This special series of EIT Climate-KIC Climate Innovation Insights captures key arguments, presentations and examples of our work that will be shared at various events during the first ever London Climate Action Week.

100 climate-neutral cities by 2030: A deep demonstration of rapid urban transformation

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Key messages

- By 2050, 80% of Europe's population will be urban[i]. Globally, urban migration is projected to add 2.5 billion to urban populations by 2050, with almost 90% of this growth happening in Asia and Africa[ii].
- Human settlements already exceed planetary resource capacity. Urbanisation will put even more pressure on all resource systems, infrastructure and city functions.
- Assertive, systems-literate interventions are essential in cities, and help is needed to shape, enable and support those interventions.
- With quality of life for citizens a key aim of city leaders, understanding the co-benefits of tackling the climate challenge and other societal challenges as a complex problem is a fundamental step towards realising carbon-reduction targets.
- The challenge of urban growth, and the opportunities linked to effective responses, cannot be achieved through distant, long-term ambition and incremental steps; a willingness to embrace a rapid, transformative agenda and experiment across multiple city systems is essential to any meaningful transition.
- EIT Climate-KIC is designing a 'Deep Demonstration' of what these systems-wide transitions could be like – called Healthy, Clean Cities – working with an initial cohort of ten cities across Europe.

Why tackle cities?

In 2015, almost 75% of Europe's population lived in cities; the projected increase is to 80% by 2050. Globally, this figure is even greater and, by 2030, the world is projected to have 43 megacities, most of them in developing regions[iii]. To put this growth in perspective:

- Cities cover less than 2 per cent of the earth's surface, but these urban areas consume 78% of the world's energy and produce more than 60% of all carbon emissions.
- Dense urban populations also are highly vulnerable to systemic risks in several forms: energy and water; food access; contagion; and catastrophic events (earthquakes, hurricanes, sea level rise). With over 90% of all urban areas in coastal ecosystems[iv], these risks can easily become

catastrophic scenarios.
- On average, urban land cover is expanding at twice the rate of urban population growth[v].

Future infrastructure must respond both to the pressures of urban growth and the need to transform how cities work if we are to create climate-resilient communities and keep global temperature rise to 1.5°C or below. We will need to go all in for radical shifts across multiple systems. For this, regulation and policy transformation is as important as innovation in the built environment.

Measures for climate-neutrality

Many sector-focused targets (around energy, buildings and transport, for example) have been established to indicate the scale of the transition required. These can be challenging for cities to use as their application often requires extrapolation from broader, global targets. Furthermore, cities often lack relevant decision support information; data may be neither granular enough nor produced in a timely way for cities to be responsive. Instead, the goal of climate neutrality by 2030 is a target that is less open to interpretation, takes a more systemic and holistic perspective, and will require the following kinds of measures:

- Work with regulation to ensure all new buildings are net zero energy as soon as possible (the IPCC has suggested this needs to happen as soon as 2020[vi]).
- In the transport sector, accelerate active mobility (walking and cycling) and achieve a rapid increase in infrastructure for and uptake of low-carbon fuels (electricity, hydrogen and biofuel)[vii].
- Urban systems need to better mimic natural systems in order to support adaptation and sequester carbon in urban areas[viii].
- Electricity supply needs to be dominated by (locally-generated) renewables[ix].
- Use procurement to ramp up the use of innovative products and services, including consideration of embedded carbon and avoided emissions where possible[x].

In the face of these very serious imperatives, cities have the very real potential to not only meet these demands, but to create better living environments for people in the process. Cities are intensely creative, capable of embracing rapid rates of change and mobilising extraordinary amounts of ingenuity and resources. Today, cities have ambitious carbon targets and a willingness to take a lead in driving change. Whilst nation-states were grappling with how to address climate change in Paris, city mayors and subnational leaders pledged to "deliver up to 3.7 gigatons of urban greenhouse gas emissions reductions annually by 2030"[xi].

However, challenges remain. For example, targets in existing city carbon plans are normally tied to long-term trajectories and associated incremental implementation plans that tend to work with known technologies. Much of the work being done by cities will leave a gap between articulated ambition and what is delivered on the ground, unless we create more space, resource, ideas and thought leadership around more urgent, transformative systems change across multiple city systems. Change of this breadth will require new ways to engage all citizens, encouraging different types of behaviour and innovating with urban policy levers.

In other words, strategic innovations are necessary across the full spectrum of urban systems work.

What needs to change?

Climate-resilient, sustainable cities can only be attained if people learn how to work together towards critical, shared outcomes. This need goes well beyond traditional political dynamics and relationships towards a more holistic approach with new models of governance; a willingness to experiment with different solutions (moving off the 'procurement conveyer belt'); an inclusive mindset towards working with communities and novel solution providers; and building different working relationships. The complexity of doing this becomes apparent when we understand the multiple systems that cities are trying to change including:

- Zero-emission mobility service systems
- Nature-based infrastructure and ecosystem regeneration
- Deep building retrofitting
- Clean energy supplies
- Circular resource loops
- Urban food production and nutrient recycling
- Growing fair, prosperous and sustainable local economies
- Healthy, vibrant, creative and accessible public spaces

Enablers to this change include working in four key areas:

- Collaborative communities
- Smarter systems
- Enabling economies
- Municipal momentum

Removing the guess work

There is some support out there for cities that want to meet this need for systemic change, but nothing that has taken city system(s) as a whole and attempted to put innovative approaches in place to accelerate a climate

transition. Instead, the city government, along with stakeholders, is expected to undertake horizon-scanning and combine multiple programmes in the hope that they take the city on a trajectory outlined in strategy.

The aim of the EIT Climate-KIC Healthy, Clean Cities Deep Demonstration process is to remove the guess work around where and how cities need to invest and intervene, by providing an evidence-based approach that indicates the systems interventions that are needed at the whole city scale, to go further, faster.

A Deep Demonstration of Healthy, Clean Cities

The Healthy, Clean Cities Deep Demonstration process will support municipalities and their stakeholders (including communities, businesses, etc) to realise a different trajectory for addressing climate change. The programme will work across the following key areas:

1. **Putting the right building blocks in place:** In order to understand how to accelerate climate change strategies, cities need to know where to invest, the economic case for making particular interventions and to be able to build communities of participation across all stakeholders. The first part to the cities deep demonstration process will therefore be to give cities the evidence, data and tools they need to start being able to co-create and enact change in a very different way to what has been seen before.

2. **Tools and resources:** There is already an abundance of tools, resources and frameworks developed expressly to help cities work towards their climate goals. Following work to understand where some of the key city challenges and opportunities are, this Deep Demonstration will be able to assemble the right mix of these to lever the necessary changes. They will draw on work from the IPCC, education and capacity-building programmes (including EIT Climate-KIC's Climathon programme [xii]) and other well-known and tested frameworks and standards (e.g. the EcoDistricts Protocol [xiiie]).

3. **Solutions and experts:** Ongoing work with the cities participating in these Deep Demonstrations will undoubtedly uncover a need for a range of expertise to support capital planning and to provide new solutions (where there are none currently available). This will involve bringing in, and coordinating: programme experts (from across the globe based on each city's priority activities); solution providers (businesses from the EIT Climate-KIC community and others); and capital and finance experts.

4. **Strategic innovations and radical acceleration, replication and scaling:** To reach carbon neutrality, there will need to be experimentation, for example with regulation and novel technologies. This element may put cities on a very different path towards meeting their climate goals. We will also need policy innovation to enable implementation and demand creation. This part of the Deep Demonstration programme will work with innovation providers; transformational experiments; accelerator hubs and start-up communities; and social enterprise platforms.

The Deep Demonstration programme will enable some of the cities that are more advanced or ambitious to get beyond solving the 'easy' things at an incremental pace. It will enable cities to accelerate activity and experiment with transformative solutions. We envisage this as a rolling programme with the mission of bringing 100 cities to carbon neutrality by 2030.

Box 1: What cities?

There has been significant interest from cities coming forward to work in this more ambitious way with us and we are moving forward with an initial cohort of ten. The cities involved represent good geographical coverage and include both smaller cities as well as some of Europe's major urban centres.

We are also working with the Global Covenant of Mayors to cultivate the work around policy innovation and to build our pipeline of both cities and support organisations going forward.

To support the cities in the initial phase of the programme, we have identified partners that bring an array of innovative capability, bridging engagement and democratic decision-making, project/programme innovation, policy invention, and new business models and capital structures. This will serve to raise ambition as well as to identify routes to implementation through changing behaviour, providing routes to financial investment and new ways of working with city levers to put delivery on a different trajectory.

Call to action

Delivering systems transition in cities is going require key actors from across the space who are willing to co-design and experiment with interventions to this effect. If you would like to get involved and for more information please contact: cities@climate-kic.org

Box 2: What is a deep demonstration?

Deep demonstrations are intended to be inspirational examples of what is possible at the level of whole systems transitions. During the first nine years, EIT Climate-KIC's approach to innovation has sought to bring together a knowledge pyramid of research, business, education and governmental entities, and in so doing link supply-side actors with demand-side actors in a thematic context. We have found, however, that the gravitational force of working with an innovation pipeline model, competitive calls and key performance indicators (KPIs) weighted to innovation supply: research projects, technologies and products looking for funding and customers or investors to sell to. We have also learned that a supply approach to innovation, in a context of public or even philanthropic funding, runs the risk of bias towards discrete, single-point solutions of an incremental nature. Such solutions rarely achieve systemic change and will not address climate change at the speed and scale we need.

A breakthrough systems-level, demand-led approach starts by identifying the complex nature of the problem and the necessary scale for intervention. It encourages us to cast innovation challenges as missions that capture imagination and inspire action across boundaries and contexts. It highlights the importance of understanding and addressing underlying assumptions that determine habits, behaviours and value generation models. Importantly, it favours using a combination of solutions – and working on multiple drivers of change simultaneously– to create deep demonstrations that enable different futures. EIT Climate-KIC has therefore chosen to position itself as an orchestrated innovation ecosystem that connects 'demand' and 'supply' in catalysing transformational systemic change, one that brings together public and private actors – businesses and states, individuals and cities. Our Deep Demonstration approach embodies this.

More information can be found here:

www.climate-kic.org/wp-content/uploads/2019/04/EIT-Climate-KIC-Deep-Demonstrations.pdf

Endnotes

i. Eurostat: Statistics on European Cities (https://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_European_cities)
ii. United Nations (2018) World Urbanization Prospects: 2018 Revision (https://esa.un.org/unpd/wup/Publications/Files/WUP2018-KeyFacts.pdf)
iii. United Nations (2018) World Urbanization Prospects: 2018 Revision (https://esa.un.org/unpd/wup/Publications/Files/WUP2018-KeyFacts.pdf)
iv. C40 (https://www.c40.org/ending-climate-change-begins-in-the-city)
v. What the IPCC Special Report on Global Warming of 1.5°c Means for Cities (2018)
vi. IPCC (2019) 'Summary for Policymakers' (https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf)
vii. What the IPCC Special Report on Global Warming of 1.5°c Means for Cities (2018)
viii. ibid.
ix. Ibid.
x. Race (2018) 'Climate Change and Cities: What We Need to Do', Forbes.com
xi. https://isocarp.org/news/ipcc-special-report-cities-climate-change/
xii. https://climathon.climate-kic.org/en/
xiii. https://ecodistricts.org/protocol/

About

EIT Climate-KIC is Europe's largest knowledge and innovation community focused on the rapid, broad-based systems transitions we now need to build prosperous, resilient, net zero-carbon societies in time.

Across most industries in Europe, the 'easier stuff' on the path to net-zero has already been done, mostly through cleaner energy supply and efficiency. What lies ahead is unprecedented and more difficult: structural change in social, economic and financial systems; fundamental transformations of city-systems, industry and land-use. New concepts of value and relationship. EIT Climate-KIC is building portfolios of co-ordinated innovations that work together to address these 'systems level' challenges.

We invite new partners and funders to help shape and scale these portfolios for large-scale climate impacts.

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