Research and competitiveness for circular economy in cities

European Framework

Circular economy in cities: URBANREC final conference 6/11/2019
FP6, FP7, H2020 Evidence knowledge base

✓ Substantial evidence knowledge obtained from EU Research Framework Programmes over the last 30 years (FP5, FP6, FP7 and H2020)

✓ Overall, **Horizon 2020 funded 3.1 billion EUR** for calls 2014-2020 dealing with Smart and Sustainable cities.
30 years of EU funded Urban development EUR ~1 billion
Horizon 2020 EUR ~3,1 billion for 612 projects
R&I Actions EUR ~12 million, ~30 participants

200 cities: hubs of Innovation & Living Labs
EU H2020 calls on Cities (2016-2019)

- Climate and Water Resilient cities
- Inclusive Urban Regeneration
- New business and governance models
- Circular and regenerative cities (GA started in June 2019)

- Citizens in EU cities successfully replicate and upscale best practices
  Systemic and cross-sectorial solutions that combine technological, digital, social and nature-based innovation;
  - SC5-13-2019: Nature-based solutions for restoration and rehabilitation of urban ecosystems
  - SC5-14-2019: Visionary and integrated solutions to improve well-being and health in cities (Call under evaluation-results in October 2019)
  - SC5-23-2019: Multi-stakeholder dialogue platform
  - SC5-20-2019: Transforming historic urban areas and/or cultural landscapes into hubs of entrepreneurship and social and cultural integration
  - SC5-2019: NBS to improve air quality in cities
Practical Information:

• Focus area: Building a low-carbon, climate resilience future

• Innovation Action (IA)

• Evaluation Process: Two-stage

• Planned opening date: **12 November 2019**

• Deadlines: First Stage: **13 February 2020**
  Second Stage: **3 September 2020**

• EU contribution in the range of EUR **30 million (~10 million per project)**
H2020 projects in and with cities

EASME Unit B.2
RTD D.2
H2020 Projects tackling Circular Economy

Projects on:
• Systemic services for circular economy
• Circular value and supply chain
• Circular and regenerative cities
• Cultural heritage reuse in a circular economy approach
• Water and waste management
• Urban metabolism

Total: 30 projects

* Data on projects managed by EASME B.2 for cities-related projects under SC5 of H2020 funded between 2014-2019
The main objective is to demonstrate the value of integrating and validating **20 eco-innovative** solutions that cover all the waste value chain.

The benefits of these solutions will be enhanced by a holistic waste data management methodology, and will be demonstrated in **4 complementary urban areas in Europe**.
Coordinator: KOBENHAVNS KOMMUNE (DK)
Beneficiaries: 24 (DK, IT, PT, DE)
EU contribution: 9,724,969 €
Duration: 48 months (Started: September 2016)

The four cities involved in the project, Copenhagen, Hamburg, Lisbon and Genoa, will engage enterprises, citizens and academia in 16 participatory value chain based partnerships to create and develop eco-innovative solutions.

Demos
- Copenhagen: mixed plastic waste
- Genoa: wood waste
- Hamburg: WEEE
- Lisbon: food

Thematic: Reduction of plastics, bio-based materials, fueling CE

http://www.ce-force.eu/
Develop 18 advanced Digital Solutions (DS) regarding groundwater management, sewer maintenance and operation, WW treatment and reuse and urban bathing water management.

Demonstrate the DS in 5 European urban and peri-urban areas: Berlin, Milan, Copenhagen, Paris and Sofia.

Contribute to the protection of human health, the increase of performance and ROI of water infrastructures and the involvement of citizens.

Coordinator: KWB KOMPENTENTZZENTRUM WASSER BERLIN GEMEINNUTZIGE GMBH (DE)

Beneficiaries: 24 (DE, DK, FR, IL, BG, IT, BE, ES, NO, NL)

EU contribution: € 4,999,557,15

Duration: 42 months (Start: 1ST June 2019)

Thematic: Water-Waste-City nexus
Projects on adaptive reuse of heritage
CLIC - Circular models Leveraging Investments in Cultural heritage adaptive reuse

- CLIC applies the circular economy principles to cultural heritage adaptive reuse

- Reuse of cultural heritage is seen as a mean to circularize the flows of raw-materials, energy, cultural capital as well as social capital

Thematic: Circular cities

- 15 partners
- 4 pilots
- €4,957,033 EU funding
- 1 startup competition
- 20 interaction moments
- 10 countries
• Design circular value chains to prevent C&D waste and reduce virgin material consumption
  ✓ **Material passports**
  ✓ **Reversible building design**
  ✓ **New business models**

  ➢ transform buildings to deliver new functions
  ➢ disassemble building components or material feedstock
  ➢ 6 pilots

**Coordinator:** Institut Bruxellois pour la Gestion de l'Environnement (BE)

**Beneficiaries:** 15 (BE, NL, DE, UK, SE, PT, BA)

**EU contribution:** € 8,858,766

**Duration:** 48 months (Started: September 2015)

Recovery and utilisation of nutrients for low impact fertiliser.

- Instrument: IA
- Total Cost: € 8523735,00
- EC Contribution: € 6239340,65
- Duration: 4 years (2017-2021)
- Project Coordinator: AQUALIA (ES)
Projects on circular and regenerative cities and building materials

REFLOW- constRuctive mEtabolic processes For materiaL fLOWs in urban and peri-urban environments across Europe

Circuit- Circular Construction In Regenerative Cities

CINDERELA - New Circular Economy Business Model for More Sustainable Urban Construction
Coordinator: AIMPLAS (ES)
Beneficiaries: 21 (ES, BE, FR, DE, PL, PT, TR)
EU contribution: 8.618.970 €
Duration: 42 months (Started: June 2016)

Objectives
- develop and implement a bulky waste management system
- enhance prevention, improve logistics, obtain high added value recycled products, e.g. adhesives, foams, new hard plastics, textiles, chemicals and fuels.

Methods
Demonstration in 4 complementary urban areas (Belgium, Spain, Poland and Turkey)

http://www.urbanrec-project.eu/
Scaling up Innovation from local to.... global

“internationalisation, interoperability, replicability and more”

How to scale-up solutions in European cities and beyond, to share the best practice experiences from past/ongoing projects, what are the key elements to make the projects successful.

**EU R&I Networking Events:**

ENoLL Open Days  
Thessaloniki, 3-5 Sept 2019  
DG R&I and EASME workshop

WORLD URBAN FORUM  
Abu Dhabi, 8–13 February 2020  
(networking session to be confirmed)
High-Level Expert Group Report on Innovating Cities (i)

✓ Assist the Commission in formulating a R&I Policy Framework for Cities of the Future (e.g. feedback to Cities Mission);
✓ Foster a systemic and cross-sectorial ‘urban ecosystem’ framework to guide investments in EU R&I actions on Innovating Cities in Horizon Europe;
High-Level Expert Group Report on Innovating Cities (ii)

- HLEG launched on 12 June 2018;
- The report promotes a systemic and cross-sectorial approach and goes beyond sectorial silos;
- It addresses inter-linked urban challenges and nexus approaches related to mobility, energy, climate change, water, waste, resource efficiency, pollution, health, well-being and social inclusion, circular economy, natural resources;
- Ensures alignment with the EU STRIA for mobility, SET Plan, COP21 Paris Agreement, IPCC 1.5 Global Warming report, Global Covenant Mayors Agenda “Innovate4Cities”, Urban Agenda for the EU, UN Habitat new Urban Agenda, JPI Urban Europe Strategic Agenda 2.0, Action Plan on Circular Economy, ECTP Horizon Europe Position Paper, etc.;
High-Level Expert Group Report on Innovating Cities (iii)

- HLEG report will go online by November 2019;
- It has been presented and validated during the European R&I Days on 24, 25 September (Cities Mission, Europe’s Clean Energy and City as Innovation Labs), and received a very positive feedback;
- It promotes innovative urban design and planning, new governance, business and financial models across scales and foster, multi-stakeholder and participatory city-making processes and citizens’ engagement and empowerment in decision making;
- 9 High level experts covering multiple fields + 2 observers
- Chair: Charles Landry (Creative Cities)
- Rapporteur: Riccardo Crescenzi (Economist, ERC)
Chapters of HLEG REPORT INNOVATING CITIES to be delivered 20 July (iv)

- Setting the Scene
- People
- Place (Place based R&I dealing with energy efficiency, mobility, resilient and sustainable construction)
- Prosperity (Economy)
- Cross-cutting issues:
  - Governance
  - Measurements, impact evaluation
  - What success looks like
- Separate volume: PUBLIC SUMMARY (4pages)
The Human Centred City: Aligned with seven agreed global agendas

- the UN SDGs & especially SDG 11
- the Paris Agreement on Climate Change
- the Habitat III New Urban Agenda
- the Urban Agenda for the EU
- the Sendai Framework for Disaster Risk Reduction 2015-2030
- the World Urban Forum meetings consensus
- The Global Solutions Summit linked to the G20
The Human Centred City: Rights & Responsibilities is:

- A city for citizens
- Citizens are city makers
- Citizens are shapers, makers co-creators of evolving city

This is the ‘right to the city’

- This is **not** an entitlement - > active citizenship

This is the ‘**co-responsibility**’ for addressing the big issues
Managing the transition: To overcome the systemic crisis

- Addressing the risk nexus
- Reassessing the economic order
- Operating with planetary boundaries
- Guiding the digitizing age
- Being inclusive, safe, resilient & sustainable
Urban Infrastructures: Context & key issues

Cities are metabolisms: They marshal, consume, process, import, export flows of resources - materials, goods, energy

Responsible for 2/3 of energy consumption & 70% CO2 emission

Sectors with main impact: Built environment, transportation, waste.
Critical issue 2: Circularity & sharing R&I actions

The key: Cradle to cradle business models

End the 'end of life cycle': reuse & recycle

New materials recyclable by design

Adaptive reuse, use smarts, bioclimatic design

Develop eco-friendly planning & design logic

Rethink all food cycles & food packaging

Imaginative waste & sewage systems
KEY MESSAGES & RECOMMENDATIONS

These highlights will contribute to the first 100 days of President-elect van der Leyen. More specifically, they will support the Climate Action and Green Deal Initiative: they aim to deliver an ambitious research, innovation and investment agenda notably for clean energy and mobility, zero-carbon circular cities, natural resources, climate resilience, and social innovation;

2030 innovative cities will operate as climate neutral and smart, citizen-centric, sustainable, inclusive, resilient and safe systems. The aim is to enhance the cities innovation capacity to address global urban challenges with a holistic view.
CHAPTER « PEOPLE »

It highlights the importance of making the most of the diversity and social inclusion, creating a city open for all, engaging and empowering citizens not just as residents but as actors of ‘Climate-neutral and Smart Cities’.

**Key R&I recommendations:**
- To address issues (e.g. social exclusion, inequalities and spatial segregation) by promoting cultural diversity, enhancing collective experience, building social bonding and achieving an inclusive city with services accessible to all.
- To understand the bonds, identify the drivers of well-being and lifestyles, social integration and cohesive communities and assess the impact of innovative zones of encounter as places of social cohesion, intercultural exchange between all age groups.
CHAPTER « PLACE »

The ‘place’ dimension advocates for innovative and circular urban planning and place-making to address key challenges (e.g. climate change, water and food insecurity, circular economy, energy and mobility issues, resource shortages) within planetary boundaries. This human centred urban planning and design is based on new business models.

Key R&I recommendations
- To promote (through integrated and innovative urban planning and design), high-performance built environments, liveable and inclusive cities that drive the circular economy agenda and unlock environmental and socioeconomic benefits, and give a direction towards sustainable economic growth, quality of life and social cohesion.
To improve the resilience to climate change, limit the global warming to 1.5 and achieve climate neutral cities. Decarbonisation needs to happen in the areas of energy, mobility, industry, agriculture and the built environment. The recommendations are zero positive city neighbourhoods, energy efficiency, clean energy, urban regeneration, adaptive reuse, quality place making (by recovering abandoned city areas).
CHAPTER ‘PROSPERITY’

The ‘prosperity’ dimension focuses on how the economy influences sustainable urban development and generates public value, with innovative solutions to build prosperous and resilient local economies in cities. It underlines the importance for cities to be part of global networks of capital, skills, knowledge and trade (of goods and services) and it calls for models able to finance public services and urban policies.

Key R&I recommendations
- To promote innovative urban ecosystems and inclusive, diverse, creative, cultural cities based on a new innovative approach to prosperity (e.g. generate innovation, jobs, equal distribution of opportunities for all citizens).
- To promote globally connected cities taking into account socio-economic conditions, technological capabilities, innovation potential, absorptive capacity and high-quality governance.
CHAPTER ‘RESILIENCE’

The ‘resilience’ dimension requires looking into the city as a system of systems, understanding what is the essence of the city and the major risks it faces (climate change, cyber dependency, energy efficiency, water and food, infrastructure resilience, social conflicts, economic unrest and public health risks) and their interdependency.

**Key R&I recommendations**

- To advance urban resilience, focusing on the understanding of the institutional and social capacity of cities and citizens to design and implement robust plans and respond to potential risk shocks.
- To futureproof and enhance the performance of the most valuable city systems to address major risks (e.g. climate change, cyber dependency...) and reach targets set out by international agreements (such as Paris COP 21...).
Cross-Cutting Chapter ‘Governance’ & Measurement of impact

- To define urban governance: understanding complexities and the way cities are governed.
- To explore how innovative governance of tomorrow’s cities, relying on citizens’ engagement, will lead to a sustainable management of urban resources (e.g. public spaces, housing, resources...).
- There is a need to create measurement tools to assess cities performance.
- To promote education, training and culture of measurement and evaluation through the active participation of citizens (as generators, validators and users of their own city-level data).
Cities Event 21 March
(Policy recommendations + PPTs)

https://ec.europa.eu/research/environment/index.cfm?pg=events&eventcode=00E50670-BD47-1111-D5C967361D6887E9
EU R&I Urban Booklet on EU funded project success stories

✓ Investing in European Success: Innovating Cities in Europe and worldwide (available on-line)
Yearly mapping of all Commission urban activities and initiatives under update process for 2019

- EU Research and Innovation for and with Cities
- Facts & Figures on H2020, FP7, FP6 and FP5
- Annex with detailed project overview of H2020, FP7, FP6 and FP5
Innovating Cities Outreach

✓ Innovating Cities web page

✓ Commission TOPIC PAGE
  https://ec.europa.eu/info/events/cities

✓ YEARLY MAPPING REPORT
  https://publications.europa.eu/s/fGbs
  executive one pager summary of this report:
  http://europa.eu/!NU39Mx
Horizon Europe
R&I Missions are...

Portfolios of actions across disciplines

intended to achieve a bold, inspirational and measurable goal within a set timeframe

with impact for society and policy making as well as relevance for a significant part of the European population and wide range of European citizens.
R&I Missions will...
relate EU’s research and innovation better to society and citizens' needs;
with strong visibility and impact
Lamy Report (2012)
Mission-oriented research and innovation

Key recommendations:
a) Build a true EU innovation policy that creates future markets
b) Design the EU R&I programme for greater impact
c) Adopt a mission-oriented, impact-focused approach to address global challenges
d) Privilege impact over process
e) Mobilise and involve citizens
f) Align EU, national and private R&I investments
g) Capture and better communicate impact

R&I Missions should...

a) Be bold and inspirational, with wide societal relevance;

b) Indicate a clear direction: targeted, measurable and time-bound;

c) Be ambitious but realistic research and innovation actions;

d) Spark innovation across disciplines, sectors and actors;

e) Drive multiple, bottom-up solutions.
Key recommendations:

• Engage citizens in co-designing, co-creating, co-implementing and co-assessing missions

• Innovation in public sector capabilities

• Mission-oriented finance and funding to leverage and crowd-in other forms of finance
Adaptation to climate change, including societal transformation

**5 Mission areas**

- Healthy oceans, seas, coastal and inland waters
- Climate-neutral and smart cities
- Soil health and food
- Cancer
Chairs of the Mission Boards

Adaptation to Climate Change including Societal Transformation:
Ms Connie Hedegaard

Cancer:
Prof Harald zur Hausen

Healthy Oceans, Seas, Coastal and inland Waters:
Mr Pascal Lamy

Climate-Neutral and Smart Cities:
Ms Hanna Gronkiewicz-Waltz

Soil health and Food:
Mr Cees Veerman
Cities Mission (1)

✓ ‘Mission' means a portfolio of excellence-based and impact-driven R&I actions across disciplines and sectors, intended to:

✓ achieve, within a set timeframe, a measurable goal that could not be achieved through individual actions;

✓ have impact on society and policy-making through; science and technology, and

✓ be relevant for a significant part of the European population and a wide range of European citizens;
Cities Mission (2)

✓ using SDGs as sources for design and implementation;
✓ clear research and innovation content and EU-added value;
✓ contributes to reaching Union priorities and commitments and Horizon Europe programme objectives;
✓ covers areas of common European relevance;
✓ is inclusive, broad engagement of various types of stakeholders from public and private sectors, including citizens and end-users;
✓ will deliver R&I results that could benefit all Member States;
✓ scientific, technological, societal, economic, environmental policy relevance and impact;

Credits: https://www.un.org/sustainabledevelopment/sustainable-development-goals/
Cities Mission (3)

✓ clear targeted, measurable objectives and clear budget frame;
✓ have the necessary scope, scale and mobilization of the resources and leverage of additional public and private funds required to deliver the mission outcome;
✓ stimulate activity across disciplines (including Social Sciences and Humanities) and encompassing activities from a broad range of TRLs, including lower TRLs;
✓ open to multiple, diverse solutions considering societal needs and benefits
✓ benefit from synergies with other Union & National programmes;
Mission on Climate Neutral Smart Cities

R&I Missions

Connect Europe closer to its citizens and key role of Cities

Cities will be central to deliver on Research and Innovation Policy. Commission’s proposal for Horizon Europe, Urban R&I Actions will be funded under several clusters within the Global Challenges and Industrial Competitiveness pillar.

The Cluster on Climate, Energy and Mobility foresees an Intervention area on ‘Cities and Communities’ that aims to significantly increase the overall energy and resource efficiency, improve the climate-resilience and reduce the environmental footprint of the cities, promote safe mobility, improve cities' regenerative capacity, whilst enhancing the quality of life for the citizens.

Cross-disciplinary, cross-actor and cross-sector collaborations.
Timeline & Deliverables

2019

October 2019 – A short input on Mission Board approach
• Strategy on outreach, citizen engagement and co-design;
• Evidence-based, use of foresight, scoping options for the identification of missions;

December 2019 – 1st draft list of proposed Missions
• Objectives & rationale of the mission (business case);
• Targets, KPIs and expected impact;
• Technical challenge & feasibility;
• Overall policy for portfolio composition (the main building blocks of the mission);
• Possible framework conditions to be developed or modified (e.g. standards or regulatory needs);
• Potential synergies with other EU funds and policies & with Member States' actions.

Meeting with Member States
Timeline & Deliverables

2020

January 2020 – Confirmation of proposed Missions

Early 2020 - Meeting with Assembly & Member States

From Jan. 2020

• Advisory role to the European Commission on the preparation of the calls on Missions for the first work programme for Horizon Europe;

• Outreach activities to engage Member States and general public

By end of 2020 - Report with Mission Board advice, overall recommendations & pending issues to be taken forward
European Partnerships

#HorizonEU
Lessons Learned
from Horizon 2020 Interim Evaluation

- Support breakthrough innovation
- Create more impact through mission-orientation and citizens' involvement
- Strengthen international cooperation
- Reinforce openness
- Rationalise the funding landscape

Key Novelties in Horizon Europe

- European Innovation Council
- R&I Missions
- Extended association possibilities
- Open science policy
- New approach to Partnerships
New approach to partnerships: why?

- Need to **rationalise** the European R&I partnerships landscape
- Need to improve the **openness** and transparency of R&I partnerships
- Need to **link** the R&I partnerships to future EU R&I missions and/or strategic priorities

Impact Assessment annex 8-5
## New approach to partnerships: why?

**Impact Assessment annex 8-5 – current partnership landscape**

<table>
<thead>
<tr>
<th>Partnership approaches</th>
<th>Public-public partnerships (P2P)</th>
<th>Public-private partnerships (PPP)</th>
<th>EIT-KICs*</th>
<th>FET Flagships**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation modes</td>
<td>ERA-NET-Cofund, EJP Cofund, Article 185, Joint Programming Initiative (JPI)</td>
<td>Contractual Arrangement (cPPP) Article 187</td>
<td>H2020 Grant agreements for different types of actions Framework Partnership Agreements (FPA)</td>
<td></td>
</tr>
<tr>
<td>Currently active R&amp;I Partnerships (Horizon 2020)</td>
<td>a) ERA-NETs: ~70 b) EJP Cofund: 5 c) Article 185: 6 d) JPIs**: 10</td>
<td>a) JUs: 7 (+HPC) b) cPPPs: 10</td>
<td>a) KICs: 6 (+ 2 until 2020)</td>
<td>a) FET-Flagships: 2 (+Quantum)</td>
</tr>
<tr>
<td>Financial contribution from H2020, estimated)</td>
<td><strong>2.500 M€</strong> (3,1% of H2020 budget)</td>
<td><strong>13.450 M€</strong> (17,5% of H2020 budget)</td>
<td><strong>2.400 M€</strong> (3,1% of H2020 budget)</td>
<td><strong>1.000 M€</strong> (1,3% of H2020 budget)</td>
</tr>
</tbody>
</table>

*EIT-KICs: Knowledge and Innovation Communities (KICs) of the European Institute for Innovation and Technology (EIT)

**FET-Flagships: Flagships of the Future and Emerging Technologies programme (FET)

*** JPIs: Joint Programming Initiatives are no EU level instruments but included here as they receive EU support via ERA-NETs and/or CSAs
European Partnerships: what is new?

- Only support partnerships if there is evidence that they are more effectively achieving policy objectives than Horizon Europe alone
- Fewer partnerships with higher impacts
- Common and coherent framework of criteria along the life cycle of partnerships, across all pillars, even across programmes and other regulations (e.g. EIT, DEP, space)
- Unified umbrella branding to improve visibility
- Increase openness and encourage a broader set of actors to participate
- Improve coherence between partnerships and Horizon Europe, also the missions
- Time limited with conditions for phasing-out the Programme funding
European Partnerships and strategic planning

- Candidates for European Partnerships have been identified as part of the strategic planning;

- The Project Team of Commissioners for Innovation and Competitiveness endorsed in March 2019 the next steps of preparation (start of IA work, engagement with stakeholders, based on the criteria of Horizon Europe);

- Work within and across clusters has resulted in a consolidated portfolio of about 46 candidates for European partnerships;

- For each partnership candidate services have prepared a fiche that builds the basis for the next steps of preparation, and the structured consultation of member States;

- List of 44 partnership candidates is part of the Orientation towards the Strategic R&I plan (Annex 7).
Portfolio of candidates for European Partnerships

**HEALTH**
- EU-Africa Global Health
- Innovative Health Initiative
- Chemicals Risk Assessment
- Fostering an ERA for Health research
- Large-scale innovation and transformation of health systems in a digital and ageing society
- Pre-clinical / clinical health research
- Personalised Medicine
- Rare Diseases

**DIGITAL, INDUSTRY AND SPACE**
- High Performance Computing
- Key Digital Technologies
- Smart Networks and Services
- AI, data and robotics
- Photonics Europe
- Clean Steel - Low Carbon Steelmaking
- European Metrology
- Made in Europe
- Carbon Neutral and Circular Industry
- Global competitive space systems

**FOOD, BIOECONOMY, NATURAL RESOURCES, AGRICULTURE AND ENVIRONMENT**
- Accelerating farming systems transition
- Animal health: Fighting infectious diseases
- Environmental Observations for a sustainable EU agriculture
- Rescuing biodiversity to safeguard life on Earth
- A climate neutral, sustainable and productive Blue Economy
- Safe and Sustainable Food System for People, Planet & Climate
- Circular bio-based Europe
- Water4All: Water security for the planet

**CLIMATE, ENERGY AND MOBILITY**
- Transforming Europe's rail system
- Integrated Air Traffic Management
- Clean Aviation
- Clean Hydrogen
- Built environment and construction
- Towards zero-emission road transport
- Mobility and Safety for Automated Road Transport
- Batteries
- Clean Energy Transition

**PILLAR III AND CROSS-PILLAR**
- EIT Climate KIC
- EIT Health
- EIT Manufacturing
- EIT Food
- EIT InnoEnergy
- EIT Manufacturing
- EIT Raw Materials
- EIT Digital
- EIT Urban Mobility

- Innovative SMEs
- European Open Science Could (EOSC)
Thank you for your attention!

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