Policy brief: emerging technologies, a lever to tackle urban challenges in the climate decade

The case of Barcelona

About Digital Future Society

Digital Future Society is a non-profit transnational initiative that engages policymakers, civic society organisations, academic experts and entrepreneurs from around the world to explore, experiment and explain how technologies can be designed, used and governed in ways that create the conditions for a more inclusive and equitable society.

Our aim is to help policymakers identify, understand and prioritise key challenges and opportunities now and in the next ten years under key themes including public innovation, digital trust, citizen empowerment and equitable growth.

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A programme of

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Introduction

This year marks the beginning of the so-called "climate decade". Greenhouse gas emissions (GHG) must fall 25-55%, compared to 2018 levels, by 2030. This is to limit global warming to 2ºC-1.5ºC and fulfil the Paris Agreement.[1] Furthermore, the United Nations has set 2030 as the deadline to realise the Sustainable Development Goals (SDGs) in order to build a more prosperous, fair, equitable and just society. Here, emerging technologies such as artificial intelligence, machine learning, blockchain, big data, the internet of things, 5G, etc. can provide the transformative tools needed to help achieve these vital commitments.

With more than half of the world's population living in urban areas, and more joining them every year, cities today consume more than 75% of natural resources, produce more than 50% of global waste and emit 60-80% of GHG.[2] Also, in many countries, cities and regions have powers related to the SDGs in areas such as water, housing, transport, infrastructure, land use and climate change. Therefore, as well as emerging technologies, cities are also major allies in the fight against the climate emergency and the fulfilment of the 2030 Agenda.

Aim and purpose of the policy brief

This policy brief proposes a set of recommendations on how cities can maximise the use of emerging technologies to combat the climate emergency and make progress towards meeting the commitments made in the 2030 Agenda.

While this document is the result of ongoing discussion in the city of Barcelona, it aims to promote good practices for other cities and urban contexts. The text, therefore, relates to the ongoing transition towards technological sovereignty as part of a broader purpose: to achieve the objectives of ecological and climate transition.[3, 4, 5]

[1] United Nations Environment Programme. (2019). [online] Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/30798/EGR19ESEN.pdf?sequence=13

[2] The Ellen Macarthur Foundation. (2017). Circular economy in cities. [online] Available at: https://www.ellenmacarthurfoundation.org/our-work/activities/circular-economy-in-cities

[3] Barcelona.cat. 2020. Ethical Digital Standards. [online] Available at: https://www.barcelona.cat/digitalstandards/es/tech-sovereignty/0.1/introduction

[4] Ajuntament de Barcelona. (2020). Esto No Es Un Simulacro: Declaracion de Emergencia. [PDF] Available at: https://www.barcelona.cat/emergenciaclimatica/sites/default/files/2020-07/Declaracion_emergencia_climatica_es_1.pdf

[5] Ajuntament de Barcelona. (2020). Estrategia d'Impuls de l'agenda 2030 a la ciutat de Barcelona. [PDF] Available at: https://ajuntament.barcelona.cat/agenda2030/sites/default/files/2020-01/Mesura%20de%20Govern%20Agenda%202030.pdf

Background and context

This policy brief stems from the technology and climate emergency work of the Digital Future Society Think Tank.[6] Digital Future Society is a programme of Mobile World Capital Barcelona that explores interactions at the nexus of society and the design, use and governance of technology.

In particular, this policy brief is the result of two prior pieces of work. The first is the report on Risks and Opportunities of Emerging Tech in the Climate Decade. The report, published in September 2020, analyses the main risks and opportunities technology offers in the bid to tackle the climate emergency and fulfil the SDGs at the global level.[7]

The second piece of work that facilitated the production of this policy brief is the virtual Tech&Climate BCN working group, which took place on 8 July 2020. The working group brought together technology and climate experts from the public and private sectors as well as civil society. Drawing on the conclusions of the already mentioned report, the experts defined a set of measures that aim to use emerging technologies to solve urban challenges related to climate change and the 2030 Agenda.

It is also important to point out that this policy brief is the result of the flourishing, though still exploratory, work on technology and climate emergency that Digital Future Society is carrying out. Consequently, this document is not an end in itself. Instead it marks the beginning of a new field of action that seeks to maximise knowledge management and collective intelligence in order to solve the urban challenges that concern sustainability and climate change through the use of emerging technology.

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[6] Digital Future Society. (2020). [online] Available at: https://digitalfuturesociety.com

[7] Digital Future Society. (2020). Risks and opportunities of emerging tech in the climate decade. [online] Available at: https://digitalfutureso-ciety.com/report/risks-and-opportunities-of-emerging-tech-in-the-climate-decade/

Recommendations: promoting a new urban environment culture with the use of emerging technologies

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The work outlined above has led to the development of the series of recommendations that follow.[8] These recommendations are for local policymakers and decision-makers in the public and private sectors and civil society.

The measures proposed seek to show how emerging technologies can be a tool that enable cities to be more ambitious when it comes to fulfilling the global commitments of the climate decade and the 2030 Agenda. A tool that can help design more sustainable and resilient cities that are fair and inclusive, and increasingly better adapted to climate change. The measures also seek to tackle the challenges inherent in the SDGs. This means they also apply to a broader context of peaceful co-existence, reducing poverty levels, inequality and social vulnerability as well as promoting inclusive and regenerative economic development, guaranteeing quality universal education, and promoting access to dignified housing and workplaces, etc.

Recommendation 1: promote the use of emerging technologies in a coordinated and coherent manner to drive climate action and the 2030 Agenda in the urban context

This would contribute to the following SDGs

To limit global warming to 1.5°C, more and more cities around the world have committed to achieving zero emissions by 2050, or even by 2030. Cities are also integrating the SDGs into their local and regional development plans and policies. Barcelona's Climate Plan 2018-2030 and 2030. Agenda Promotion Strategy offer clear examples of these commitments.[9, 10]

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[8] C40 Cities. (2018). 19 Global Cities Commit to Make New Buildings "Net-Zero Carbon" by 2030. [online] Disponible en: https://www.c40.org/press_releases/global-cities-commit-to-make-new-buildings-net-zero-carbon-by-2030

[9] Ajuntament de Barcelona. (2018). Plan Clima 2018-2030. [PDF] Disponible en: https://bcnroc.ajuntament.barcelona.cat/jspui/bitstream/11703/109461/3/Plan_Clima_2018-2030.pdf

[10] Ajuntament de Barcelona. (2020). Estrategia d'Impuls de l'agenda 2030 a la ciutat de Barcelona. [PDF] Disponible en: https://ajuntament.barcelona.cat/agenda2030/sites/default/files/2020-01/Mesura%20de%20Govern%20Agenda%202030.pdf

The "Climate Emergency, Urban Opportunity" report published by the Coalition for Urban Transitions concludes that by using existing and proven technologies, policies, and other low-carbon measures, cities can cut their carbon emissions up to 90% by 2050.[11] In this scenario, the use of digitalisation and emerging technologies is essential to tackle urban climate challenges and the 2030 Agenda. Despite this, around the world today, and especially in developing countries, the inclusion of digitalisation and the use of emerging technologies in climate action plans and strategies is uncommon. There is very little mention of these technologies.[12]

There is a need for greater promotion of the benefits and opportunities emerging technologies can provide when tackling urban challenges inside and outside of public and private institutions (see recommendations 3 and 6). This is possible through alliances, public-private forums, and intersectoral roundtables, etc.[13] These efforts must also be supported with suitable mechanisms to coordinate, collaborate and improve governance to further strengthen the synergies between national, regional and local plans concerning digitalisation, climate action and the 2030 Agenda. A clear distribution of institutional responsibilities and the use of incentives should back these efforts further to ensure effective "all-government" and "all-society" approaches.

Lastly, we must ensure that the interaction between urban challenges and emerging technologies is not confined to silos; it must be integrated and coherent, as in the case of the Urban Agenda for the EU. The Urban Agenda promotes digital transition intertwined with other urban challenges such as climate action, energy transition, and other social and economic aspects.[14]

Highlighted case: Smart City Expo World Congress (Barcelona)

Since 2011, the Smart City Expo World Congress (SCEWC), in Barcelona, has become the world's leading annual meeting point to empower cities and collectivise urban innovation through the use of technology.[15] Over the course of 3 days, people from the tech industry, politicians, businesspeople, and representatives of civil society take part in dynamic actions that make it possible to design and establish a sustainable and inclusive future with the urban environment as the common denominator.

The aim of the SCEWC is to collectivise urban power, increase the strength of cities, identify business opportunities, establish partnerships and contribute to the enactment of common policies. It is a place to share research, best practices, and possible shared solutions achieved through effective collaboration, all in response to the challenges of digital, ecological and climate transition at the local level.

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[12] Economic and Social Affairs. (2018). World Economic and Social Survey 2018. [PDF] Available at: https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/WESS2018_full_web.pdf

[13] Examples of initiatives in this field include Foro TIC y Sostenibilidad, the LIFE Green TIC Project and Alliance Green IT.

[14] FUTURIUM - European Commission. (2017). Urban Agenda for the EU. [online] Available at: https://ec.europa.eu/futurium/en/urban-agenda

[15] Smart City Live. (2020). [online] Available at: https://www.smartcityexpo.com/

Recommendation 2: use emerging technologies to promote new models of consumption and ensure greater transparency and accountability

This would contribute to the following SDGs

Achieving the sustainability and climate change goals set for 2030 requires ambitious action to rethink our model of production and consumption. The current linear (throwaway) model of consumption does not take the planet's limits into account, is inefficient and leads to many climate, environmental and social consequences.

Furthermore, several studies and surveys have shown how large swathes of the public, based on their beliefs, are not adopting the most effective measures to combat climate change.[16, 17] This is also true for local authorities and private companies who often fail on accountability, transparency and effectiveness regarding the impact of their policies, or their sustainability and climate change commitments.

The following measures will address both of these challenges. The first is to develop publicly-accessible IT systems, such as online platforms, updated with information in real-time (or almost real-time) to show how cities are performing, including progress and impact indicators, in relation to climate commitments and the 2030 Agenda.[18] It is also important to ensure effective communication of existing scientific and technological knowledge concerning the benefits of emerging technologies for the population (for example, the benefits of the internet of things and big data in the fight against climate change). When this knowledge is not available, there should be requesting measures to obtain it through targeted research.

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[16] Treehugger. (2019). Are People Clueless When It Comes To Their Carbon Footprints? [online] Available at: https://www.treehugger.com/are-people-clueless-when-it-comes-their-carbon-footprints-4855544

[17] Departament de Territori i Sostenibilitat. (2019). Conclusions Generals. [online] Available at: http://territori.gencat.cat/ca/01_departament/03_atencio_a_la_ciutadania/04_dret_dacces_a_la_informacio_ambiental/06_resultats_estudi_opinio/conclusions_generals/

[18] Examples of online panels related to compliance with the SDGs and/or monitoring GHG emissions and other environmental vectors include the European Cities SDG Index, the GPC Interactive Dashboard and the Environmental Dashboard of the city of Oberlin (Ohio, United States).

Another measure is to develop systems, platforms and mechanisms that give the public easy access to consumption data (water, local energy production and consumption, mobility, etc.) and their ecological footprint, to better facilitate effective behavioural changes. Examples of this include monitoring energy in real time (such as the residential energy-saving project in the city of Sabadell, which uses electricity monitors), applications to measure the impact of using digital technologies (such as the application developed by The Shift Project), energy consumption comparison systems based on gamification (as Opower does), encouraging the adoption of digital prosumption policies through decentralised local energy communities (as promoted by Fundación Prosume), and creating gamification and competition platforms at neighbourhood level based on artificial intelligence.[19, 20, 21, 22, 23]

Highlighted case: the EFC tool, Open University of Catalonia (Barcelona)

Members of the WiNe (Wireless Networks Research Lab) research group at the Open University of Catalonia's Internet Interdisciplinary Institute (IN3) in Barcelona are designing a tool called EFC to assess the energy footprint of computing.[24] This will facilitate the effective use of cloud resources by calculating the energy consumed.

The EFC tool, which is still in the development stage, will help raise awareness among organisations and enable them to employ appropriate measures to reduce their carbon footprint and develop energy efficiency policies that will optimise consumption. In addition, it will encourage the establishment of mechanisms that will ensure users are increasingly aware of how much energy cloud services consume. Cloud services are booming and consume vast amounts of energy.

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[19] Ajuntament de Sabadell. (2011). L'Ajuntament de Sabadell queda finalista als prestigiosos premis ManagEnergy. [online] Available at: http://ca.sabadell.cat/fitxes/noticies/2011/2011041401_cat.htm

[20] Ajuntament de Sabadell. (2009). Guia de consum energetic intel.ligent. [online] Available at: https://www.yumpu.com/es/document/view/34965153/guia-de-comptadors-intelligents-ajuntament-de-sabadell

[21] The Shift Project. (2019). "Carbonalyser": The Browser Extension Which Reveals the Climate Impact of Internet Navigation [online] Available at: https://theshiftproject.org/en/carbonalyser-browser-extension/

[22] Oracle. (2020). Oracle Utilities Opower Energy Efficiency. [online] Available at: https://www.oracle.com/industries/utilities/products/opower-energy-efficiency-cloud-service/

[23] Prosume. (2017). White Paper- decentralizing power. [PDF] Available at: https://prosume.io/wp-content/uploads/2017/09/white-paper_v2-2017.pdf

[24] Universitat Oberta de Catalunya. (2020). Un proyecto de la UOC gana el reto Tech & Climate para reducir el impacto ambiental de las empresas tecnológicas. [online] Available at: http://www.live.uoc.edu/portal/es/news/actualitat/2020/326-proyecto-reto-tech-climate.html

Recommendation 3: make use of emerging technologies to design effective modelling, monitoring, and information systems that will feed evidence-based urban policies

This would contribute to the following SDGs

In order for urban development policies to tackle environmental challenges effectively, they must be evidence-based. Easy access to environmental data and information makes it possible to adopt regular and high-quality monitoring practices, resulting in better formulation, implementation and assessment of urban policies.

For this reason, local governments must guarantee the availability of high-quality data and information in an open, accessible, harmonised, interoperable and anonymous format. In addition, the use of tools such as big data, artificial intelligence and the internet of things opens up infinite possibilities in the field of collecting and analysing information. This has a positive effect by improving the capacity to respond to urban challenges.

Some of the possibilities that emerging technologies offer in the field of urban sustainability include a boost to urban action through effective collection, management and use of city data; better linkage of energy consumption and generation curves (for example, through the use of platforms such as Dexma and Awesense); better urban modelling of climate and environmental risks in the medium term and at neighbourhood scale; enhanced collection of mobility data and the use of public spaces to improve the design of mobility webs and to encourage shared transport (such as the studies produced by Barcelona Regional and 300.000 km/s), etc.[25, 26, 27, 28, 29, 30]

[25] C40 Cities. (2020). City Intelligence. [online] Available at: https://www.c40.org/programmes/city-intelligence

[26] Dexma. (2020). DEXMA Platform. [online] Available at: https://www.dexma.com/what-is-dexma-platform/

[27] Awesense. (2020). [online] Available at: https://www.awesense.com/features

[28] BSC-CNS. (2020). Urban Air Quality Modelling. [online] Available at: https://www.bsc.es/research-development/research-areas/atmospheric-composition/urban-air-quality-modelling

[29] Barcelona Regional. (2020). Mobilitat com a Servei (MAAS). [online] Available at: https://www.bcnregional.com/ca/projects/mobilitat-com-a-servei-maas/

[30] Mercè. (2020). http://merce.300000.eu/

Highlighted case: CALIOPE-Urban, Barcelona Supercomputing Center (Barcelona)

Short-term quality forecasting systems can operate as early warning systems for the general population (especially for vulnerable groups), facilitating swift and effective measures when air quality is poor. In this context, the pollution modelling work performed by Barcelona Supercomputing Center and Smart Citizen has resulted in the CALIOPE-Urban project. The project aims to collect open data on atmospheric conditions through citizen participation.[31, 32]

The CALIOPE-Urban project is developing an air quality measurement and modelling system that can provide information about pollution levels in Europe and Spain, and create precise air quality forecasts. With this aim in mind, CALIOPE has been developed with high spatial and temporal resolutions for Europe (12 km x 12 km and 15 layers, 1 hour) and Spain (4 km x 4 km and 15 layers, 1 hour), encouraging better and more precise decision-making relating to air pollution.

Recommendation 4: encourage eco-innovation and improve knowledge transfer through citizen participation and transdisciplinary collaboration forums

This would contribute to the following SDGs

Local climate change plans and other strategic environmental policies for the urban environment are generally produced through or accompanied by, participatory processes. This practice promotes broad participation by the interested parties from the public and

[31] BSC-CNS. (2020). Urban Air Quality Modelling. [online] Available at: https://www.bsc.es/es/research-development/research-areas/atmospheric-composition/urban-air-quality-modelling

[32] Smartcitizen.me. (2020). [online] Available at: https://smartcitizen.me/

private sectors, and civil society, to ensure that the preferences and priorities of key sectors are considered. This allows the integration of various viewpoints, strengthens innovation, promotes greater acceptance by the public and improves the feeling of belonging.

To enrich these processes, the participation of emerging tech sector agents, from tech giants to start-ups, should not be overlooked. In addition, adopting network collaboration and collective intelligence approaches (as organisations and initiatives such as Climate CoLab and Omdena do) may be a determining factor in responding to local challenges.[33, 34] Therefore, encouraging the creation of multi-stakeholder platforms that bring together different sectors and enable public-private collaboration that discusses how emerging technologies solutions can tackle the urban challenges of the climate decade should be common practice at the local level.

Lastly, one should not forget the importance of encouraging participatory democracy. Today there are many open-source digital platforms such as Decidim and CitizenLab, which connect citizens and public sector decision-makers in order to encourage more consensual decision-making in cities.[35, 36]

Cities can also join the work performed by local networks such as C40 cities, ICLEI, Metropolis, Carbon Neutral Cities Alliance, the Covenant of Mayors and the Global Covenant of Mayors to perform a comparative assessment of best practices in the use of emerging technologies to tackle urban challenges and work as part of a network. They can also follow the actions of networks and sectoral groups such as the Climate Chain Coalition, Climate Change AI and the International Telecommunication Union's Focus Group on Smart Sustainable Cities.[37, 38, 39, 40, 41, 42, 43, 44]

[33] Climate CoLab. (2020). [online] Available at: https://www.climatecolab.org/

[34] Omdena. (2020). [online] Available at: https://omdena.com/projects/#finished_challenges

[35] Decidim.org. (2020). [online] Available at: https://decidim.org/

[36] Citizen Lab. (2020). Plataforma. [online] Available at: https://www.citizenlab.co/es/plataforma

[37] C40 Cities. (2020). City Intelligence. [online] Available at: https://www.c40.org/programmes/city-intelligence

[38] Urban Sustainability Exchange. (2020). [online] Available at: https://use.metropolis.org/case-studies

[39] Carbon Neutral Cities Alliance. (2020). CNCA Innovation Fund. [online] Available at: https://carbonneutralcities.org/initiatives/innova-tion-fund/

[40] Covenant of Mayors Europe (2020). Good Practices. [online] Available at: https://www.covenantofmayors.eu/plans-and-actions/good-practices.html

[41] Global Covenant of Mayors. (2020). Data4cities - Global Covenant of Mayors. [online] Available at: https://www.globalcovenantofmayors.org/our-initiatives/data4cities/

[42] Climate Change AI. (2020). [online] Available at: https://www.climatechange.ai/

[43] Climate Change Coalition. (2020). [online] Available at: https://www.climatechaincoalition.io/

[44] ITU. (2015). Focus Group on Smart Sustainable Cities. [online] Available at: https://www.itu.int/en/ITU-T/focusgroups/ssc/Pages/default.aspx

> ### Highlighted case: citizen assemblies on climate change (Ireland)
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> A citizen's assembly is a group of people from a neighbourhood, city or country who have been selected at random to represent the population as a whole. This is conducted through stratified random sampling, applying various selection criteria such as age, gender and educational attainment. This group then discusses specific issues such as climate action and works towards reaching conclusions on the issues at hand.
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> Today, citizen assemblies on climate change, which originated in Ireland in 2016, are proliferating in an increasing number of countries (Ireland, France, Sweden, the United Kingdom, Spain, etc.), cities, districts and neighbourhoods (by councils such as Cambridge, Oxford and Leeds, and various London districts).[45] In the United Kingdom, in June 2019, six Select Committees of the House of Commons called a citizens' assembly to understand public preferences on how the UK should tackle climate change. The six Select Committees involved were Business Energy and Industrial Strategy, Environmental Audit, Housing, Communities and Local Government, Science and Technology, Transport, and the Treasury.[46]

Recommendation 5: design innovative public contracting and procurement systems that minimise the tech industry's ecological footprint

This would contribute to the following SDGs

Public bodies are major consumers. By using their purchasing power to choose environmentally friendly goods, services, and construction work, local authorities can make a significant contribution to sustainable consumption and production. This is called Green Public Procurement (GPP). Although GPP is a voluntary instrument, it plays a key role in developing a more efficient and circular economy, optimises the use of resources and has high potential to stimulate eco-innovation.

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[45] Climateassembly.uk. (2020). [online] Available at: https://www.climateassembly.uk/

[46] Climateassembly.uk. (2020). About - Climate Assembly UK. [online] Available at: https://www.climateassembly.uk/about/

It is estimated that the Information and Communications Technology (ICT) sector concerns 5-9% of global electricity and has a carbon footprint associated with 1.4-4% of global GHG emissions.[47] Although an increasing number of companies in the emerging tech industry, led by the tech giants, are incorporating sustainability into their practices and making progress towards the fulfilment of the SDGs, the trend is still far from widespread. To speed up this transition, GPP managers have tools available to make the ICT industry greener and more responsible. One such tool is the European Union's GPP criteria to include green requirements in public tenders (for example, procurement and contracting of data centres, cloud services, and electrical and electronic equipment, etc.).[48]

One interesting example of GPP is the AI4Cities initiative through which six European cities and regions are using pre-commercial procurement processes to bring potentially interested parties together. The aim is to seek artificial intelligence solutions to mobility and energy in order to accelerate carbon neutrality.[49] In addition, local cooperation centres (groups of public partners that work together on public contracting to achieve more flexible, innovative and sustainable public procurement) can have a multiplier effect.[50]

Highlighted case: call for grant applications for urban innovation projects - "the proactive city" (Barcelona)

In the context of the "new normal", the city of Barcelona has designed a call for innovative public grants to respond to the specific challenges of the post-Covid-19 era.[51] With a bottom-up approach and under the banner "the proactive city", Barcelona is seeking to promote urban innovation towards technological solutions that improve sustainability and urban resilience, as well as boost the local economy.

The grant applications were promoted by BIT Habitat (Barcelona Institute of Technology for the Habitat), which is a municipal foundation that aims to promote the social, economic, planning and tech aspects of urban innovation in Barcelona in response to the new challenges cities face. There were a total of 217 proposals submitted in the 2020 call, with seven successful applicants selected for funding.

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[47] Digital Future Society. (2020). Risks and opportunities of emerging tech in the climate decade. [online] Available at: https://digitalfuturesociety.com/es/report/risks-and-opportunities-of-emerging-tech-in-the-climate-decade/

[48] European Commission. (2018). EU Criteria GPP. [online] Available at: https://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

[49] Ai4cities.eu. (2020). [online] Available at: https://ai4cities.eu/

[50] Partnership on Innovative and Responsible Public Procurement of the Urban Agenda under the EU. (2020). Local Cooperation Centres for Innovative and Responsible Public Procurement [PDF] Available at: https://ec.europa.eu/futurium/en/system/files/ged/action_6_lcc_-_final_version.pdf

[51] BIT – Barcelona Institute of Technology. (2020). La Ciudad Proactiva [online] Available at: https://bithabitat.barcelona/es/ciutatproactiva

Recommendation 6: invest in training and research to better equip public and private professionals in the emerging tech field

This would contribute to the following SDGs

One of the reasons for the low presence of emerging tech solutions in the local climate agenda is a lack of appropriate awareness and knowledge of the potential these technologies have to tackle the environmental crisis. As new methodologies, technologies, tools, and approaches that can respond to the ecological crisis appear, there is a need to provide specialised training in order to assess and respond to environmental requirements properly.

Governments and companies must implement activities to train and develop skills on emerging tech consistently and on a regular basis. Both the public and private sectors must ensure that their employees have the knowledge and tools necessary to measure and manage their environmental and social impacts correctly. The exercise should become a process of continuous learning, not only targeted at civil servants but also stakeholders in the private sector and civil society.

The urban environment is another such sector that poses significant challenges due to the complexity of the aspects involved (economic, technical, environmental and social, etc.) and its multiple connections to other sectors (urban planning, energy, mobility, waste management, water supply, etc.). So, within the framework of the Urban Agenda for the EU, there could be funding for research on topics of urban interest that cut across institutions and bodies, analysing how emerging tech can improve urban development practices.

Highlighted case: the Catapult Network (United Kingdom)

To tackle cross-cutting challenges such as those mentioned above, countries like the United Kingdom have promoted so-called "Catapult" centres.[52] The Catapult Network is comprised of world-leading technology centres and is designed to transform the country's capability for innovation in specific areas and help drive future economic growth.[53]

The Catapult Network has been responsible for directing over 2.5 billion GBP of public and private sector investment and, since 2011, has supported over 5,000 organisations and 12,000 projects in fields such as gene therapy, satellite applications, digitalisation and energy transition. One of its centres, the Offshore Renewable Energy Catapult, is now the UK's leading innovation centre for offshore renewable energy.[54]

Recommendation 7: use emerging technologies as a lever to promote the circular economy in cities

This would contribute to the following SDGs

An increasing world population, concentrated mainly in cities, and a growing urban middle-class has increased demands and pressure on urban infrastructure and government resources. There is now a greater appetite for resources in cities. All this, combined with a lack of a holistic approach to urban management, is causing vast economic losses as a result of a linear economy that is extremely wasteful and associated with negative environmental impacts.[55]

Achieving a regenerative economy requires a systemic change from a linear economic model

[52] Catapult. (2020). [online] Available at: https://catapult.org.uk/

[53] Catapult. (2020). Supercharging Business Performance Through Innovation. [PDF] Available at: https://s3-eu-west-1.amazonaws.com/media.www.catapult/wp-content/uploads/2020/01/09160102/2019-Catapult-Network-Brochure-16pp-FINAL.pdf

[54] ORE. 2020. [online] Available at: https://ore.catapult.org.uk/

[55] The Ellen Macarthur Foundation. (2017). Circular economy in cities. [online] Available at: https://www.ellenmacarthurfoundation.org/our-work/activities/circular-economy-in-cities

to a circular one. According to the Ellen MacArthur Foundation, decoupling growth from the consumption of finite resources relies on three basic principles: 1) design out waste and pollution in cities, 2) keep products, components, and materials at their highest value and in use, and 3) regenerate natural systems.[56]

In the digital era, emerging technologies have become a great ally of the circular economy in taking advantage of existing opportunities in three key urban systems: buildings, mobility and products. Blockchain and big data can make it possible to establish local and regional hubs of secondary markets and materials by shortening supply chains, making management more agile and cleaner, and extending product lifetime.[57]

Digitalisation also promotes progress towards "servitisation" in many sectors, including transport and mobility with incentives such as Mobility as a Service and the development of new business models such as "Hello Tractor", which operates at the local level in Kenya, Mozambique, Senegal, Tanzania and Bangladesh.[58]

Highlighted case: the "eReuse" project (Barcelona)

Through the "eReuse" project, the Electronic Reuse Association, based in Barcelona, is using blockchain technology to extend the useful life of electronic devices, ensuring a reuse rate of 95%.[59] This transforms a cost for councils into income that stays in the community. The project also creates one job for every 300 items reused. Due to these good results, more than 10 cities across eight countries are replicating the open-source eReuse project.

Ereuse.org, coordinated by Asociación Pangea, is an initiative dedicated to the transition towards collaborative and circular consumption of electronics.[60] Its main objective is to strengthen the development of open local and regional platforms for the reuse of electronic products, thus avoiding premature recycling.

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[56] The Ellen Macarthur Foundation. (2017). Cities in the Circular Economy: An Initial Exploration. [PDF] Available at: https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Cities-in-the-CE_An-Initial-Exploration.pdf

[57] Excessmaterialsexchange.com. (2019). The EME Pilot Report 2019. [online] Available at: https://excessmaterialsexchange.com/pilot-report-release/

[58] Hellotractor.com. (2020). [online] Available at: https://hellotractor.com/

[59] Ereuse.org. (2020). [online] Available at: https://www.ereuse.org/

[60] Pangea.org. (2017). Proyectos [online] Available at: https://pangea.org/es/proyectos/

Conclusions

Local bodies will have to deal with many challenges over the coming decade. One of these is already setting the political and strategic agenda for the near future: the post-Covid-19 (green) recovery. The European strategy in response to the pandemic has been clear and conclusive: Member States must push forward ecological and digital transitions in an ambitious and integrated manner.[61] This desire is in keeping with the EU's prior announcements on combining the EU's Digital Strategy with the European Green Deal to achieve a climate-neutral Europe by 2050 in addition to addressing other relevant environmental challenges.[62, 63]

How these priorities will translate at the local level remains to be seen. But one thing is certain: knowing how to combine (with an inclusive vision, ambitious policies and adequate investment) the opportunities that exist at the intersection between the ecological and digital transitions will be key to developing more prosperous urban societies. Here, emerging tech can become a lever for progress in tackling the ecological and climate emergency, but not without first prioritising justice, equality, inclusivity, and sustainability as guiding principles.

[61] Consilium.europa.eu. (2020). Plan De Recuperación Para Europa. [online] Available at: https://www.consilium.europa.eu/es/policies/eu-recovery-plan/

[62] European Commission. (2020). The European Digital Strategy - Shaping Europe's digital future [online] Available at: https://ec.europa.eu/digital-single-market/en/content/european-digital-strategy

[63] European Commission. (2019). A European Green Deal. [online] Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

Acknowledgements

This policy brief is the result of the joint work and collaboration of the people listed below:

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