results, good practice and evidence to urban actors across Europe and support dissemination, exploitation, uptake, and replication of solutions and approaches. With this, a contribution to a strong European Research Area is expected, creating benefits for city authorities and municipalities of cities of different sizes and situations. Furthermore, the partnership wants to position as the European hub for international cooperation on sustainable urbanisation.

Specific objective:

- Make research and innovation results widely available for urban authorities, municipalities, business, local initiatives
- Unleash the full potential of the urban dimension in the ERA
- Support replication, mainstreaming and scaling-up

Operational objective:

- Develop and implement activities for training and learning
- Extend target-group specific communication to support dissemination and take-up
- Intensify cooperation with European and international networks
- Support widening participation and international relationships

KPIs

- Policy briefs and recommendations are co-created with and made available for urban governance and city networks
- Widened participation is achieved and international relationships managed
- Results and solutions from R&I projects and/or urban living labs are available for local urban policy and public administrations throughout Europe and beyond

Contribution to the European Green Deal

As laid out already in Table 1, the DUT partnership with its vision, objectives, thematic priorities and the portfolio of activities, strongly contributes to the European Green Deal. In Table 2 the contributions of DUT to this European ambition are elaborated in more detail. While the thematic priorities chosen in DUT match widely with the European Green Deal objective of designing transformative policies in various sectors, the other DUT objectives and the planned additional activities correspond to the European Green Deal objectives of mainstreaming such policies, positioning the EU as a global leader and acting together. This overview also demonstrates that it is not only about setting the 'right' thematic priorities, but equally about the portfolio of measures to fully achieve the ambitions.

Table 2: Connecting DUT objectives and activities to the Green Deal priorities

Green Deal objectives			DUT objectives	DUT activities
TRANSFORMING THE EU'S ECONOMY FOR A SUSTAINABLE FUTURE	Designing a set of deeply transforma-tive policies	Increasing the EU's climate ambition for 2030 and 2050	Take up cities role in sustainable transformation; vision of DUT - enable local authorities and municipalities, business and citizens to make global strategies into local action	Strengthen cities and municipalities capacities to transform neighbourhoods and urban areas into sustainable places
		Supplying clean, affordable and secure energy	SO2.1 Address key domains / areas for urban transitions to support European goals	Pillar on energy transitions through Positive Energy Districts, including efforts to prepare the energy system for PEDs, integrated urban and energy planning as well as governance issues
		Mobilising industry for a clean and circular economy	SO2.1 Address key domains / areas for urban transitions to support European goals	Pillar on circular economy and nature-based solutions addressing e.g. urban small-scale manufacturing, urban agriculture and circularity in the urban built environment
		Building and renovating in an energy and resource efficient way	SO2.1 Address key domains / areas for urban transitions to support European goals	Pillar on energy transitions through Positive Energy Districts and Neighbourhoods addressing the design, construction and maintenance of energy systems of buildings and building compounds, including aspects regarding materials, energy technologies, energy planning, management and monitoring of buildings, etc. associated to Positive Energy Districts
		Accelerating the shift to sustainable and smart mobility	SO2.1 Address key domains / areas for urban transitions to support European goals	Pillar on sustainable mobility transitions tackling integrated mobility systems that consider active modes, new technologies, digitalisation of the transport sector and create evidence and recommendations for policy making.

	From 'Farm to Fork': designing a fair, healthy and environmentally-friendly food system	SO2.1 Address key domains / areas for urban transitions to support European goals	To some extent Pillar on circular economy and nature-based solutions with continuing R&I on food-water-energy nexus and urban agriculture
	Preserving and restoring ecosystems and biodiversity	SO2.1 Address key domains / areas for urban transitions to support European goals	Pillar on circular economy and nature-based solutions by investigating urban biodiversity and fostering nature-based solutions in urban settings
	zero pollution ambition for a toxic-free environment	SO2.1 Address key domains / areas for urban transitions to support European goals	To some extent Pillar on sustainable mobility transitions as well as on circular economy and nature-based solutions by focusing on solutions that have co-benefits regarding air and other environmental pollutions.
Mainstreaming sustainability-ty in all EU policies	Pursuing green finance and investment and ensuring a just transition	SO3.3 Support replication, mainstreaming and scaling up	Providing evidence and recommendations for sectoral policy making, creating interfaces to investment programmes to foster large scale implementation of urban transition pathways; connecting to regional strategies and structural funds
	Greening national budgets and sending the right price signals	SO1.2 Target R&I efforts to actual needs (challenge-driven) of cities and municipalities	Alignment of R&I programmes and mobilisation of national funds for joint actions, strengthening national capacities towards sustainable urban development; national coordination to strengthen dissemination and uptake in sectoral policy making
	Mobilising research and fostering innovation	SO2.2 Strengthen trans- and interdisciplinary R&I to achieve integrated pathways SO2.3 Address critical issues and interdependencies	Shaping and strengthening R&I for urban transformation, connecting national and transnational / international levels, implementing a challenge-driven R&I programme

		across domains, sectors and interests	
	Activating education and training	SO3.1 Make research and innovation results widely available for urban authorities, municipalities, business, local initiatives	Mobilising all stakeholder groups and supporting capacity building through different formats – e.g. stakeholder dialogues, training modules, seminars, webinars, synthesis
	A green oath: 'do no harm'	SO1.1 Foster co-design of approaches and solutions with all stakeholder groups SO1.3 Mobilise city authorities, business, societal actors, and researchers for urban R&I	Co-design of transition pathways with all stakeholders, including citizen participation; fostering urban living labs as formats for experimentation and co-creation
THE EU AS A GLOBAL LEADER		SO3.2 Unleash the full potential of the urban dimension in the ERA	International outreach to position DUT as the European hub for urban transitions and establish international cooperation
TIME TO ACT - TOGETHER: A EUROPEAN CLIMATE PACT		SO3.1 Make research and innovation results widely available for urban authorities, municipalities, business, local initiatives	Shape an innovation ecosystem to create evidence for policy making, provide results and evidence for decision makers to act, design a challenge driven R&I programme to address challenges of cities and citizens

1.2.3 The partnership program and its key areas

The partnership's objectives will be addressed through a comprehensive programme management approach that invests in challenge-driven research and innovation activities along an agreed Strategic Research and Innovation Agenda (SRIA). It will, in tandem implement a portfolio of accompanying measures to create and manage a wider innovation eco-system involving all relevant stakeholder groups and strengthen impact creation.[15]

The role of R&I to achieve these objectives, impacts and the overall ambition related to global and European policies, lies not only in creating new technological solutions, but also in creating capacities and co-creation processes to implement these in full scale. This requires research and science-policy cooperation in the fields of new governance models, public sector innovation, social, socio-economic and socio-technical innovations and new kinds of business models, to ensure sustainable investments and a substantial transformation of urban systems.

To achieve these objectives and impacts the DUT partnership builds upon the *SRIA 2.0* developed by JPI Urban Europe and published in February 2019. The SRIA 2.0 responds to the urgent need for ambitious, sustained and truly inter- and transdisciplinary research and innovation to create knowledge- and evidence-based policies, methods, tools and technologies for sustainable urbanisation. It aims to support Europe's cities and urban areas in their transition towards a future that maximizes their sustainability and their liveability in this era of global competition for commerce, industry, tourism, labor and investment; to take highest use of technological solutions and drive urban innovation. It has been developed in a comprehensive co-creative process, involving manifold stakeholders across Europe (see Annex 1). In this sense, the SRIA 2.0 priorities highlight the needs voiced by city authorities, urban municipalities, public authorities, local initiatives and research.

In addition, the SRIA 2.0 does not only indicate key areas for action. It offers a framework to identify key issues for research and innovation for sustainable urban development. Following the call for a much stronger consideration of interlinkages across the three dimensions of sustainability and the various urban related goals and strategies,[16] the SRIA 2.0 proposes an approach to identify such critical issues for urban transition pathways and for achieving sustainability targets.[17] To this end, it proposes a methodological approach towards a continued debate on urban transitions and helps to prioritize key issues to be addressed by the partnership.

Four priority themes have been identified as crucial to support urban transitions. Need for action has been specified around:

- ***Digital transitions and urban governance***: Digitalisation offer potential for economic development and innovative urban planning such as i.e. innovative digital-based and citizen-centred governance approach to support urban regeneration. Digital transition shall be the nears to make change in the Public Administration (PA) on one side, and

[15] This approach corresponds strongly with the concept for missions as proposed by Marianna Mazzucato. JPI UE has already established several elements of such a programme management. The DUT partnership will offer the framework for widening the portfolio of activities and instruments.

[16] Independent Group of Scientists appointed by the Secretary-General, Global Sustainable Development Report 2019: The Future is Now – Science for Achieving Sustainable Development, United Nations, New York, 2019, page xxi

[17] The SRIA 2.0 is available at https://jpi-urbaneurope.eu/app/uploads/2019/02/SRIA2.0.pdf

the Community on the other, and face, together, the complexity, promoting a new role for PA as process enabler. Digital transition needs to support, explore and resolve the theme of urban data in terms of big data. Digitalization is implemented in an accelerating pace across Europe and in many parts of the world's urban areas. Digitalisation also enables more connections to citizens and empowers and engages them to shape their urban environments through digital democracy. It improves social policies, presents major opportunities to support sustainable solutions, while data sovereignty is clear, and regulations are in place. In the current digital transition, urban governance may also risk implementing suboptimal or segregating technical solutions unless city administrations work with capacity building in public innovation governance and integrated urban planning to expand the current policy scope in many urban digitalisation efforts to include issues such as poverty, gender, education, and marginalised neighbourhoods. The legal framework is one of the main obstacles in enabling digital transition as key element for supporting innovative urban governance: evolving regulations and practice on data management, GDRP and interoperability, as well as block chain cannot play a decisive role without a specific legal focus which is needed to transform PA as enabler of change.

- ***From resilience to urban robustness:*** Cities and urban areas need to drive sustainable urban development and realise green agendas, as well as tackle climate change and safeguard urban eco-economies. A widespread recognition of good practice, clean-tech development, rewards, awards, and business models that fully address social and environmental targets is central in this respect. A special focus could be given to urban regeneration processes as key enablers to implement urban robustness: as the world turbulence and global disruptive events probably will increase even if +1.5C climate change is achieved – both in numbers and intensities, urban systems require response paradigms built on 'safe to fail' adaptability principles as a baseline for urban resilience rather than efforts at conserving ill-suited linear systems. New alliances among new public/private roles and relationships and a transition to knowledge based and public- or inhabitant-centric implementation offer potential. In addition, there is the need to empower local authorities to take their role of transition leader and enhance the political commitment towards the engendering of sustainable urban areas. Resilience also links in with safety. EU road safety policy for cities aims to link sustainability and safety considerations. This means promoting infrastructure measures that privilege walking and cycling and enhance their real and perceived safety, promoting public procurement of clean and safe vehicles, integrating road safety consideration into Urban Vehicle Access Restriction Schemes. Urban resilience can be in synergy with overall well-being and robustness as long as climate change action entails an integrated approach to adaptation that facilitates more liveable cities for people. This includes a good balance between mitigation and adaption measures..

- ***Sustainable land use and urban infrastructure***: Cities and urban areas in general attract people and create positive effects out of agglomeration, density, and diverse and intersecting infrastructures and facilities. These positive effects of urbanisation are underpinned by integrated urban planning and management by public administrations and across diverse public and private actors. This is particularly supported by public engagement and participation in decision-making relating to land-use management, flows of people, flows of information, goods, and resources, place-making, and impact on existing settlements and environs. Consequently, at the same

time there are also risks involved and currently increasingly wicked problems around e.g. congestion and accessibility, transformation of the built environment and the urban energy system, loss of identity or demand/waste of natural resources. Furthermore, urban areas may succumb to conflict and clashes between powers, mismanagement of transportation flows, existing tensions that intensify and severely limit progress towards sustainable urbanisation. Added to this, increased spatial and social inequalities between different types of urban areas may be caused by increasing economic polarisation, segregation and gentrification dynamics, suburban sprawl, and shrinking cities in functional regional contexts.

- ***Inclusive public spaces***: Public spaces should be ideally attractive to all, as these are spaces for wellbeing and health (stimulating people to move), increasingly green public and shared places for people, where different groups and communities meet, preconceived ideas of the Other are challenged, and where citizens control their streets and shared spaces. Urban development and planning can be used to increase urban quality of life by design, public space management, walkability and cycling. A high quality, accessible and reliable public transport system is key to reducing car traffic, congestion and related emissions. Public spaces may also retain and emerge as second living rooms (as housing living areas get smaller). However, a dilemma regarding everyone's right to the city is that public spaces are constantly influenced by power balances and the needs of different groups and communities.
  The partnership should stimulate urban mobility planning for walking and cycling, and favour public transport innovation, as well as inclusive and accessible planning of the urban environment through experimentation with shared streets concepts or new mobility services.

Each of these key areas is not only worth to be investigated in principle to create knowledge and evidence how to tackle the underlying dilemmas or exploit the potential of innovative solutions, tools, methods and approaches, but they are also key for transforming any urban sub-systems. Thus, in order to operationalize the SRIA 2.0, the partnership will cover three main sectoral concerns in the form of three sub-programmes in the DUT partnership: the urban energy transitions through Positive Energy Districts, circular economy and sustainable urban land use as well as inclusive urban mobility and connectivity, each of them an essential area towards urban transformations and at the same time highly interlinked.

1.2.4 The four dilemmas addressed through three sub-programmes

The three priority areas impact each other as well as most of all the other urban grand challenges. In between the three, their interlinkage can be generalized something like this: neighborhoods cannot produce more energy than they consume without new mobility solutions and more circular use of resources. New mobility solutions necessitate innovative energy technology and design thinking. Sustainable energy systems and smart mobility solutions are mandatory, should cities obtain circularity.

For the partnership to maximize impact for the European and global policies (The Green Deal, Urban Agenda for the EU, The Paris Agreement and the UN Agenda 2030), these three priority areas have to be approached in an integrated manner and with a firm commitment to urban regional and city authority capacity building in terms of ambitious policy-making and implementation.

To address these domains and the challenges identified within each sectoral concern, the partnership will foster challenge-driven R&I and technological development to address the specific issues related to the four cross-cutting key areas. This will allow to shape thematic innovation eco-systems that take the particularities of the respective domain into account. The efforts towards co-creating integrated transition pathways and strategies will be pursued to tackle the wicked issues of sustainable urbanization. Evidence will be created with and for city administrations, municipalities, business and society, aiming at all kinds of innovation and capacity building needed to transform our neighborhoods and urban areas. The partnership will offer a framework for innovation, demonstration and preparing larger scale implementation of solutions (Figure 4).

The bold vision to be accomplished by this support is not merely sustainable urbanisation but transformations to regenerative urban areas which supports and replenishes as far as possible the planetary resources they consume and enhance the various ecosystems they are part of and live by.[18]

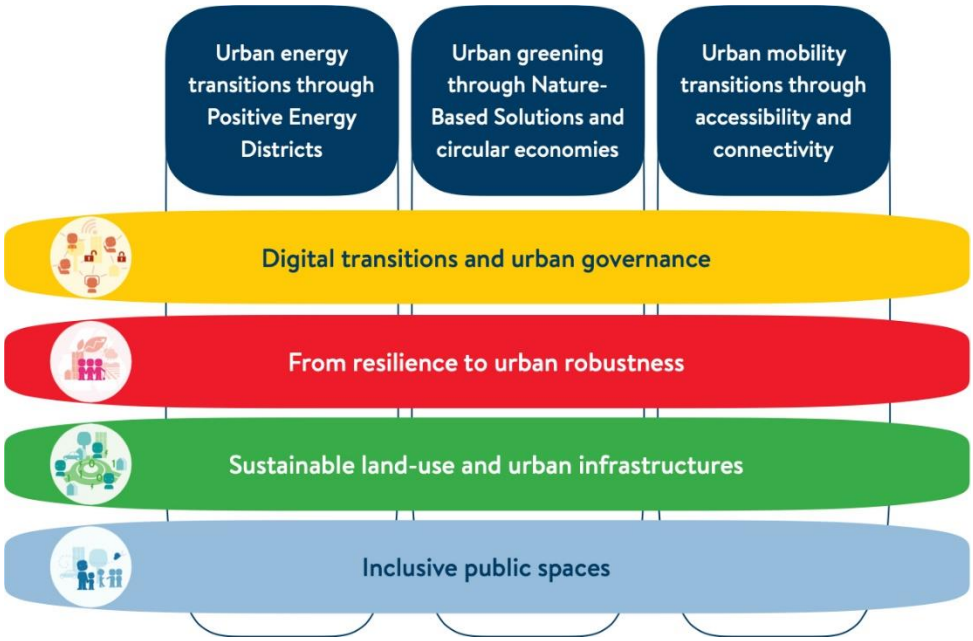

Figure 4: Sectoral priorities and identified key issues for urban transitions.

1.2.5 Urban energy transitions through Positive Energy Districts

Urban areas are key actors in achieving climate change mitigation targets, decarbonization and the energy transition. Cities are the hubs of communication, commerce and culture. They consume more than two-thirds of the world's energy and account for more than 70% of global CO2 emissions.

Positive Energy Districts (PEDs) are key tools to urban energy transition. PEDs are a subsystem within cities that aim towards energy efficiency and generation of an energy surplus. As an integral part of comprehensive sustainable urbanisation strategies, PEDs shift the focus from

[18] Cf. UN Habitat (2014) 'The city we need', <http://mirror.unhabitat.org/downloads/docs/The%20City%20We%20Need.pdf>

the individual positive energy building towards neighbourhoods and thus a comprehensive level of impact on sustainable urban development and the energy transition process.

PEDs are defined as *energy-efficient and energy-flexible urban areas or groups of connected buildings which produce net zero greenhouse gas emissions and actively manage an annual local or regional surplus production of renewable energy. They require integration of different systems and infrastructures and interaction between buildings, the users and the regional energy, mobility and ICT systems, while securing the energy supply and a good life for all in line with social, economic and environmental sustainability.*[19]

The focus on the urban neighbourhood as the "nucleus" for urban sustainability creates opportunities and requires systemic approaches regarding technological, social and economic innovation. Neighborhoods offer a manageable size in terms of integrating urban planning and energy planning, including technological, spatial, regulatory, financial, legal, environmental, social and economic perspectives. Resulting in a network of sustainable urban neighbourhoods, PEDs will substantially contribute to a sustainable urban future in general.

PED implementation serves as a tool to bring forward overall strategies for innovative development of the energy system in urban neighbourhoods, cities and the regional context. Integrated approaches support re-consideration of planning procedures and governance structures, thus influencing policies on different levels. Need for behavioral changes and new forms of energy consumption, energy flexibility (e.g. sharing, trading) and energy production will have impact on the organization of daily life and therefore have an impact on society. New technologies and system integration require new business models and support green business.

Through PED implementation the partnership aims to

- Mainstreaming integration of planning on neighborhood-, city- and regional levels with energy planning and climate-neutrality
- Optimising the essential energy transition functions: energy efficiency, energy production and energy flexibility
- Adapting governance structures through cross-sectoral approaches, integration of top-down and bottom-up approaches and innovative stakeholder engagement strategies

Positive Energy Districts and the key areas
Digital Transitions and Urban Governance
PEDs require cross-sectoral approaches and innovative stakeholder involvement. Integrated developments require cross-sectoral perspectives and approaches in planning, implementation and operation respectively. This poses challenges for governance structures on regional, city and local (neighbourhood) levels and a re-consideration of integration top-down and bottom-up approaches.
Digitalization of administrative procedures, planning fundamentals and planning processes is an imperative for a state-of-the-art integrated planning approach. A process set-up including relevant stakeholders and citizens from early planning stages needs to be developed. To make PED implementation feasible in the long run, fitting business models, including PuP and PPP strategies, need to be developed.

[19] JPI Urban Europe: White Paper on PED Reference Framework for Positive Energy Districts and Neighbourhoods, March 2020, https://jpi-urbaneurope.eu/app/uploads/2020/04/White-paper-PED-framework-definition-2020228-final.pdf. This framework was developed with input from stakeholders and national consultations.

From Resilience to Urban Robustness

PEDs can be transformative elements leading to urban robustness if developed in a substantially integrated way. PED implementation processes and actions must contribute to technical resilience and urban robustness in a wide sense, by ensuring an integrated strategy, combining innovative technological solutions with social and economic innovation policies. Putting the urban neighbourhood in the focus allows for a diversity of applied approaches and therefore increases abilities to adapt and robust change management.

Sustainable Land Use and Urban Infrastructures

PEDs need to be adapted to different urban contexts and redevelop existing urban structures towards sustainability. While many European cities face challenges of growth and urban expansion, all of them are confronted with the challenges of refurbishment and retrofitting. PED implementation aims at developing a framework suitable for different urban contexts (greenfield developments, brownfield developments, retrofitting and refurbishment).

Different pre-conditions require applied approaches, both regarding strategies and technological solutions, and might lead to considering wider urban/regional/national contexts, to achieve a positive energy balance. Strategies need to consider aspects of density, greening, protection of buildings/cityscape, quality of life and affordability. To provide feasible economic implementation, strategies need to build on and develop existing urban structures and infrastructures (built environment, energy systems, mobility systems, waste management etc.).

Inclusive Public Spaces

PEDs are hubs for integration of quality of life, inclusiveness, sustainability and cityscape. Public spaces play an essential part to urban life – most importantly in their ability to provide opportunities for interaction, integration and mobility. Public spaces very much define the way we experience a city, the way we behave (including energy consumption behaviours), interact, live in our cities.

While technology, renewable energy sources, energy grids, materials and buildings play important parts in the cityscapes, we are still dealing with living urban structures that need to be carefully transformed, keeping in mind the people who live in them, with their needs and abilities. Public spaces must play an integral part in the PEDs: Energy efficiency, energy production and energy flexibility are all supporting the “green city”, influencing interaction and behaviour of users and defining the quality of urban life.

1.2.6 Urban mobility transitions through accessibility and connectivity

Mobility and freight transport are essential for individual development opportunities, access to work, education, social contacts, health provisions, a variety of amenities and access to products. This way mobility is essential for the social and economic essential aspects of sustainability. But physical transport of people and cargo need infrastructures, vehicle movements and all kinds of supporting systems and services which need energy, space and cause noise, emissions and safety effects. This has impact – directly and indirectly – on liveability, health, spatial and air quality and other aspects of the living environment.

The mobility sector is heading into a new era: Automation, digitization and electrification will give us new mobility and transport services. New types of private actors will enter the domain of transport and mobility, and relations between the sectors of mobility, energy provision, ICT and land-use will become more and more intertwined. The use of the mobility and transport system changes due to social economic and demographic developments will give rise to new demands – partially triggered by new mobility and transport options. This opens promising venues for sustainable urban mobility, but could, if left unchecked, also induce adverse environmental effects, negative health effects or put specific user groups (age, abilities, gender) at a disadvantage. Mobility in this partnership will combine mobility technology with the cities spatial planning and the user perspective.

The aim for the program is to seek for approaches to achieve a mobility and transport system that is flexible and able to accommodate physical movements of passengers and cargo in an affordable and sustainable way. It should also invite to opt for mobility choices that contribute to health and to pleasant surroundings. The program therefore includes healthy transport modes, like walking and cycling.

An integrated approach to mobility

The functioning of urban mobility, accessibility and connectivity deeply affects wellbeing, prosperity and urban development opportunities, and at the same time influences the living environment. Therefore, well-balanced developments are crucial for almost all other domains and aspects of urban life. This goes for the physical aspects of the transport system, with its demands for spatial integration and the physical effects of the use of the systems, for the functional aspects such as accessibility and affordability, as well as for the financial, legal and governance requirements.

Therefore, a transdisciplinary and integrated approach of urban mobility, accessibility and connectivity in itself and as seen in interaction with other domains and sectors, is a crucial added value. , in comparison with the sectoral and technological approaches as we see in Horizon Europe, especially the Global Challenge of Climate, Energy and Mobility and the Mission of Climate-neutral and smart cities, national, regional and local programmes. In particular the 2ZERO partnership and the partnership on Connected, cooperative and automated mobility aim to create technologies, products, services, systems towards new vehicles and mobility solutions. As indicated in Table 3 potential interfaces and synergies have been identified. More opportunities may arise also with the partnerships on rail, waterborne or aviation when it comes to integrated, multi-modal urban mobility. As the DUT partnership applies an holistic approach to mobility, with a strong link to spatial development, not only the impacts of new types of vehicles or of advancements of existing mobility systems will be investigated but how the need for movement can be reduced, how mobility patterns might change and how urban planning can exploit new solutions best.

Although the Mission on Climate-neutral and smart cities is still under development, the draft outline prepared by the Mission Board offers already some insights into possible synergies. DUT could support the mission through reaching out and mobilizing a wider range of cities, in particular smaller and mid-sized cities, through funding for experimentation and co-creation of transition pathways, and actions to make results and good practice available. On the other hand, the high-level political commitments through Climate City Contracts aimed for by the Mission Board could create a higher awareness and a spirit of urgency, the DUT partnership could benefit from.

The urban setting is the very place where these challenges physically come together and have to be resolved taking care of their mutual relationships and interactions. The tools, methods and approaches developed to support the necessary urban transition will be useful for all kinds of stakeholders to get insight in potential development directions, in the consequences of their choices in the complex and dynamic setting of urban mobility, access and connectivity, and gives arguments and inputs for decision processes in urban, regional and national investment programmes.

Urban mobility, accessibility and connectivity play central ‘connecting’ roles in most of the challenges for sustainable urban developments. The right balance is needed between attractive and at the same time high-density urban areas, providing spatial proximity and

sufficient densities for mass-transit, transport technologies and services for physical transport, and the potential of digital connectivity. At the same time, the rights of individual citizens must be protected (privacy, freedom of movement) and reliable mobility and transport safeguarded whilst also giving opportunities for introducing new, attractive, affordable and accessible transport technologies and services. Mobility transitions require integrated approaches in terms of infrastructure planning, spatial planning, taking care of energy supply, ICT conditions, and a sound financial basis. All these aspects define important conditions and input for policy making, to be able to compare scenarios for sustainable mobility systems and for needed short-term decisions on investments and policies.

The partnership aims to

- Help actors understand the opportunities of transport options and the behavioural responses to these options
- Integrate promising solutions in future proof, sustainable, affordable, healthy, safe and inclusive mobility systems
- Develop co-creation, co-designing and co-development tools, models, approaches and strategies to involve citizens, private companies and public authorities in the transition to user centric sustainable Urban Mobility, Accessibility and Connectivity – safeguarding the interests and inclusion of citizens, making best use of the innovativeness of companies and the necessary governance, policy and legislative basis provided by public authorities

Urban mobility transitions and the key areas
Digital Transitions and Urban Governance Effective Urban Mobility needs adequate, digital, support systems and must interact with digital connectivity. Digital transitions and urban governance are closely interrelated with developments in mobility and transport. New mobility and logistics technologies, like automation and energy provisions, and services like MaaS and TaaS, rely heavily on efficient digital systems. These technologies and services also introduce new actors in the urban and mobility setting and may even result in shifting paradigms – from vehicle ownership to use, blurring boundaries between public and private transport and between the roles and tasks of public authorities and private companies. Challenges lie in the effective, but at the same time responsible use of 'big data' and potentially sensitive personal information. It is vital to find a sustainable and attractive 'balance' between physical mobility and digital connectivity. This entails a new balance in power positions between actors in the public sector, private sector and citizens, including new ways to secure the rights of individual citizens as set against the power position of very large international companies.
From Resilience to Urban Robustness Resilience and urban robustness is an essential aspect of the increasing complexity of the mobility and logistics system as such, as well as in the increasing interwoven relationship with energy, ICT and spatial systems. Without pro-active measures, this interplay becomes increasingly more vulnerable to system failures, may they be within or across systems or from disturbances caused by extreme weather conditions and disasters, including manmade, intentional disruptions resulting from cyber-crime and terrorist attacks. Challenges lie in finding sufficiently robust solutions for reliable and effective mobility and transport, able to withstand disruptions and limit expenditures at the same time. To attain this, there is a need to avoid creating too much over capacity, but at the same time retain flexibility, agility and development opportunities.
Sustainable Land Use and Urban Infrastructures Mobility and transport have very direct and strong interactions with the City and its spatial proximity. This is strongly linked to sustainable land use and urban Infrastructure. The mobility and goods transport 'system' interrelates with the urban systems, both from a physical perspective (built facilities, built environment) and

from a functional perspective (proximity; urban spaces and provisions inviting to use sustainable transport modes).

The challenge is to ensure mobility fairness and inclusiveness, which means that the sustainable mobility and transport options must be accessible and affordable for all. Another challenge is to make high density urban space solutions (including housing) that are both attractive and affordable, to avoid the rise of new societal divisions and segregation between dense metropolitan, suburban and rural areas.

Inclusive Public Spaces

Urban Mobility and Accessibility has a strong interrelation with inclusive public spaces – especially on the neighbourhood and street level: Multiple-usage of available space for transport, as well as for other activities, including leisure and social contacts, would be efficient but should be attractive.

The challenges in this realm lie in designing and developing attractive urban spaces that provide room for social contacts and leisure activities, but at the same time offer effective, safe and useable transport.

1.2.7 Urban greening through Nature-Based Solutions and circular economies

Although European urban areas nourish a relatively high degree of biodiversity (sometimes higher than in surrounding, non-urban landscapes),[20] from a regenerative point of view they are still fragile and not nearly as 'green ' as needed to support human and planetary well-being including climate action. Contemporary cities and urban areas, in Europe and beyond, are vulnerable to disruptions of various kinds, be it through heat waves or other weather events, by food scarcities, financial turbulence, mobility disruptions, etc. By developing and improving Green-Blue Infrastructures (GBIs) and Nature-Based Solutions (NBS) overall urban liveability, public health, and urban robustness may be considerably improved together with cutting-edge approaches to clean-tech and entrepreneurial creativity. For instance, increased focus on the opportunities and challenges in urban agriculture and urban eco-system services through nature-based solutions, from neighbourhood levels over urban functional areas including to peri-urban areas and the urban-rural continuum, is needed to shape robust green infrastructures to increase desired resilience and adaptive capacities.

Furthermore, this greening and support of robustness also requires a shift in resource use. 75% of global natural resources are being consumed in cities. As an increasing scarcity of resources, such as fertile land, nutrients, clean water and air as well as raw materials (metals, wood and plastics) is expected,[21] circular economy is a crucial strategy in urban transitioning. This makes cities and urban areas attractive starting points for making the global transition to a circular economy. Through targeted governance measures, city authorities have great potential to define and implement measures and regulations for public procurements, for business activities, for consumption and resource management. Most of today's industrial production needs to be reshaped at all levels for it to become more circular: From uptake and use of resources, design and production processes to logistics and distribution – the focus needs to be on circularity and sustainability. This is particularly evident from an urban robustness perspective on current European urban systems, e.g. around food security. Consumers don't operate in a vacuum, but in a cultural context that mirrors the behaviours and practices amongst producers, regulators and administrations. The urban form, setting, land-use, public spaces, mobility, transport and digitalisation strategies set the game plan. It is not just the circular economy that needs to be built into the complex urban webs of power,

[20] Cf. EC (2020) 'Natura 2000 in Cities', https://ec.europa.eu/environment/nature/natura2000/management/pdf/Natura_2000_in_cities.pdf , p. 7.
[21] EMF, 2012

interests and dilemmas, but also the culture of working and actors' capacity to deal with the urban dilemmas.

As cities and urban areas urgently need to increase the circularity of their economies at a faster pace, Incentives are needed. The focus and behaviour of producers, suppliers and consumers must change for our society to move towards more circular ways of making and consuming. When waste becomes a resource, this will change existing business models and value chains. The process has already been started in some cities. But there is a great need for more knowledge, solutions and experience for circular cities to become the norm, not the exceptions.

Regulative frameworks, such as taxation policies, play a pivotal role. The economic system needs quality guarantees for reused materials. Also, strategies such as "plastic free Europe", followed by campaigns for shared action between diverse actors representing many different member countries, have the potential to boost the commitment of private as well as public bodies. The challenge is to make sure these efforts and solutions are knowledge-based, tested and made available to all.

Science-policy collaboration is vital

Circular economy is a key strategy in transforming urban areas and to achieve several SDGs and the Paris Agreement – particularly focusing on the following areas: 1) built environment: construction, remodelling and deconstruction; 2) natural resources and biodiversity, including urban farming; 3) urban small-scale manufacturing.

The DUT partnership will provide knowledge, experience and be a sparring partner for local administrations, governments, industry and society on how to speed up the process for urban areas to become circular. The transition to circularity requires systemic change at all levels.

For the circular economy to become reality, the transition must be equally driven in the public as well as the private sector. Public purchasing and development strategies must play along with the business sector's process to become climate-neutral, circular and clean. By the means of well-functioning science-society and science-policy activities and engaged, multi-sectoral networks, the partnership will be an important catalyst for the necessary collaboration between decision makers, public and private, the R&I communities and society to happen.

The partnership aims to:

- Apply a dilemma-based approach to urban greening and circularity to support urban robustness;
- Transform from linear- and large-scale approaches to circular small-scale approaches across neighbourhoods to urban functional areas;
- Establish the urban partnership as a relevant knowledge hub and platform for knowledge exchange on urban greening, nature-based solutions, and circular economy transitioning in cities;
- Address urban practices, including culture, attitudes and behaviours; regulatory frameworks, obstacles and drivers.

Urban greening and the key areas

Digital Transitions and Urban Governance

Digital transitions, particularly in urban governance, can be a boost for Nature-Based Solutions as well as Green-Blue Infrastructures in terms of real-time update as well as supporting coordination and stock-taking of urban ecologies and biodiversity. Furthermore, they may also fulfill crucial roles in contemporary urban agriculture and future urban food security.

Digital tools have proved to enable the construction sector to use materials in a circular manner. However, it can also be conducive to increase the urban governance capacities to guide and plan for urban circularity as this transition also requires more of creative bureaucracies and public innovation governance than the current common conventional linear government models in much local and regional authorities (not to speak of national and EU settings).

Digitalisation enables many kinds of businesses to make the transition to circularity, using the resources in the most efficient way and minimise waste. Digital infrastructures and resources, like AI, big data and smart technology of all sorts, also make it possible to share knowledge and experiences across distances and borders.

Challenges can be that digitalisation spurs online shopping business models and that increased, digital consumption may affect the liveliness of streets, city life and the social fabric of city centres in negative ways.

From Resilience to Urban Robustness

Urban greenery and access to water can promote biodiversity, public health and security, as well as offer solutions for stormwater treatment and runoff. These positive effects of people's access to and use of urban and peri-urban greenery and water occur in many types of spaces, including parks and recreation areas, urban gardens, allotment areas, plant nurseries, ponds, creeks, and various urban and natural areas such as wetlands, woodlands and surface water reservoirs.

The quality and use of urban materials are closely linked to urban robustness. Cement and concrete production processes are top emitters of greenhouse gases. To comply with environmental limits, cities and urban areas need to find/use new materials and new urban design in new as well as for refurbishment in existing built environments. This can be done with increased circularity in the shape of re-use and recycling of materials in construction and maintenance. Thus, research and implementation actions on nanomaterials and new sustainable urban materials are needed.

Urban circular economies need to vastly increase urban climate change adaptive capacity and to improve urban resilience. Local urban innovation ecosystems must be able to face emergencies and crises and events, whether they are local or global, financial, natural or political.

Sustainable Land Use and Urban Infrastructures

Nature-based Solutions and Green-Blue Infrastructures requires urban design and integration of the design of living environments in and around communities of varying size, density and location. Uses of ecosystem services involving shrubs, trees, alleys, etc. can counteract the presence of urban heat islands, floods, air pollution and noise.

Circular in cities involves the pattern by which resources and materials are shared and transported. In that manner, circularity is closely linked to mobility, urban infrastructures and land use. Waste from one sector becomes valuable resource for another, most probably reducing the use of energy and cutting emissions in the process.

Re-construction is preferred before new development constructions, with reference to circular economy and environmental impact.

Challenges are related to that reuse of building materials has environmental benefits and causes logistics and transportation. Also, the process of increasing circularity can contribute to gentrification and issues of environmental justice and liveability. On the other hand, actors of production and manufacturing (for instance food systems and urban farming) can move back into the cities, thus reducing the negative impact from transportation and contribute to the circular transitioning from within cities.

Inclusive Public Spaces

Urban greening, Green-Blue Infrastructures, and Nature-Based Solutions are common components in contemporary placemaking as well as types of public spaces in their own right and management regimes. It is crucial to cultivate these types of public spaces, both for urban public health as well as urban democratic health.

Urban circular economies, in and across various sectors and infrastructures, are highly potent means to tackle environmental degradation in the form of air, visual, and sonic pollution, all challenges that drive dilemmas that materialize in urban public spaces.

Increased privatisation means that urban open public spaces risk being reduced to consumption spaces in a (outdated) linear sense of make-sell-waste. Extensive security measures risk reducing openness and inclusiveness if the drivers behind threats are not targeted – hence reducing public spaces to palliative symptom treatment rather than part of pre-emptive spaces to achieve substantial safety in urban areas. Together, these current developments risk ruin the creative, dynamic, and flexibility potential of urban life in public spaces, a risk which is hence detrimental to transitions towards urban circular economies.

With this concept the ambition of the existing Member States networks to drive urban transitions can be significantly enhanced and extended towards the key domains for urban transitions and climate neutrality.

The partnership will build upon and integrate already existing European activities and ERA-NETs in the related areas. All of the mentioned ERA-NETs or actions were or are managed by the JPI Urban Europe:

1. Urban energy transition
    - **ERA-NET Smart Cities and Communities:** The outcome of this ERA-NET Co-fund revealed the need to address the urban energy transition in a place-based rationale and suggested the conclusion that a "Smart Cities" narrative would not lead to a broad take-up on urban level. Therefore, the concept of a place-based programme on Positive Energy Districts was developed together with SET Plan Action 3.2. Based on this insight, the consortium decided to fund the administrative and structural set-up of the trans-national programme on Positive Energy Transition.
    - **SET Plan Action 3.2 on Positive Energy Districts:** The PED programme is being set up as a trans-national R&I programme organised by JPI Urban Europe since October 2018. After building a programme management structure and a Europe-wide consultation process on the theme of PED in 2019, the programme will publish its first joint call in early 2020. The programme is unique in its mission to establish 100 positive urban energy districts in Europe by 2025 and in its pledge to do this by working with cities and the real-estate sector on eye-level. It is following the place-based rationale developed in the JPI Urban Europe.
    - **ERA-NET Positive Energy Districts:** The ERA-NET Co-fund will be established in 2020 and managed by the JPI Urban Europe. It will run the second and third call in the series of joint calls under the PED programme.

2. Capacity building for urban transitions
    - **ERA-NET Smart Urban Futures**: Outcomes in many cases driving a wider sense of smart urban approaches to issues concerning inclusive, vibrant and accessible urban communities, new dynamics of public services and innovation governance, and concepts and strategies for smart urban transformation, including growth and shrinkage.

- **ERA-NET Enhancing Urban Transformation Capacities** (to be established in 2020 under Horizon 2020)

3. Increasing circularity
   - **ERA-NET Sustainable Urban Global Initiative** focusing on food-water-energy nexus: By bringing together the fragmented research and expertise across the globe the aim of this ongoing ERA-NET Cofund is to find innovative solutions to the Food-Water-Energy Nexus challenge. Activities by urban R&I actors focus to develop more resilient, applied urban solutions that bring inter- and trans-disciplinary research and innovation together from across the globe, to benefit a much wider range of stakeholders.

4. Urban mobility transition
   - **ERA-NET Urban Accessibility and Connectivity** (currently under implementation): aims to create a portfolio of research and innovation projects that support the implementation of Sustainable Urban Mobility Plans and decision making for public and private investments in infrastructures and services. Scenario decision-making (including public and private spheres as well as communities) and innovations (technological, organisational and institutional as well as social). Projects are expected to contribute to the transition towards sustainable, inclusive, accessible and affordable mobility systems.

All these activities and funded R&I projects created valuable knowledge, methods, tools, solutions and references regarding the transformation of the various domains. However, so far, the various sectors and key issues related to sustainable urban development have been addressed mostly with individual calls and sequential actions. To boost urban transformation these efforts must be continued and strengthened, their interrelationships must be better considered and synergies across these and other sectors exploited.

In this sense, the partnership aims to step up the ambition and address the sectors with an integrative and holistic approach in a more comprehensive, continuous and connected way. It will also create knowledge and evidence along the recommendations of the report on Global Sustainable Development by addressing the interrelatedness of urban systems, strategies and goals and thus contribute to changing key systems of our cities with a significant impact on our urban economies and societies.

Giving stronger focus on the selected sectors will also strengthen the involvement of business, from industry to entrepreneurs and social innovators. Within the urban innovation system business innovations play a very particular role – with municipalities as main investors and procurers on the one hand and citizens and users of new systems and services on the other. Public and private business models must be redesigned along the transition pathways and integrated well into the overall planning and management of neighbourhoods and urban areas to ensure inclusiveness, accessibility, efficiency and effectiveness of new business solutions. By creating an urban innovation eco-system involving all urban actors the underlying conflicts of interests, ambitions and needs can be addressed and solutions and approaches co-designed.

Programme management efforts will be increased by enhancing capacities for synthesis, stepping up the dissemination and exploitation activities, connecting research and policy, establishing a European knowledge hub on urban transitions that connects existing R&I networks in the three sectors and possible connected domains. The critical issue of replication

will be addressed as this is still seen as one of the most critical issues in increasing the impact of R&I investments. Although various efforts have been and are taken regularly to support replication of good practice effects are still limited. Formats and capacities need to be put in place to allow a variety of opportunities for peer-to-peer learning, trainings, experimentation and scaling-up.

In this sense the partnership also allows to take advantage of the results achieved in the above-mentioned ERA-NET Cofunds (and those of other related projects generated in various EU programming frameworks), bring them towards implementation, replicate good practice, mobilise and support more cities to take up action. It is expected that the partnership will also allow to develop and establish formats and instruments bridging towards larger scale investments and by that help closing the gap between research and urban practice and policy.

On an operational level this requires the mobilisation and involvement of a wider set of partners – broadening the spectrum of funding agencies and programme owners to cover the entire innovation and value cycle as well as establishing cooperation mechanisms with research, city and business networks to strengthen capacity building across all stakeholder groups.

1.2.8 Interfaces and relationships with other Partnerships

With its focus to address urban transitions in an integrative way, considering particularly the needs of the energy, mobility and circular economy sectors, the partnership offers interfaces to various other candidate partnerships. It also aims to take use and build upon specific sectoral developments and achievements and join forces on urban related aspects and implementation (see Figure 5). Besides the general interfaces to various sectoral networks, a set of partnerships is seen as highly relevant/important for this proposal and its ambition. For example, close relationship to the partnership on Clean Energy Transition exists, as well as (some more details can be given on the rationale for including the energy-related PED programme in the urban partnership with partnerships dealing with Build environment, food, biodiversity and mobility.

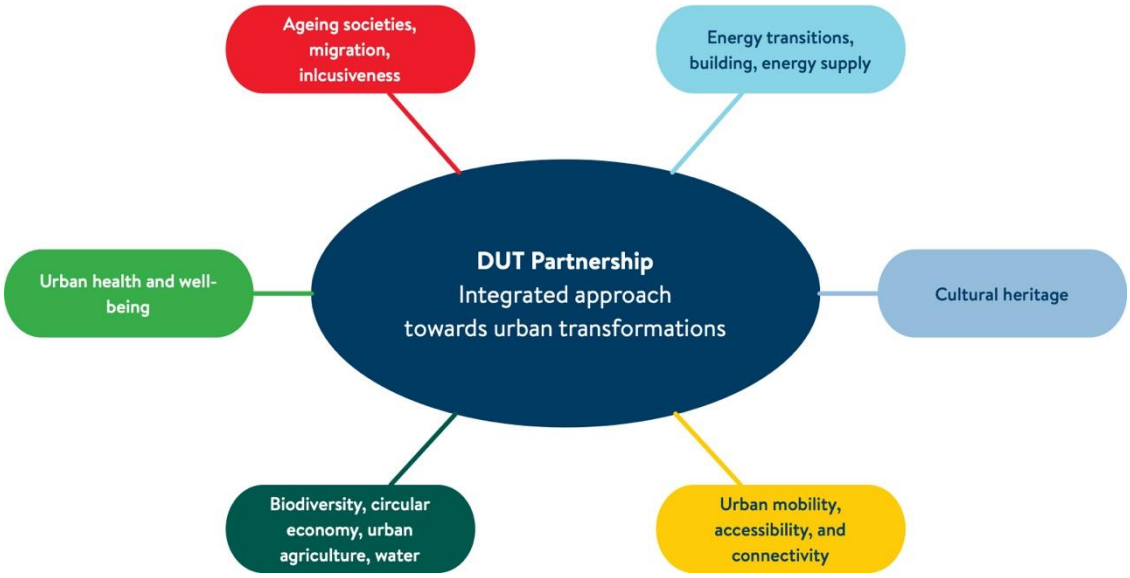

Figure 5: indication of interfaces to various sectoral fields, offering potential for cooperation with other partnerships, networks or projects.

The details on possible modes of interaction and cooperation with these other partnerships will be elaborated during the further process. However, Table 3 gives an overview of possible interfaces.

Table 3: Overview of related partnerships and potential interfaces and modes of interaction

Partnership	Potential interfaces	Possible modes of interaction
Clean Energy Transitions	As far as the CET partnership is discussed at this point, it is expected to focus on key challenges in energy technology and system innovation and create evidence for smart and integrated energy systems. On the other hand the DUT partnership targets the utilization of such technologies and (sub-)systems for the transformation of neighbourhoods and districts into positive energy ones. This shapes an interface when it comes to the application of energy technologies and systems into the urban context as well as the role regional energy systems play in the provision of renewable energies for urban areas.	Regular exchange on a strategic level to mutually consider latest developments and align actions. Joint calls on selected topics to integrate issues related to energy technologies and systems into the urban context and particularly in the context of Positive Energy Districts Joint workshops to connect the communities, also with regard to the impact energy technologies or energy transitions have on other sectors and areas, in particular mobility and circular economy
Built environment and construction	The transformation of our built environment and the housing stock is a key element to achieve sustainability targets. The construction and energy management of buildings play a crucial role in the energy transitions and the efforts taken by the DUT partnership on Positive Energy Districts and Neigbourhoods. On the other hand, new technologies, materials and solutions for construction contribute to improving circularity and resource efficiency. In this	Contribution of building and construction related R&I results, in form of new materials, technologies, processes and services to the DUT priorities and activities. Such results could be taken up in DUT calls in the context of PED, dissemination and exploitation activities to validate and test their potential from an integrated urban development perspective, by considering aspects of systems integration,

	context there is a high potential to take up, validate and integrate research and innovation results of the Built environment and construction partnership in the DUT partnership.	urban governance, public sector innovation, behavioural aspects, etc. Identifying stakeholder needs and raising research and innovation demands from the DUT perspective towards the Built environment and construction partnership. Facilitating joint discussions with all stakeholder groups to ensure alignment and foster dissemination and take-up of new solutions, products and services across Europe.
Rescuing biodiversity	Without knowledge-based planning and management of land-use and natural resources, the pressure brought on by rapid urbanization might lead to significant conflicts in urban areas, risking reduced biodiversity and negative consequences for human wellbeing, economy and social equity. A targeted collaboration with the partnership *Rescuing Biodiversity to Safeguard Life on Earth* will therefore be prioritized.	Regular exchange on a strategic level to mutually consider latest developments and align actions. Joint calls on selected topics to integrate issues related to biodiversity in the urban context Joint workshops and outreach on urban biodiversity and adjacent topics, like nature-based solutions in cities, greening of cities and circular economy
Safe and Sustainable Food System	Urban collaboration, engagement and infrastructure are vital for the development of the food system of the future. In this sense, cities and municipalities must take part in ensuring consumer trust, safety, quality and traceability. Approaches to foster urban agriculture can be tackled together to combine the experiences and requirements from the urban perspective and the agriculture sector.	Joint efforts to engage relevant actors in the necessary efforts. Possibly joint calls. Joint workshops to connect the communities, also with regard to urban agriculture, sustainable production and consumption as well as circular economy
2ZERO	The electrification of vehicles is one of the enablers for sustainable transportation and mobility. While 2ZERO is expected to accelerate the development of zero tailpipe emission vehicles with a system approach, with user centric solutions and technologies including recharging infrastructures and grid interaction, DUT offers a framework to investigate the impact and potentials of such solutions in the urban context. This could comprise aspects related to integration of new solutions in sustainable mobility systems, impacts on land use, public procurement and new business models, new services, behaviour and societal impacts, consequences for circular economy and energy systems, etc.	Contribution of R&I results created by 2ZERO projects, in form of new vehicles, systemic solutions, infrastructure requirements and services to the DUT priorities and activities. Such results could be taken up in DUT calls, dissemination and exploitation activities to validate and test their potential from an integrated urban development perspective, by considering aspects of systems integration, urban governance, public sector innovation, behavioural aspects, etc Identifying stakeholder needs and raising research and innovation demands from the DUT perspective towards the 2ZERO partnership. Facilitating joint discussions with all stakeholder groups to ensure alignment and foster dissemination and take-up of new solutions, products and services across Europe.
Cooperative, Connected and	CCAM offers new opportunities for sustainable mobility in particular in urban and peri-urban areas. While the CCAM	Contribution of R&I results created by CCAM projects, in form of new technologies, infrastructure requirements and services to the

Automated Mobility (CCAM)	partnership focuses on large-scale demonstration pilots, including the development of automated vehicles (passenger and freight), required communication systems and services as well as related infrastructure, DUT aims to address and exploit the potential of such new developments from an integrated perspective. This could include the analysis and validation of new mobility models, considering implications for business, governance and citizens, building capacities in policy, city administration and society to assess the potentials and identify further R&I needs.	DUT priorities and activities. Such results could be taken up in DUT calls, dissemination and exploitation activities to validate and test their potential from an integrated urban development perspective, by considering aspects of systems integration, urban governance, public sector innovation, behavioural aspects, etc. Identifying local stakeholder needs and raising research and innovation demands from the DUT perspective towards the CCAM partnership. Connecting projects and facilitating joint discussions with all stakeholder groups to ensure alignment and foster dissemination and take-up of new solutions, technologies and services across Europe. Supporting dissemination of results towards Member States, regions, cities and municipalities, also in terms of national framework conditions, capacity building or replication.
EIT Urban Mobility	Under development	
Water4All	Urbanization has a major impact on entire water systems including groundwater systems. Blue infrastructure is a key element to be considered for sustainable urban development. In the context of circular economy the efficient use of water resources plays an essential role. On the other hand the demand for water and the management of wastewater in urban areas defines a challenge for the water sector. The utilisation of new water technologies, processes and services in cities and municipalities will highly contribute to urban transformation and the shift towards circular economies.	Regular exchange on a strategic level to mutually consider latest developments and align actions Activities for knowledge sharing. Possibly joint calls on selected topics to integrate issues related to water and blue infrastructure in the urban context

Other links may be explored, notably partnerships on other modes of transport, such as rail, aviation or waterborne, as well as with digital partnerships (e.g. on smart networks and services).

In the field of energy, the DUT partnership is focusing on energy transitions through PED and **envisions a close collaboration with the SET Plan**, as JPI Urban Europe is already cooperating with the SET Plan Action 3.2 and running the programme management for this Action, which focuses on the creation of Positive Energy Districts (PEDs). Among the technology initiatives of the SET Plan, this action is unique, in that there is evidence to show that the implementation of most urban solutions does not follow a market logic, but rather a place-based rationale.
This results from three characteristics:

- the complexity of the urban system and the resulting interrelations between the energy, mobility and circular economy systems;
- the integrative role of energy and urban planning and permit-giving in the creation and refurbishment of the urban built environment;
- the need to ensure the well-being of citizens and urbanites in an inclusive way, in order to uphold and enhance the liveability of cities and urban areas.

At the same time, industry is not an investor in the development of the urban built environment. The two main actors that invest in urban infrastructure are:

- municipalities, as they are responsible for the energy planning, urban planning and permit-giving process, and who (supported by energy utilities) invest in the urban infrastructures needed to run our built environment;
- real-estate companies, that create and manage the buildings.

Although energy efficiency and social inclusiveness are important policy goals in the urban context, the real-estate market has proven unable to deliver on those goals. This is why city administrations need to design innovative policy measures and related administrative procedures, in order to ensure the liveability of their urban spaces and the well-being of their inhabitants. However, as innovation is not necessarily part of the mandate of cities (especially when they are of small or medium size), they will need support to mobilise additional resources on top of their day-to-day administrative tasks.
The experience of the JPI Urban Europe has shown that it is imperative to work with cities and urban areas on eye-level, and in a structured and programmed way, in order to bring about the innovations needed for the energy transition on urban systemic level. This goes hand in hand with the approach taken in the prospective co-funded urban partnership. The partners of the DUT partnership therefore believe that it will be essential to further implement the programme on Positive Energy Districts (PED) in this context. Therefore, the DUT partnership will address energy transitions related issues by focusing exclusively on PED.

1.2.9 **Estimated investments needed**

Boosting urban transformations and creating a European R&I eco-system in support of such developments requires on the one hand knowledge about how to tackle the wicked issues underlying the need for these transformations and on the other hand the co-design of city- or community-specific approaches and solutions. From neighbourhoods and towns up to metropolitan areas, we must mobilise and support European cities and municipalities of all sizes, to turn urgent challenges and risks into opportunities and solutions. This requires an efficient and effective interplay of R&I programmes, efforts and investments across all levels. As indicated in Figure 6, the partnership will not only follow its vision and aims, but also realise these, in alignment with national and European efforts and investments.

The partnership will invest in challenge-driven and strategic research and innovation on key issues and build capacity across countries and regions. It will align nationally and regionally funded R&I projects and activities and facilitate learning, replication and mainstreaming across Europe. The national programmes involved allow to reach out to a wider set of municipalities, to promote and disseminate approaches and solutions, tailor-made to deal with national particularities and to overcome language-, legal- or regulatory barriers.

Overall estimate of required resources for partnership: EUR 30–40 million per year

National/regional investments estimated by EUR 20–30 million per year

Detailed overview according to implementation actions: to be elaborated

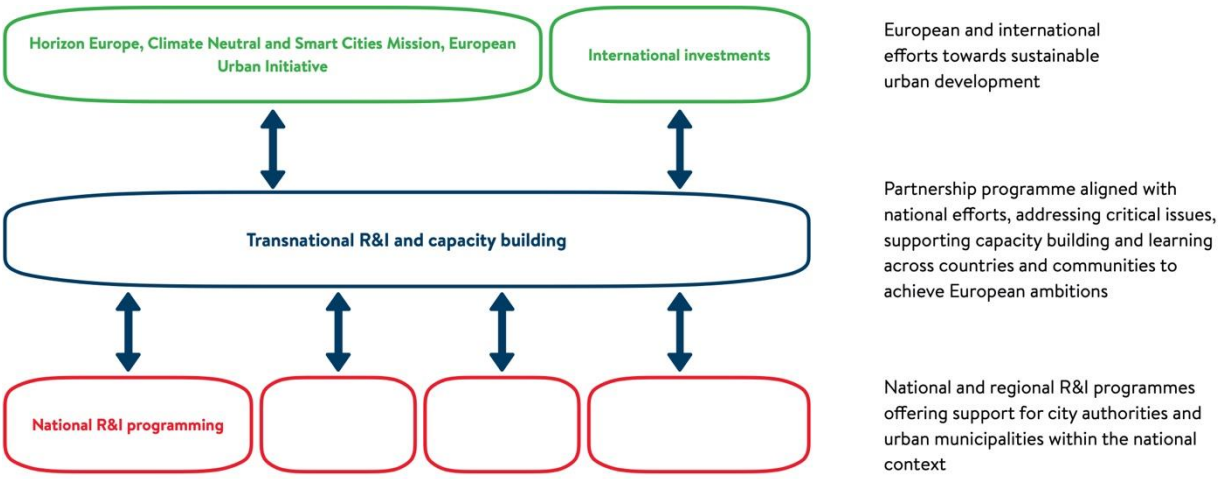

Figure 6: overall European R&I efforts and resources addressing urban innovation and transformation.

1.2.10 **Exit strategy**

The proposed Partnership is based on a network with a governance system that allows self-sustainability for the core operations. The management of the network is financed by national in-kind contributions mainly, including also a membership fee allowing to run some basic infrastructure.

While the partnership and the co-funding of the EC will allow to step up the ambitions, widen the portfolio of activities and extend the management capacities, it is planned to maintain the modus operandi of national in-kind contributions and fees. The Governing Board, the decision making body, will discuss immediately after the launch of the partnership and agree on the corresponding model.

As part of the overall development process of the partnership and the preparation of the annual work plans, reflection on strategy, priorities and achievements will take place to assess future opportunities, national interests and priorities. The results of such reflections are discussed in the decision-making body of the partnership to identify needs for action in an early stage. This also involves the continuation of the partnership after the EC co-funding has ended. It is expected that in the final phase of the partnership another strategy process will be implemented to assess the interests and priorities for continuing the cooperation of Member States.

1.3 Necessity for a European Partnership

As indicated in Table 1, the partnership clearly relates to European policies – from the Green Deal and the Urban Agenda for the EU up to the renewed ambition of the ERA. Several reports on the SDGs as the overarching ambition globally emphasise the importance and relevance of the urban and peri-urban setting for achieving these goals. With its vision and proposed priorities and implementation actions the partnership offers additional capacities to work on the European perspective and approach on that highly important and urgent matter.

The core added value is seen in the combination of addressing key sectors for European transformation, with the integrated and holistic urban perspective as a central node for these transformations to play out. In this sense, it aims to establish as the programme that offers an urban innovation ecosystem that can also be used by sectoral partnerships for bringing particular (technological) solutions into the urban context and assess or validate the requirements and opportunities for their implementation from a systemic and multi-stakeholder perspective.

It is also expected that with this approach the partnership will contribute to the implementation of the European mission on Climate Neutral and Smart Cities. The aim of achieving 100 climate neutral cities by 2030 is ambitious in itself but only the tip of the iceberg to achieve the goal of climate neutrality by 2050. Whatever concrete actions the Mission Board will define, it will be key to bring the spirit of urban transitions to as many cities as possible, including smaller and medium sized cities who are faced with urban challenges with a different quality than larger, particularly Superstar Cities.[22] As small and medium sized cities in many cases are difficult to reach through European level programmes and activities, the partnership, as a cooperation of national programmes and authorities, can support and complement such efforts (see Figure 6). A first self-assessment of cities' engagement in activities implemented by JPI Urban Europe have shown that it was indeed possible to mobilise mid-sized cities to a higher degree than what has been realised in Horizon 2020.[23]

In addition, current debates show that it is not only a matter of creating new knowledge and evidence but also about building capacities to take better use of existing experiences, solutions and approaches. Shaping a platform for dissemination, replication, peer-to-peer learning is key to speed up sustainable urban development. The partnership aims at shaping and facilitating such a platform (strategic programme management) through its portfolio of activities. This opens manifold opportunities to connect and support also projects funded from other national or European programmes as well as directly contribute to the European mission.

Besides the funding of city administrations and other public bodies, a strong involvement of all relevant stakeholder groups as well as a clear impact for citizens and societal actors is called for by Horizon Europe as well as the missions. The urban partnership clearly aims to work along those lines – by considering societal and municipal needs for research and innovation, facilitating local experimentation and participatory approaches through Urban Living Labs, involving societal actors and civic organisations in multi-stakeholder dialogues.

[22] Florida, R. (2017) *The New Urban Crises: How Our Cities Are Increasing Inequality, Deepening Segregation, and Failing the Middle Class - and What We Can Do About It*, New York: Basic Books.

[23] S. Meyer, et al. (2019) 'Engagement of Cities in JPI Urban Europe', self-evaluation report, internal document

This is expected to result in bringing R&I closer to people and creating evidence for inclusive, attractive, just and sustainable neighbourhoods and urban areas.

Urban Living Labs in the partnership will hence be developed even more into urban transformation nexus to build capacities for learning, co-creating, and capitalising on existing knowledge, solutions, and approaches. This will be done by supporting local levels in a genuinely challenge- and dilemma-driven way, which enables the various local settings with all their idiosyncratic characteristics and ongoing processes to tackle global and common challenges while tailoring the responses and ways forward to suit them. The partnership will apply and foster such approaches whether it is addressing backbone infrastructures for robustness or design governance for inclusive public spaces or organisational change to capitalise on digitalisation or innovation governance for urban liveability. Urban living labs are thus a crucial part in finding integrated urban development and governance along the lines of the forthcoming Leipzig Charter 2020. In this sense, the urban living labs spark and re-ignite local or even neighbourhood urban innovation ecosystems and will harness urban R&I for the transnational movement towards urban transformations.

In addition, the partnership concept requires a stronger coordination at the national level. Addressing and cooperating with stakeholders and policy makers from the sectors on energy, mobility and circular economy as well as related domains requires cross-sector and cross-policy cooperation on all levels. This is already anticipated in the governance model by including national coordination mechanisms as well as a cooperation with funding agencies and programme owners.

The cooperation of national programmes and policy makers also allows to consider national regulations, frameworks and urban planning conditions to a wider extent, facilitate peer-to-peer learning within and across countries and connect global strategies to local actions.

This national coordination is complemented by a transnational alignment and cooperation of R&I funders, programme owners and public authorities. The partnership allows to establish an urban innovation ecosystem across countries and regions, benefit from national programmes and expertise on a European level. In terms of strengthening European efforts on sustainable urban development, the partnership creates a platform for governmental bodies to exchange on approaches and experiences (e.g. between national programming, Horizon Europe, and relevant investments from ESIF funds and programming towards sustainable urbanisation, such as Urban Innovation Actions (UIA) and URBACT[24]) to drive urban transition pathways towards transformation.

Through such a transnational cooperation, national and regional agencies do not only cooperate in joint funding but in developing most appropriate framework conditions for urban R&I – from strategic research up to all forms of innovation and validation. Supporting co-creation, multi-stakeholder involvement and local experimentation requires framework conditions that are open for all stakeholder groups and that go beyond traditional approaches of research funding. Such transnational networks, including funders, R&I programme owners as well as city networks, are crucial for showcasing and sharing experiences because

[24] cf. Fioretti, C., Pertoldi, M., Busti, M. and Van Heerden, S. (eds) (2020), *Handbook of Sustainable Urban Development Strategies*, EUR 29990 EN, Publications Office of the European Union, Luxembourg.

municipal and local governments are the implementation level of national sustainability policy.[25]

Efforts to improve these conditions are ongoing among the JPI Urban Europe funding agencies and programme owners but are sometimes limited due to national legislation. Research indicates that transnational multi-stakeholder partnerships, e.g. for tackling the SDGs, yield better results if they leverage local ownership and if the institutional and policy environment is favourable to them.[26] The partnership offers opportunities to take such developments further, widen the spectrum of agencies involved and improve the conditions for integrated urban R&I projects. This would not only lead to transnational cooperation to realise a common agenda and contribute to the wider European ambition but also to advance national frameworks towards transformative research and innovation.

As urban policy is mainly a matter on national and regional level, a European Partnership is an important vehicle for connecting the related sectoral policies. For example, the DUT partnership could team up with the UAEU partnerships more strongly with regard to research and innovation aspects and, depending on the final plans for the next phase of the UAEU, offer support for the implementation of approved action plans or the preparation of new ones. In cooperation with stakeholder networks, such as Eurocities, ERRIN, CIVITAS, POLIS, ICLEI and others, joint efforts can be taken to mobilise cities and raise awareness of good practice. Leveraging the potential of research results from various European programmes, including CIVITAS, URBACT, UIA, Horizon 2020 SC 5 generated projects around Nature-Based Solutions in Smart and Sustainable Cities, etc., to the wider European communities and regions will help to increase the impact of the related investments in R&I. While the partnership is aiming to connect to H2020 and Horizon Europe funded city-related projects, it at the same time will realise a comprehensive programme management, building upon a wider portfolio of implementation measures beyond joint calls. For doing so, the partnership will build upon and enhance the efforts of JPI Urban Europe in facilitating multi-stakeholder cooperation, experimentation on local level, dissemination of research results towards policy making, capacity building in research, policy and society. Through such activities it will also aim to connect to and complement implementation measures established for the mission on climate-neutral cities.

As JPI Urban Europe receives more and more interest from countries outside Europe, the launch of a European Partnership also offers the opportunity to establish as the European hub for international cooperation on urban transition pathways. According to the proposed portfolio of implementation measures, this international cooperation does not only include joint funding, but also capacity building as well as dissemination and replication activities and thus allows various international organisations to connect to and engage in the partnership.

[25] Bai, X. et al. (2019) 'Networking urban science, policy and practice for sustainability', in Current Opinion in Environmental Sustainability, 39:114–122, p. 114.

[26] Valencia, S. C. et al. (2019) 'Adapting the Sustainable Development Goals and the New Urban Agenda to the city level: initial reflections from a comparative research project', in International Journal of Urban Sustainable Development, 11 (1): 4–23, p. 15

1.4 Partner composition and target group

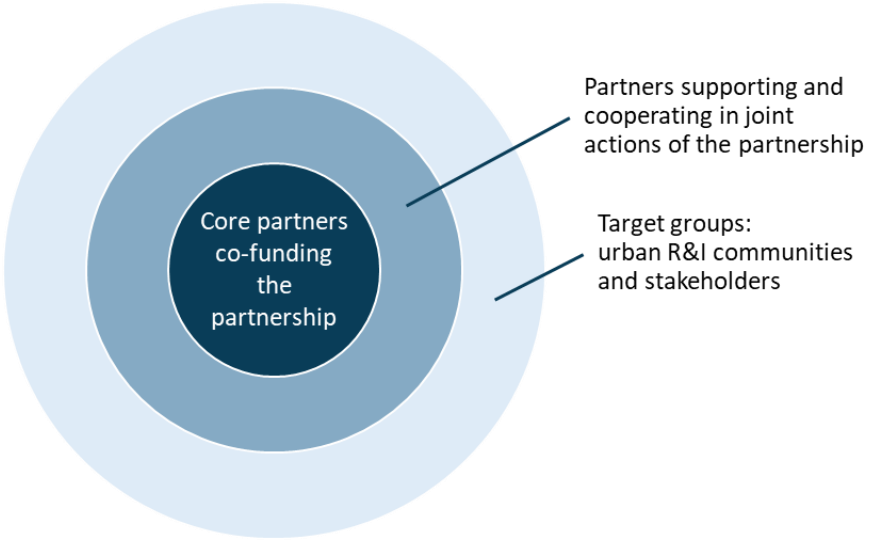

Figure 7: Partner network and target groups

Core group: Co-funding partners

As a co-funded partnership the core group is composed of public bodies responsible for research and innovation programmes, including

- Programme owners and funders, different kinds of funding agencies to cover well the entire innovation cycle;
- Partners that manage thematic or open programmes relevant for urban development.

The implementation of the DUT partnership is supported by two existing Member States networks – the JPI Urban Europe and the PED Programme of the SET Plan, which have already taken up the challenge to address the complexity of sustainable urban development. The DUT partnership offers a framework for both networks to not only join forces but create a common programme based on a joint vision, work programme and consolidated governance structure. More details about both networks is given in Annex 2.

Table 4 lists the countries and partners that have stated their interest in the partnership and that are currently involved in the DUT preparations.

Table 4: Countries and organizations interested to join the partnership and engaged in the DUT preparations

Country	Organisations
AT	Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, Austrian Research Promotion Agency FFG
BE	Innoviris, Flanders Innovation & Entrepreneurship VLAIO, National Fund for Research and Science FNRS, Flanders Research Foundation, Wallonia Ministry for Public Service SPW, Flemish Government – Department for Environment, Nature and Energy
BG	Bulgarian National Science Fund
CY	Research and Innovation Fund
CZ	Ministry of Industry and Trade, Technology Agency of the Czech Republic
DE	Federal Ministry for Education and Research

DK	Danish Innovation Fund
EE	Ministry for Finance, Ministry for Culture, Estonian Research Council
ES	Centre for the Development of Industrial Technology CDTI, State Research Agency AEI
FI	Academy of Finland
FR	Ministry of Research and Innovation, ANR
HR	Ministry of Environment and Energy
IT	Ministry for Education, Universities and Research
LV	Ministry of Education and Science, VIAA
NL	Ministry of the Interior and Kingdom Relations, Dutch Research Council NWO
NO	Ministry of Local Government and Modernisation, Research Council Norway
PL	National Science Centre, National Centre for Research and Development
PT	Science and Technology Fund FCT, Regional Fund for Science and Technology of the Azores Regional Government FRCT
RO	Executive Agency for Higher Education, Research, Development and Innovation Funding UEFISCDI
SE	Vinnova, Swedish Energy Agency, Formas
SI	Slovenian Research Agency
SK	Ministry of Education and Research
TR	TÜBITAK
UK	Economic and Social Research Council, Arts and Humanities Research Council, Innovate UK

Partners supporting and contributing to joint actions: networks representing urban stakeholders and R&I communities

To achieve the objectives and impacts of the DUT partnership a close cooperation with stakeholder networks is envisaged. While the core group is composed of funders, the contribution of partners and organisations representing the various stakeholder groups is seen as key to ensure that the R&I priorities meet the practitioners' needs and create highest impact. Discussion about appropriate formats for this cooperation are ongoing and are also considered in the governance model. The following networks are considered, although different cooperation schemes might be needed depending on the kind of network or its mission:

- City authorities' networks, such as Eurocities, CIVITAS, Polis, ERRIN, ICLEI, CEMR or the Covenant of Mayors;
- research networks, such as EERA Joint Programme Smart Cities and the Urban Europe Research Alliance UERA, ESPON, relevant COST actions;
- networks and associations of urban planners, business and industry, e.g. ISOCARP, ECTP;
- partnerships of the UAEU or future UAEU implementation structures;

- the City Science Initiative CSI which aims to better connect research and city administration and achieve a better utilisation of research for sustainable urban development
- the Community of Practice on Cities, initiative of the European Commission led by JRC and DG REGIO, open stakeholders such as cities and networks of cities, international and intergovernmental organisations and research bodies;
- civil society organisations.

Cooperation with these actors aims at contributing to the identification of key issues and R&I priorities, mobilisation of stakeholders, dissemination and exploitation of research results among the various target groups as well as offering evidence for the stakeholder networks' own policies and activities.

The cooperation is also a means to avoid duplication of efforts and potential silo practices in urban development related policy.

Target groups: urban R&I communities and stakeholders

As the DUT partnership applies a quadruple helix approach, the target groups comprise all urban actors, including

- City administrations and urban municipalities;
- Business: infrastructure and service providers, industry, entrepreneurs, social innovators, intermediaries;
- Research organisations: universities, public and private research organisations, across disciplines;
- Civil societal actors: local initiatives, NGOs, social innovators, grassroots, inhabitants.

The target groups will be invited to contribute to the agenda setting through consultations and interactive stakeholder dialogues (AGORA). In addition, they can apply for R&I projects as well as join or benefit from additional activities, such as the AGORA Stakeholder Platform, trainings or dissemination measures.

International cooperation:

Besides the European partners, the partnership will be open for international participation on all levels, from individual countries to R&I funding networks, such as the Belmont Forum, UN bodies or Mission Innovation up to interested stakeholders, cities or local initiatives.

This international dimension is seen as important to ensure that globally agreed policies are considered and to bring local experiences and results to global levels. As urban development is place-based there is much to gain from international exchange. At the same time, the partnership aims at exploiting European solutions worldwide and promoting Europe as the frontrunner in sustainable urban development. According to the partnership vision, a global community of practice is needed to drive urban transitions and learn from solutions, experiences and approaches from international R&I activities of regions and cities worldwide.

2 Planned Implementation

2.1 Activities

Implementation

In the SRIA 2.0 an urban transition arena is proposed as the overarching concept for implementing the agenda and reaching the ambition (Figure 8). Following such an approach, not only new knowledge or innovations will be created but a programme management put in place that monitors, synthesises, communicates and makes available such results, evidence, guidelines, tools or case studies for wider use and strategic reflections. The partnership aims to build upon and advance the transition arena initiated in JPI Urban Europe.

Figure 8: Urban Transition Arena – highlighting the key implementation actions needed to achieve the ambition of the partnership.

Accordingly, the following portfolio of implementation measures is proposed for the partnership (Figure 9):

- **Joint calls for challenge-driven R&I**, addressing critical issues for urban transitions with integrated and multi-stakeholder approaches will provide the backbone of the partnership. In this context, the concept of Urban Living Labs or Innovation Labs will be advanced to ensure that such approaches are not only used for experimentation but are introduced as the 'new normal' in urban transition management.
- A **multi-stakeholder community of practice** will be continued, managed and extended to facilitate science-policy-business-society dialogues, share experiences, disseminate results and reflect on key issues for urban transition and sustainable urban development. Emphasis will be given to mobilise representatives of cities as core partners for the design of the programme. This is crucial to leverage public and private investments made not only through urban R&I programming but also in ESIF actions and programming such as URBACT, UIA, etc. Through urban living labs beyond "projects", actors previously involved in various projects may increase the impact by

new transnational exchange and tackling challenges in sharing experiences and know-how.

- **Communication and dissemination** measures are taken to not only make R&I results accessible for all stakeholder groups but also prepare guidelines, references or tools for replication and mainstreaming. Various communication channels will be used to reach out to the different stakeholder groups, including social media, videos, printed material. Events and workshops, trainings, guidelines and references will be organised and prepared to reach out to different target groups and make new solutions and approaches available.
- A key element of programme management is **synthesis** of R&I results and achievements. Drawing conclusions for a cluster of projects, connecting projects across calls and themes as well as progressing from individual project results to wider outcomes and recommendations for practitioners will be enabled through dedicated synthesis activities.
- **Models for replication** will be investigated to design and implement formats, guidelines, actions to support replication of good practice, building upon experiences from lighthouse projects and other replication efforts.
- A **knowledge hub** will be established to support capacity building on integrated approaches for sustainable urban development. Various disciplinary or sectoral research networks do exist, among others the Urban Europe Research Alliance UERA, ESPON, the Smart Cities programme of the European Energy Research Alliance, COST actions, etc. To create such a knowledge hub on urban transitions, support will be given to connect these networks, strengthen alignment across the participating research organisations and helping to overcome fragmentation of our European R&I landscape on urban transitions.
- **Trainings** on new approaches for sustainable urban development, fostering ULLs, experience exchange on new approaches and solutions, strengthening public sector innovation, awareness raising of new public and private business models and their consequences for municipalities
- **Standardisation, certification** or legislative issues to be addressed wherever necessary to create frameworks for new business models and the uptake of innovative solutions. The manifold investment capacities of cities will be harnessed by seamlessly linking pre-commercial and innovative public procurement into the innovation cycle set into motion by the joint calls of the programme.
- **Monitoring** systems will be advanced to not only follow the progress of projects but also to take stock of diverse urban solutions, good practice cases and the contribution to achieving the objectives of the Partnership and the related policy targets. Such information and references will be made available on the website and through dedicated promotion material or workshops to allow the wider community to benefit and make use of them.
- Interfaces to **public procurement and investment programmes** will be investigated to support take-up and larger scale implementation of tested approaches and solutions by developing links with UIA, ESIF, private funds, etc.[27] The DUT partnership can be

[27] cf. Fioretti, C., Pertoldi, M., Busti, M. and Van Heerden, S. (eds) (2020), *Handbook of Sustainable Urban Development Strategies*, EUR 29990 EN, Publications Office of the European Union, Luxembourg.

complementary with the ERDF and S3 due to its challenge-driven approach. –It helps participants to identify local and regional urban needs (including support in capacity building for local governance to monitor and review SDG achievement[28]). The existence of a long-term agenda and the seven year timeframe presents an opportunity to shape synergies. Models are investigated how regions can join the partnership and connect their regional development programmes to the DUT ones.

- The scope of activities will be regularly evaluated and reflected upon to ensure that it serves the entire urban community, from municipalities and public authorities to infrastructure providers, utilities, planners and developers, industry, social entrepreneurs and, of course, society at large.

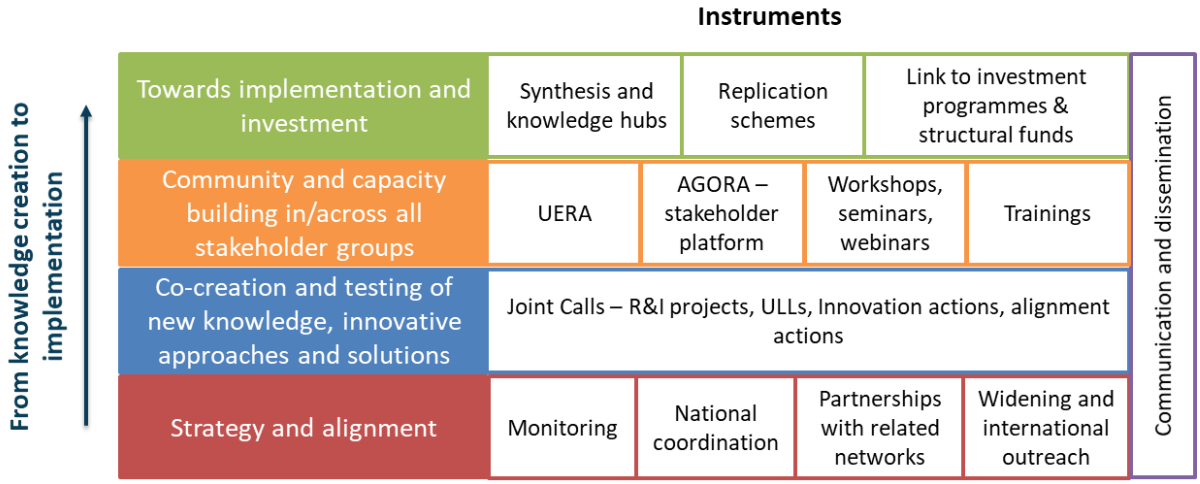

Figure 9: portfolio of implementation measures of the DUT partnership.

The DUT partnership will use the portfolio of implementation actions as a mechanism to shape synergies, create interfaces, and complementary actions to offer it as the platform for urban related sociotechnical systems for urban transformations and to avoid unnecessary duplication of efforts among Horizon Europe partnerships and missions and other urban development related EU initiatives.

2.2 Resources

For realising the partnership the following kinds of commitment are required and discussed with the core partners:

- **Financial commitments and in-kind contributions to the governance structure**:

  This includes the participation at Governing Board and Funding Agencies Working Group meetings as well as other events such as conferences, match making or projects meetings, payment of the membership fee, and, if possible, secondment of personal

[28] cf. Siragusa A., Vizcaino P., Proietti P., Lavalle C., European Handbook for SDG Voluntary Local Reviews, EUR 30067 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-15403-7, doi:10.2760/670387, JRC 118682.

for Management Board or working group meetings. This financing model has been established in both existing Member States networks to set-up and maintain a management structure that coordinates the portfolio of activities and run some basic infrastructure, such as website and promotion and communication material, cover expert travels or hosting events.

Overall, based on experiences of the existing Member States networks, the required national commitments for coordinating and running the partnership are estimated to sum up to about EUR 1.45 million per year. Details are given in Table 5.

- **Financial commitments and in-kind contributions to the joint calls and other dedicated implementation actions:** This includes the provision of national budgets for joint calls as well as the coverage of personal costs for the call coordination and management. In addition, contributions from funding agencies in terms of personal costs to develop new and/or improve existing instruments are expected.

  The required national contributions to the call budgets over the whole duration is expected between 500,000 and EUR 5,000,000 per country and call, depending on the size of the country, the size of the related R&I community, the relevance of the call topics for the community, etc. This range is estimated to cover the three pillars in parallel and allow in total calls of about EUR 20–30 million budget.

- **Efforts for national coordination** to ensure mobilisation of relevant stakeholders, promotion of joint actions, strengthening impact creation and implementation of results on national / local level, organisation of national/regional/local events and alignment with national strategies and priorities.

  The required budget for these activities will sum up to about EUR 50,000 to 200,000 per country and year, again depending on the complexity of the national landscape and required efforts to coordinate across sectors and stakeholders.

As indicated in Figure 9 the portfolio of implementation measures includes the link to urban investment programmes and structural funds. Connecting the partnership investments in R&I to urban investment funds is seen as important to strengthen uptake of solutions. This includes also opportunities to connect the partnership to DG REGIO programming relevant to the urban dimension, including URBACT and UIA. On the other side, the utilisation of ERDF depends not only on national prioritisation and urban policy, since member states manage these streams in varying ways and with different national-regional-local dynamics in effect, and thus requires efforts on national, regional and local levels to consider urban transition aspects in these negotiations and processes. The partnership aims to support national and regional agencies in the development of synergies. This is a long-term process from programming (alignment) to concrete joint actions supported by ERDF.

Table 5: estimated in-kind and cash contributions from participating countries for managing the partnership.

	National commitments to management	Estimated amount/a	Financing source
MB	• Partnership coordination according to the portfolio of implementation measures. MB members are fully or partly financed by their countries to ensure sustainability of the overall management and governance.	€ 800,000	In-kind

	• DUT secretariat (administration and general communication) + expert travels, events, communication and promotion material, subcontracting	€ 10,000 per country (approx € 150,000)	Membership fee
FAs	5-6 meetings per year; development of joint calls; development of new instruments; support in strategy development; national coordination; participation in AGORA events	€ 250,000	In-kind
GB	2 meetings per year; support in strategy development; national coordination; participation in AGORA events; efforts of GB Chairs on policy coordination;	€ 250,000	In-kind
Total budget	**per year**	**€ 1,450,000**	

2.3 Governance

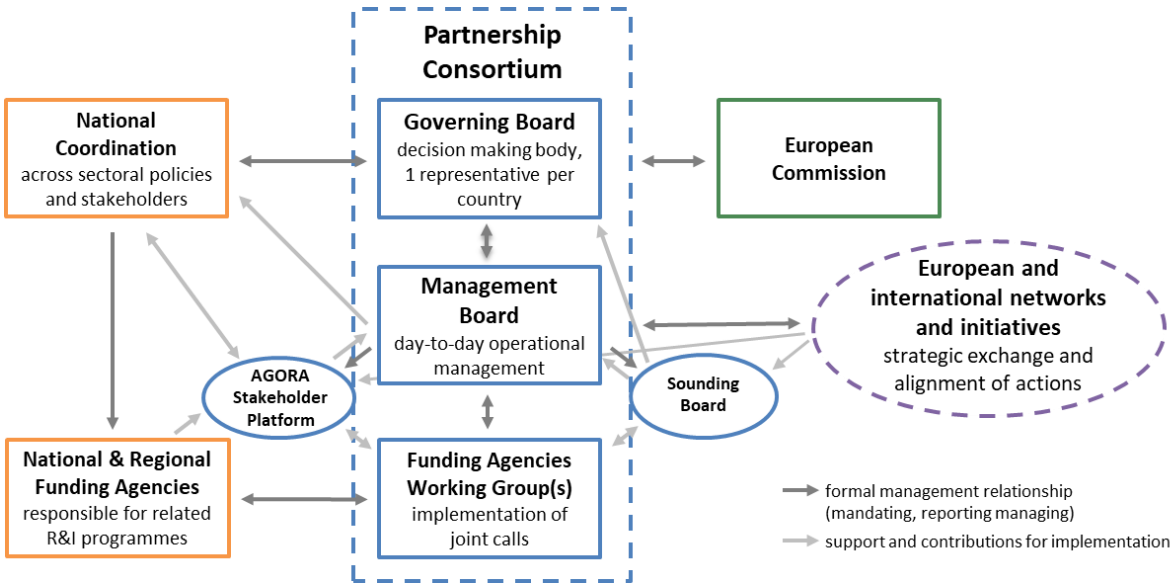

Figure 10: scheme of the governance system.

The **Governing Board (GB)** is the ultimate decision-making authority of the partnership and responsible for the overall strategic orientation, including connection to the EU and national policies, priorities and budgets. All partners in the consortium have a seat on the GB and are required to bring decision-making authority for their country. EC acts as an observer in the Governing Board. Terms of References will be agreed upon, specifying the main tasks and working procedures among the partners as well as in relation to the EC, MB and other bodies. The GB members are also responsible for establishing national coordination mechanisms appropriate to prepare national/regional decisions, ensure mobilization of national stakeholders and actors and align the partnership with national programmes.

The **Management Board (MB)** is responsible for the operational management and coordination of the partnership, including the development and implementation of the partnership's portfolio, the monitoring of the agreed implementation actions, the

stakeholder involvement, as well as the relationship management with related national, European and international networks and initiatives. The MB cooperates with the funding agencies on the preparation of calls, coordinates the AGORA Stakeholder Platform as well as the Advisory Boards established. In cooperation with all relevant partners and bodies (including SET Plan Working Groups, neighbouring partnerships, stakeholder networks, etc.), the MB is responsible for preparing the annual work plans as well as the reporting towards GB and EC.

The **Funding Agencies Working Group (FAWG)** is the panel of national, regional or international R&I funding agencies that are interested in participating in joint calls. Efforts will be taken to ensure a representation of funding agencies along the entire innovation cycle in each country – from science funds up to innovation agencies. Subpanels might be established to allow an efficient management of calls.

The funding agencies are independent public organisations, responsible only to their own government. In the management structure they are therefore present not in the form of a board but as a working group of independent actors. Unlike the GB and MB, which can make decisions by majority, each funding agency always retains its sovereignty. The FAWG is chaired and supported by the MB.

Besides the formal bodies and panels of the partnership governance, two mechanisms will be put in place to support co-creation of the partnerships' programme with (1) a wider range of urban stakeholders across European countries and beyond and (2) representatives from stakeholder networks. Accordingly, these two mechanisms comprise

(1) shaping and managing an open platform (AGORA) for all stakeholder groups to engage, contribute to and benefit from the partnership's activities;
(2) establishing a Sounding Board to ensure a close cooperation and exchange on strategic and operational level with the aim to consider latest scientific developments, create synergies with other partnerships' activities and align strategies and actions with related networks.

The **AGORA Stakeholder Platform** represents open and flexible formats to mobilise, engage and inform urban stakeholders, from representatives of municipalities and city administration to business, entrepreneurs, social innovators and local initiatives up to researchers from various disciplines. Low-threshold settings are The AGORA represents one of the key actions to support co-creation of strategic priorities and joint actions, disseminate research results and reflect on their potential for policy makers and business. AGORA activities are regularly organised as highly interactive events, as places for encounter and dialogue[29]. Possible AGORA formats comprise strategic dialogues, thematic workshops, webinars or open consultations.

Besides shaping an open platform for all stakeholder groups to engage in the partnership, a **Sounding Board** will be established to ensure alignment with other networks and partnerships at the European and international level. Through the Sounding Board a continued and longer-term cooperation with key experts and networks is aimed at that offer reflections on the strategic orientation and the identification of synergies through aligned and

[29] The AGORA formats have been developed in the EXPAND project (H2020 funded CSA, grant agreement No 726744), see also the report: AGORA – The JPI Urban Europe's Stakeholder Involvement Platform, the Validated SIP Concept, March 2019.

joint actions. The Sounding Board will be composed of representatives of urban stakeholder and research networks as well as representatives of other partnerships, as indicated in the second ring of partners in Figure 7. Formats for interaction with the Sounding Board will tackle a strategic and an operational level:

- Strategic cooperation: a regular exchange with Member States representatives, e.g. with the Governing Board, will be facilitated to jointly reflect on strategic matters regarding the further development of the partnership and its thematic priorities and key implementation measures.
- Operational cooperation: a formalised process will be established to ensure cooperation on various implementation actions, e.g.
    - Regular exchange with the Sounding Board to ensure an alignment of actions across all involved parties;
    - Development of joint actions with selected Sounding Board members and networks/partnerships, in terms of mobilisation efforts, communication and dissemination, co-organisation of events, trainings, etc.;
    - Involvement of the Sounding Board in the process of preparing annual work plans and calls to align with other partnerships and address key challenges of urban practitioners.

Complementing the governance on transnational level, some elements need to be mirrored at national level. Cross-policy coordination as well as multi-stakeholder engagement must be ensured in the partner countries to maximise impact and synergies.

A **national coordination mechanism** is called for to allow cross-policy coordination at national level and a consideration of national and local conditions for urban transitions. This coordination mechanism must fit the particular requirements and conditions of the national R&I community as well as the urban policy framework, each country needs to develop and implement its own specific model. In any case, such a national coordination should support the following aims:

- establish and coordinate dialogues with sectoral policies, ministries in charge of urban-related matters, cities, municipalities and related national stakeholder organisations and networks to assess local/national priorities and provide evidence for policy making;
- facilitate an exchange among different national and regional funding agencies along the innovation cycle and promote the participation in the partnership;
- support the advancement of national or regional framework conditions towards funding for all stakeholder groups to strengthen transformative research and innovation;
- disseminate results of transnational R&I projects and the created evidence, policy recommendations and good practice on national and regional level to enhance the impact.

2.4 Openness and transparency

As indicated in Figure 11, a process is proposed and has been agreed with core partners (see Table 4) for the further elaboration of the partnership. The following key elements will be applied:

- Regular information to Member States through the Horizon Europe Programme Committee to allow all countries to assess possible participation;
- Regular exchanges have taken place with the Commission's DUT partnership owners group to inform and receive feedback during the drafting of the partnership proposal as well as direct involvement of EC representatives in the planned workshops and consultations to ensure alignment with other planned EU activities and relevant EU policies.
- Workshop with interested partners from Member States and related networks to discuss the concept, reflect on the vision, objectives and key implementation measures as well as identify potentials for cooperation with national programmes as well as other networks and partnerships;
- National consultations will be used to promote linkages with national strategies and programmes and to support decision making on national commitments;
- A public consultation was carried out (March-April) to allow a wider community to contribute to the development of the work plan and raise awareness of the upcoming initiative;
- Organisation of a multi-stakeholder dialogue (AGORA) to allow interested stakeholders from public authorities, infrastructure and service providers, business, local initiatives and research to engage in the development of the work plan. This event will be broadly announced and will also be open for international participation;
- New countries have been already approached in this phase and the efforts to inform potential new partners about the partnership and assess their opportunities and priorities to join the network will continue throughout the process. This also includes international partners;
- Meetings with committed partners will be organised to co-design the governance model and agree on the work plan;
- Exchanges with related networks and neighbouring partnerships are taking place throughout the drafting process and will continue during the further preparation process to specify possible modes of interaction and cooperation.

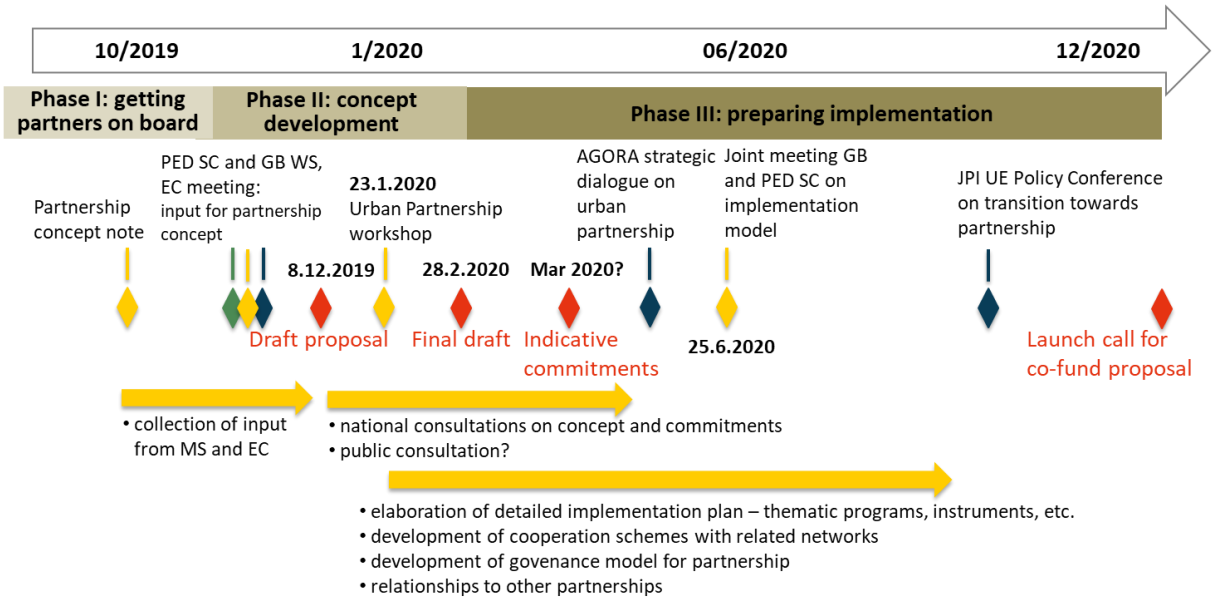

Figure 11: Indicative process to prepare the partnership

Strategy to mobilise and involve stakeholders

It is one of the partnership objectives to ensure availability and accessibility of results for urban stakeholders, policy and decision makers. City authorities call for better models and stronger efforts to take advantage and use of research results and some cities across Europe agreed to team up to exchange and cooperate on this matter.[30] The partnership will support such ambitions and set up dedicated actions to strengthen relevance of R&I for all stakeholder groups and foster dissemination, exploitation up to replication.

Challenge-driven R&I and Urban Living Labs:

As outlined in the work plan challenge-driven R&I will be a central element to ensure that R&I is oriented towards practitioners needs. This requires involvement of urban actors in all phases, from specifying research issues up to involvement in R&I projects. Experiences have already been made with formats to mobilise and engage practitioners and representatives of urban municipalities and city administrations (AGORA). Such stakeholders will be invited to share their needs, co-design R&I issue articulation and reflect on R&I results. Furthemore, they will provide clear overviews of how city authorities can engage in the partnership beyond the calls. A crucial element in this development is to continue looking into formats fit for small and medium sized cities.

Participation of municipalities and city administration in R&I projects:

Co-design of new solutions and approaches is seen as essential to pave the way towards a wider use of research results and achieve a higher awareness towards required changes as well as preparedness to follow-up with implementation actions. This calls for a strong involvement of public authorities, city administration and business in research and innovation. At the same time, not all funding agencies are allowed or able to fund such partners. To overcome these limitations the following measures have been identified in a self-evaluation and are considered for the implementation of the partnership:

- Encourage countries and funding agencies to review their opportunities to support cities and other urban stakeholders as project partners with funding for personnel and travel as well as mobilise additional agencies that can fund these partners;
- Make call texts and framework conditions more attractive for municipalities, cities, business and civic organisations;
- Consider alternative measures to ensure reimbursement of municipal/city administrations' travel and personnel costs;
- Mobilize policy makers and regulatory bodies in order to create a conducive and fair legal environment to support innovation in sustainable urban areas.

Communication and dissemination:

Appropriate formats for communication and dissemination will be provided, including a website, newsletters, social media, regular conferences, workshops, seminars to reach different target groups. Good experiences have been made with special webinars targeting a broad set of urban stakeholders to trigger debates on key issues, raise awareness and promote research results. Special requirements will be introduced to certain projects to

[30] City Science Initiative

provide policy briefs, guidelines and other target group specific information. Support will be given to develop such material and disseminate it through various channels. In addition, special attention will be given to models for replication and mainstreaming.

Partner recruitment strategy

The partnership can already build upon a strong network:

- 20 European member states are cooperating since 2010 on matters related to urban transitions;
- a community of practice has been established through the AGORA including representatives from city administration, municipalities, local initiatives, infrastructure providers, social innovators, universities, RTOs from across Europe and beyond;
- relationships with various networks and initiatives have been established as indicated in Figure 12.

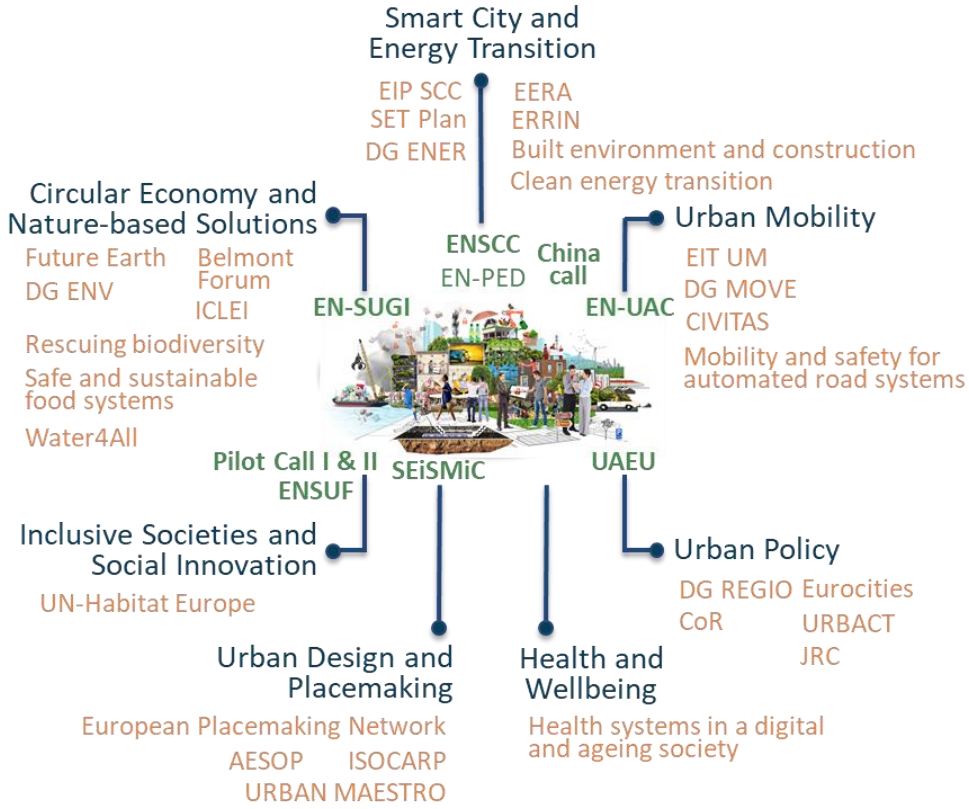

Figure 12: established relationships of the partnership based on previous calls and ERA-NETs of the partners countries.

However, continued efforts are needed to widen the network to ensure a full geographical coverage in Europe, reach out to and mobilise as many cities, towns and urban communities as possible. In this regard teaming up with other networks, platforms and initiatives is seen as important as it will facilitate

The recruitment strategy of the partnership aims at addressing different target groups on four levels as indicated in Table 6.

Table 6: target group specific recruitment strategy.

Target group	Aim	Action
Countries and regions	Mobilisation of new countries and partners	Missions to new countries, identification of key actors, analysis of their urban challenges and priorities, establishment of working relationships
R&I programme owners and funding agencies	Recruitment of new agencies in all partner countries along the innovation cycle	Identification and relationship building to new funding agencies, invitation to join the FAWG and assess cooperation opportunities, regular information on upcoming calls, involvement in strategic and call preparation events
Urban stakeholders and researchers	Mobilisation of municipalities, city administration, infrastructure and service providers, real estate, planners, local initiatives, societal actors, researchers, etc.	Most of the planned communication and dissemination activities are addressing the wide spectrum of urban stakeholders, AGORA dialogues and workshops, webinars, conference sessions are open for all interested parties. Promotion of such events will be done in cooperation with national, regional and local partners to ensure wider outreach.
Networks and partnerships	Relationships and cooperation with relevant (sectoral) European and international networks	Screening of relevant networks, initiatives and organisations will be carried out. Conferences will be used to (1) promote the partnership and (2) assess opportunities for cooperation with other networks. Specific interfaces will be developed with selected partnerships under Horizon Europe.

3 Annex 1: SRIA 2.0 Process

This strategy was developed in a highly co-creative process, starting with and building upon the long-term vision that was requested by GPC, including the following steps (see Figure 13):

- The development of a position paper of the **Scientific Advisory Board** of JPI Urban Europe[31]. Focus of the position paper was to propose a strategic reference on how to connect to the SDGs and other international policies and to provide recommendations for key elements of the SRIA.
- An **open consultation** to collect input and views of urban stakeholders on thematic priorities as well as on strategic elements addressed in the SAB position paper, related to the implementation of the research and innovation agenda, such as enhanced science-policy cooperation, capacity building in research and policy as well as benefits of and conditions for transnational and international cooperation. More than 80 responses were received from researchers, city administration, public bodies and business from across Europe and beyond.
- In addition, the **Urban Europe Research Alliance**, a network of European research organisations addressing urban research issues and supporting the implementation of the JPI Urban Europe SRIA, provided a consolidated response to the consultation[32].
- A **Stakeholder Dialogue** was organised to reflect and consolidate the consultation results towards key issues for the SRIA. Again, the Stakeholder Dialogue brought together urban stakeholders from most of the JPI Urban Europe partner countries, involving policy makers, researchers, city administration, city networks, societal actors and research funders.
- All this input was used to develop a SRIA concept which was not only discussed with the Scientific Advisory Board and the Governing Board but was also put forward for **national consultations**. This allowed to reflect the SRIA concept and its proposed priorities against national ones, to align the agenda with national, regional and municipal strategies and programmes and to mobilise urban actors. National feedback was received from 10 countries.
- Additional consultations were organized with the partnerships of the Urban Agenda for the EU. These partnerships address key issues for sustainable urban development and identified needs for action regarding better knowledge, better regulation and better funding. As several of these have elaborated joint action plans it was thought highly relevant to align the SRIA 2.0 with those actions and priorities. Thus, a consultation workshop was carried out with the **coordinators of the UAEU partnerships**.
- Finally, a **consultation with the European commission** was used to consider priorities of the various urban-related EC units under Horizon 2020 and to anticipate those of Horizon Europe with the ambition to ensure complementarity and well-structured interfaces in support of future cooperation.

[31] Reference SAB position paper

[32] Reference to UERA position paper

- All this input was consolidated and resulted in the SRIA 2.0 concept, its thematic priorities and work plan.

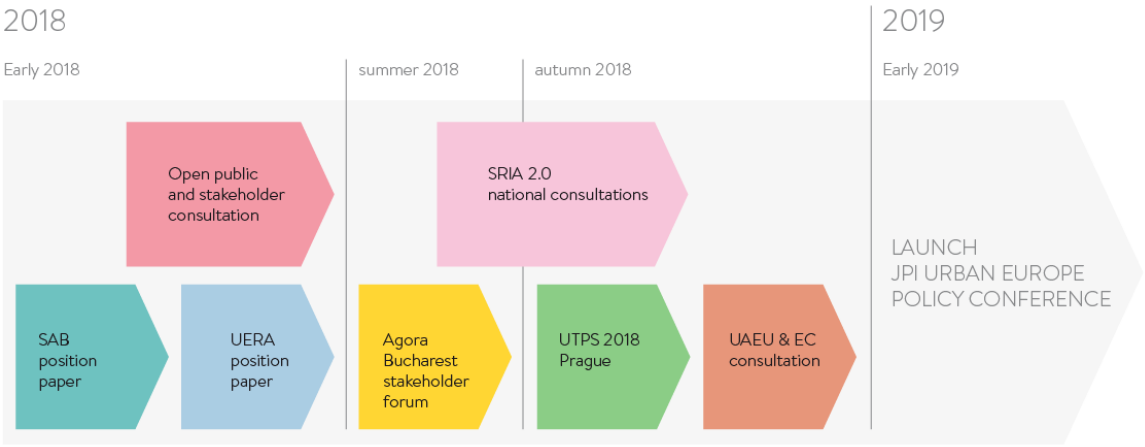

Figure 13: Key elements of the SRIA 2.0 process and timeline

4 Annex 2: Existing Member States networks

Since 2010, 20 Member States and Associated Countries have been cooperating in **JPI Urban Europe**, a R&I initiative addressing the challenges of sustainable urban development with an integrated, inter- and transdisciplinary approach[33]. The success of the JPI Urban Europe is based on

- a shared vision, put down in the form of a Strategic Research and Innovation Agenda (SRIA),
- a multi-annual R&I programme set out to implement the SRIA,
- a Funding Agencies Working Group (FAWG) to set up and run the annual joint R&I calls,
- a Stakeholder Platform (AGORA) to keep in touch with the problem owners, industry and research,
- a network of R&I institutions under the name of Urban Europe Research Alliance (UERA),
- and a Programme Management Team, which forms the hub of all activities and keeps the evolution of the network going.

Through all these measures a community of practice has been developed to address key issues such as how to benefit from smart city approaches, nature-based solutions or innovative mobility systems, how to encourage local co-creation and experimentation to build the ground for change on organisational and individual level or how to support decision making and urban governance. With the ambition to create scientific evidence and good practice not only research projects were funded but actions were taken to mobilise stakeholders, make research results accessible for decision makers, and improve funding formats to better meet the needs of urban stakeholders. So far about 100 million Euro have been spent in 7 calls for R&I projects, resulting in more than 80 research and innovation projects funded since 2012, involving almost 500 project partners. Experiences have been made with different forms of Urban Living Labs to strengthen co-creation of new solutions throughout Europe.

In addition to these joint efforts, the research and innovation programme on **Positive Energy Districts and Neighbourhoods** (PED) was started in 2018, as one of the actions related to the **SET Plan implementation**. This programme which aims at initiating 100 PEDs is jointly implemented by JPI Urban Europe and the SET Plan Action 3.2. Additional formats are under development considering the establishment of a cities panel, mobilizing stakeholders from municipalities, planners, real estate, construction industry, etc. With its focus on a particular thematic area in the context of sustainable urban development and its holistic approach towards PEDs, the PED programme covers a specific area within the wider JPI Urban Europe ambition and agenda. At the same time, it widens the portfolio of activities and mobilises new stakeholder groups.

[33] More information on activities and projects is available at www.jpi-urbaneurope.eu