European Parliament

Cities: Front line of climate action

SUMMARY

Cities have a crucial role to play in addressing the climate change challenge and delivering on the ambitions of the Paris Agreement. In the European Union (EU), where nearly three quarters of the population live in urban areas, many cities are leading the way in this regard, taking action in three areas central to increasing energy efficiency and reducing emissions – namely, buildings, energy supply, and transport – and acting as living laboratories of climate-change-related innovation.

The EU supports cities in their efforts by providing guidance, promoting experience- and knowledge-sharing, fostering cooperation, and funding climate action. Climate-relevant initiatives are in place in various policy fields, from transport to the environment, research and innovation, the most high profile being the Covenant of Mayors for Climate and Energy, which currently counts some 7 600 signatories.

A supportive framework is essential to ensure city-level initiatives have enough resources and potential to effect meaningful change. Easing access to climate funding and strengthening the role of cities in climate governance are among the main challenges ahead, and the main demands of city associations. The latter issue is being examined by the European Parliament, notably in relation to the proposal for a regulation on energy union governance. Two own-initiative reports exploring the role cities play, first, in the implementation of the Paris Agreement, and, second, in the institutional framework of the Union, are also under preparation.

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Global context

The central aim of the Paris Agreement on climate change is to keep the global temperature rise – largely driven by increased carbon dioxide (CO_2) and other human-made greenhouse gas (GHG) emissions into the atmosphere – to well below 2°C above pre-industrial levels, while pursuing efforts to limit the temperature increase to 1.5°C. It also establishes a global goal on adaptation (see box), which is to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change.

Action in urban centres is essential to deliver on the Agreement's ambitions. Cities, which are currently host to over half of the world's population (a figure expected to grow to 66 % by 2050), account for more than 70 % of global energy-related GHG emissions. At the same time, they are also highly vulnerable to the consequences of those emissions. In its Fifth Assessment Report (2014), the United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) warns that urban climate change-related risks (including rising sea levels and storm surges, heat stress, extreme precipitation, inland and coastal flooding, landslides, drought, increased aridity, water scarcity, and air pollution) are increasing, with widespread negative impacts on people, local and national economies and ecosystems. Worldwide, 70 % of cities are already dealing with the effects of climate change, and thousands have adopted climate change plans.

> **Acting on two fronts**
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> Climate change mitigation refers to 'efforts to reduce or prevent emission of greenhouse gases'. Examples of measures include using new technologies and renewable energies; upgrading the energy efficiency of older equipment; and changing management practices and consumer behaviour.
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> Adaptation means 'anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise'. Measures can include adapting building codes to future climate conditions and extreme weather events, building flood defences, and using less water.

Research has shown how decisive the choices made in terms of urban infrastructure investments are for locking the world into a high-carbon or a low-carbon path. The C40 Cities Climate Leadership Group, connecting 90 of the world's greatest cities, estimates in a recent report that from 2016 to 2050, over US$1 trillion in investment is required across all its affiliated cities to meet the ambition of the Paris Agreement through new climate action. There is, at the same time, a strong economic case for low-carbon urban development, which, according to the Global Commission on the Economy and Climate, could represent a US$16.6 trillion economic opportunity worldwide by 2050.
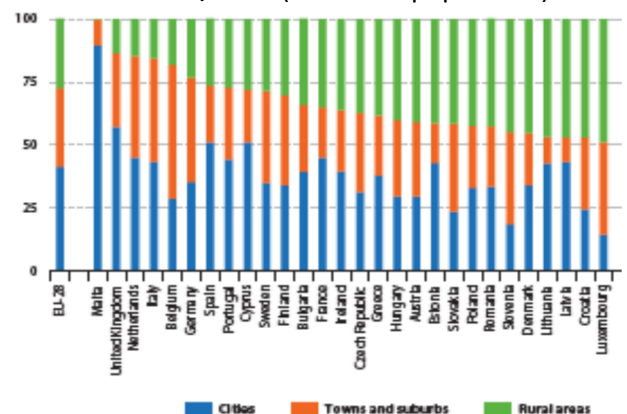
Urban climate action in the EU

Europe is a highly urbanised continent. Some 41.6 % of the EU-28 population were living in a city[1] in 2014, with a further 31 % residing in towns and suburbs. As such, nearly three quarters of the EU population was living in an urban area (see Figure 1), a share projected to rise to just over 80 % by 2050. The concentration of people and activity in cities often causes high levels of local pollution with impacts on air, water and waste. At the same time, it offers opportunities to reduce such impacts. Cities provide meeting points or hubs where people, businesses and resources can cooperate and innovate, bringing remedies to

Figure 1 – Distribution of population, by degree of urbanisation, 2014 (% of total population)

Source: Eurostat, Urban Europe, 2016 edition.

environmental problems. On another level, their density can allow for more energy-efficient forms of transport, housing and service provision. This is all the more important as cities currently account for some 80 % of Europe's energy use.

Mitigation: decreasing energy use and greenhouse gas emissions
As part of its climate action, the EU aims to become a highly energy-efficient and low-carbon economy by 2050, by cutting its GHG emissions by 80-95 % compared with 1990 levels. Binding targets were set for 2020 (i.e. a 20 % cut in emissions, 20 % of total energy consumption to be sourced from renewable energy, and a 20 % increase in energy efficiency) and for 2030 (a cut of at least 40 % in emissions, a 27 % share for renewables, and a 27 % increase in energy efficiency). This 40 % cut in emissions by 2030 is also the EU's commitment to the Paris Agreement.

Three areas are central to increasing energy efficiency and reducing emissions in urban settings, and represent key points of leverage for city action: buildings, energy supply, and transport – which is still primarily fossil-based (the sector is 94 % dependent on oil).

Transport
To achieve the EU's climate goals, emissions from urban mobility, which accounts for 40 % of all CO_2 emissions of road transport and is still heavily reliant on the use of conventionally fuelled private cars, need to be significantly reduced (see box). High population densities and a high proportion of short-distance trips, make cities well-suited to the switch to low-carbon transport, with the development of walking, cycling and public transport, and the early market introduction of alternative-fuel vehicles. Cities are already active on those two fronts, taking steps first to **support low-emission vehicles** and

> **Decarbonising urban transport**
> As part of its general objective of cutting carbon emissions in transport by 60 % by 2050, set out in its 2011 White Paper on transport, the European Union seeks to:
> - phase out conventionally fuelled cars in cities by 2050;
> - achieve essentially CO_2-free move-ment of goods in major urban centres by 2030.

second to **reduce private car use** by encouraging a shift to other transport modes (incentivising public transport,[2] cycling and walking) and/or the use of car-sharing and car-pooling schemes.

Measures to reduce car traffic include congestion charging, as practised in London. Pricing congestion (whose annual cost in the EU approaches €100 billion or 1 % of EU gross domestic product – GDP) is an application of the EU's recommendation to use the 'polluter pays' principle, the idea being that people should take account of the costs their journey inflicts when deciding to travel, and possibly choose other travel modes or times, thereby alleviating congestion in urban transport networks. Park-and-ride (P&R) systems, in which drivers leave their cars in a car park near a public transport stop on the outskirts of a city and transfer to a bus or train to ride into the centre, are another policy option, widely used across Europe to decrease traffic pressure on inner cities. In Warsaw, where the car-to-owner ratio is steadily growing, 740 000 cars used P&R car parks in 2014, the primary reason for the scheme's popularity being the savings in cost and time for the user.

Attractive and competitive alternatives are the key to achieving a shift away from the car towards low-carbon modes. In Copenhagen, where DKK 1 billion (around €135 million) has been invested in cycling infrastructure since 2005 alone, bikes already outnumber cars. Cycling is Copenhageners' preferred means of transport because it is the quickest and easiest way to get around town (only 1 % of them mention environmental concerns as their main motivation). Cyclists can ride from one part of Copenhagen to another almost without leaving the cycle tracks, saving the city 90 000 tonnes of CO_2 emissions

annually. A network of 28 Cycle Super Highways around Copenhagen, covering a total of 500 km and aimed at encouraging more people to commute by bike, is under development. Once completed, the project could potentially reduce car journeys during rush hour by 1.4 million. Bikes are also integrated into the wider transport network (e.g. they are allowed on metros and trains).

In a 2017 survey on Europeans' expectations in terms of mobility, 66 % of respondents would be ready to use their cars less if the necessary investments were made to facilitate travel. Improved possibilities to combine several modes of transport (i.e. intermodality) ranks first in the list of priorities, the development of digital services being considered a crucial enabler. Providing integrated and seamless mobility is the core of the 'Mobility as a service' (MaaS) concept, a scheme[3] tested by various European cities (including Vienna, Hannover and Helsinki) that could potentially shift travellers' demand away from private vehicles by combining public transport and access to a car when necessary. MaaS systems allow consumers to buy mobility services provided by the same or different operators by using just one platform and a single payment. Platforms typically offer an intermodal journey planner (covering various modes: bus, metro, rail, bike-sharing, taxi, car-sharing, car rental, etc.), a booking system, easy-payment, and real-time information.

Supporting low-emission vehicles is another strand of city action. Introducing alternative propulsion systems and fuels in large fleets of urban buses, taxis and delivery vans can make a significant contribution to reducing the carbon intensity of urban transport. Public procurement, of which a significant part is undertaken by municipal and local authorities, offers an opportunity to favour low-emission alternatives for public transport vehicles such as buses. A growing number of cities are considering no longer buying

> **Low-emission vehicles**
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> EU legislation currently refers to low-emission vehicles as vehicles with tailpipe emissions below 50g CO_2/km. This would include some plug-in hybrids, full electric and fuel cell (i.e. hydrogen-powered) vehicles, with the latter two also qualifying as zero-emission vehicles.

conventionally fuelled diesel buses in the near future. Paris is seeking to phase them out, moving towards a fleet made up of 80 % electric buses and 20 % biogas buses by 2025. The plan is expected to lead to an 80 % reduction in GHG emissions from the bus network, as well as a 50 % reduction of the carbon footprint of the whole Paris public transport network. Hamburg has decided to procure solely zero-emission buses as from 2020.

Electric mobility is gaining ground in Europe, with Norway taking the lead. In the EU, Amsterdam is setting an example in the transition to electric transport, through the implementation of a wide range of pro-electric vehicle measures, as presented below.

> **Amsterdam: making electric driving the norm**
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> While a large part of the legal and regulatory framework for electric vehicles (EVs) is dealt with by the Dutch central government (e.g. tax incentives), Amsterdam has designed its own strategy to support electric transport. For instance,[4] the city offers purchase subsidies to businesses willing to switch to EVs (€5 000 per vehicle for fully electric taxis, company cars or delivery vans and up to €40 000 per vehicle for plug-in electric buses and lorries). Electric car drivers have priority when it comes to residential parking permits. Electric taxis benefit from free parking while charging batteries, and are granted priority at the Central Station taxi rank. Amsterdam has adopted a demand-driven approach for charging facilities, whereby (future) EV owners could request a public charging point close to their home, or apply for subsidies to build one at their own premises. Today, the city has the highest density of charging stations in the world (2 081 at the end of 2016, with an expected rise to 4 000 by 2018). Charging points are powered by wind turbines located in the harbour area, a point worth underlining, since, as the European Environment Agency (EEA) points out, EVs are only as clean as their source of power.

Buildings and energy supply

Buildings use [40 %](#) of the EU's final energy, predominantly for space heating, cooling, and hot water, and are responsible for 36 % of CO_2 emissions in the EU. Around 75 % of the existing building stock is currently energy inefficient. Improving energy efficiency[5] in buildings could reduce total EU energy consumption by 5 to 6 % and lower CO_2 emissions by about 5 %. The built environment is therefore a key target for interventions to manage energy use and climate change in cities. Municipal governments have [various powers](#) in relation to urban development and the built environment, from the implementation of regulatory standards to land development and housing provision. Their interventions can be grouped into three main strands: creating new sustainable urban districts championing 'eco-city' principles (see below) for maximising density and minimising energy use; renovating existing buildings to improve their energy performance; and encouraging changes in people's energy consumption behaviour.

Equally important to achieving the EU's climate goals is a shift away from fossil fuel energy generation. Research [shows](#) that in Nordic[6] urban areas, the average citizen consumes 30 % more energy in the buildings sector than the average EU citizen, on account of the greater demand for heating during winter and greater floor area per person; however, the corresponding CO_2 emissions per capita are 50 % lower than the EU average, thanks to a larger share of renewables, district heating, electric heating (including heat pumps), geothermal energy and modern biomass[7] in the heating mix.

> **Energy performance of buildings**
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> The Energy Performance of Buildings Directive (adopted in 2002, recast in 2010 as Directive 2010/31/EU) is the main legal [instrument](#) addressing energy efficiency in buildings in the context of the 2020 energy efficiency targets. It requires all new buildings to have nearly zero or very low energy needs and qualify as nearly zero-energy buildings ([NZEB](#)) as of the end of 2020 (2018 for public buildings). In parallel, Member States have to put in place support policies to stimulate the refurbishment of existing building stocks towards similar standards. At the end of 2016, the Commission adopted a [proposal](#) to review Directive 2010/31/EU, with the aim of accelerating the renovation of existing buildings, proceeding at the very slow pace of 0.4 % to 1.2 % per year. The proposal addresses [inter alia](#) the use of digital solutions, and the link between building renovation and the development of electro-mobility.

Sustainable city planning: the case of eco-cities

The term 'eco-city' was first coined in the 1980s and originally defined as 'an urban environmental system in which input (of resources) and output (of waste) are minimised'.[8] The concept, bringing concern for the natural environment to the forefront of the planning process, has been gaining momentum ever since, evolving from a few pioneering initiatives to a truly global and mainstream phenomenon, against the backdrop of a majority of people living in cities and the growing international recognition of the scale and severity of climate change.[9] Many initiatives across the world therefore have a specific focus on CO_2 reduction measures. Eco-city projects fall into three categories: new developments (a city built from scratch, such as [Masdar City](#) near Abu Dhabi); expansion of existing urban areas (new districts or neighbourhoods); and retrofits (sustainable development innovation/adaptation within existing urban infrastructure).[10] Among their character-istics: they are of substantial scale; take place across several sectors (housing, transport, energy, waste, water, etc.); and are embedded in, and supported by, policy processes. Eco-cities can be seen as sites of experimentation and innovation, helping drive broader socio-technical transitions.[11] **Malmö** is a case in point. The Swedish city, which aims to make all its activities climate neutral by 2020, has applied eco-city concepts in various [neighbourhoods](#), using each as an [opportunity](#) to test new systems. Examples include the [Western Harbour](#), often cited as Europe's [first carbon-neutral](#) district; [Augustenborg](#), where green roofs and open storm water channels were tested, and the Sege Park with its [1250 m²](#) photovoltaic panels. In Hyllie, various [solutions](#) are being tested prior to deployment throughout the city, from smart grids and intelligent energy solutions to fossil free mobility and sustainable waste management.

District heating and cooling (DHC) can play a significant role in the decarbonisation of the sector, especially if based on renewable electricity (through heat pumps), geothermal and solar thermal energy, and waste heat. In Gothenburg, a leading city in the DHC field, the energy mix of the district heating system, supplying heating to more than 90 % of all apartment blocks and some 9 000 single-family houses, currently consists of 74 % recovered heat, 18 % renewable energy and 8% fossil fuels, most of it produced through cogeneration. Copenhagen's district cooling system also makes use of existing resources, i.e. seawater from the harbour and waste heat from the power plants. Still under expansion, it is eventually expected to help reduce CO_2 emissions by up to 30 000 tonnes each year.

Efforts to decarbonise energy supply also include the electricity system. Munich, for instance, is taking steps to supply the entire city with 100 % green electricity by 2025 (based on a mix of wind, water, geothermal, solar and biomass power), in cooperation with the city-owned utility company. A first milestone was already reached in 2015, when the company-operated plants began producing enough green energy to power all private households in the city, as well as its underground and tram systems.

Going digital: smart cities and climate change

'Smart city' and 'smart urbanism' initiatives are one of the key means through which European cities are developing technical innovation to address climate change matters. While various definitions exist in the literature, in EU terms, smart cities refer to places where the city's functioning is made more efficient with the use of information and communication technologies (ICT), resulting in better public services for citizens, better use of resources and less impact on the environment. Smart city initiatives address problems of common interest with the aid of digital technologies. Researchers have identified six smart city dimensions or axes: smart governance; smart economy; smart mobility; smart environment (including energy); smart people and smart living.[12] Several different types of smart city remedy are relevant to climate change mitigation. CO_2 emissions reductions can be achieved through **mobility solutions** such as smart cycling plans and bike sharing, integrated multi-modal travel (reducing congestion and enhancing public transport, as with the MaaS schemes presented in the transport-related section above) and smart traffic flow systems (reducing travel and transit times). Technologies used include geo-sensors, data-mining, smart cards and radio frequency identification (RFID), and tracking. Remedies related to **building technologies and management**, including power and lighting management of existing and new buildings and outdoor lighting, can help decrease both energy consumption and carbon emissions. Smart plugs, light sensors and power management automation software are among the main technologies applied.

Various examples of this can be found in **Barcelona**, one of the leading smart cities worldwide. 50 % of lighting power is controlled remotely. The city has smart LED streetlights fitted out with sensors that switch on when they detect motion and dim when the streets are empty. All in all, improvements across the urban lighting system are estimated to generate 30 % energy savings. 19 500 smart meters monitoring and optimising energy consumption have been installed in targeted areas of the city. Mobility-related digital innovations include a sensor system helping drivers to locate available parking spaces quickly, thus reducing congestion and emissions. Drivers can get real-time information on free spots on their smartphones, using the ApparkB app. The Bicing app, providing updated information on the location of public bike stations and bike availability, is another of the many municipal apps available in Barcelona, which has one of the biggest free public WiFi networks in Europe. Smart technology is used to improve the speed and efficiency of the city's new 'orthogonal bus network', and digital bus shelters are also in place.

Adaptation measures

The impacts of climate change that European cities will experience differ based on their geographical location and intrinsic vulnerabilities. However, all of them are likely to be affected. Climate change will impact several aspects of urban living, as well as the provision of essential services such as transport, water, energy or health care (Table 1).

Table 1 – Climate impacts on urban life			
	Living	**Working**	**Moving**
Heat	Decreased comfort Health risks Increased energy use for cooling/decreased for heating	Reduced labour productivity Increased energy use for cooling/decreased for heating	Discomfort on public transport Rail buckling Increased energy use for cooling/decreased for heating
Floods	Nuisance/health risks Damage to houses Power and water failures	Reduced accessibility Economic asset damage Power and water failures	Blocked roads and rail
Water scarcity	Discomfort Health and safety risks	Reduced productivity Power and water failures	Shipping constraints
Wild fires	Health and safety risks Damage to houses	Damage to economic assets	Transport route blockages
Storms	Nuisance/health risks Damage to houses Power and water failures	Economic asset damage Reduced accessibility Power and water failures	Blocked roads and rail

Source: European Environment Agency (EEA), Urban adaptation to climate change in Europe 2016.

Poor urban design can make such impacts worse. For instance, soil sealing (i.e. its permanent covering with impermeable layers of buildings, roads, parking lots etc.) leads to higher urban temperatures (the 'urban heat island effect', whereby built-up areas are hotter than surrounding rural areas); the imperviousness of the sealed areas reduces natural drainage which, especially during heavy rains, may result in urban floods. Green infrastructure is thus a key element in climate change adaptation, with trees; and green roofs, façades and areas helping to cool cities and drain excess rainwater after cloudbursts.

Unlike mitigation, adaptation is still a novel item on European cities' agendas. A 2014 survey[13] of 200 European cities across 11 countries showed for instance that 72 % of them had no adaptation plan in place, while 35 % had no mitigation plan. Over the last couple of years, hundreds of cities have started to assess their vulnerability to climate change and to develop plans and strategies. The frontrunners began putting measures into practice and exploring monitoring schemes. Rotterdam, Europe's largest sea port, is one of those.

Rotterdam's integrated climate change adaptation approach

In addition to sea and river flood defence (based on a flexible storm surge barrier, the Maeslantkering, permanent sand dunes along the coast, and dykes along the rivers), Rotterdam is taking steps to address heavy rainfall threats. It has built water storage spaces (including one with a capacity of 10 000 m^3), and is working on blue-green corridors (watercourses and ponding areas). Over 185 000 m^2 of green roofs were installed in 2014 alone. In the ZOHO district, the city is experimenting with many different ways of climate proofing an urban area.

In 2013, it was estimated that in the region of Rotterdam, some 3 600 jobs in the construction industry, consultancy offices and ICT were directly related to climate change adaptation.

How the EU supports cities

The main forms of EU support include providing guidance, promoting experience and knowledge sharing, fostering cooperation, and funding mitigation and adaptation action.

EU initiatives for cities

Climate-relevant initiatives are in place in various policy fields, from transport to environment or research and innovation, the most high-profile one being the Covenant of Mayors, a major bottom-up movement currently numbering some 7 600 signatories.[14]

The Covenant of Mayors for Climate and Energy

The [Covenant of Mayors for Climate and Energy,](#) whose signatories voluntarily commit to implementing the EU's climate and energy objectives on their territory, is open to all local authorities democratically constituted with elected representatives, whatever their size and the stage of implementation of their energy and climate policies. Its origins go back to 2008, when the European Commission launched the Covenant of Mayors to endorse and support their efforts in the implementation of sustainable energy policies. In October 2015, the Covenant of Mayors was merged with the [Mayors Adapt](#) sister initiative, to form the new integrated Covenant of Mayors, built around three pillars: mitigation, adaptation, and secure, affordable, and sustainable energy.

> **Signatories' commitments**
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> The commitments for covenant signatories are linked to the EU's climate and energy policy framework (i.e. the [2020](#) package for signatories who joined between 2008 and 2015; and the [2030](#) framework, as well as the [EU Strategy on Adaptation to Climate Change](#), for those joining after 2015). This means that new signatories now pledge to reduce CO_2 emissions by at least 40 % by 2030, and to adopt an integrated approach to tackling mitigation and adaptation.

Signatories submit an [action plan](#) in which they commit to a minimum CO_2 emission reduction target (see box) and define the measures they need to put in place to reach this commitment. The plan is based on a baseline emission inventory and a climate risk and vulnerability assessment. Signatories regularly report on progress in the implementation of their action plans. Scientific, methodological and technical support for the Covenant of Mayors initiative is provided by the Commission's Joint Research Centre.

The aims of the Covenant of Mayors for Climate and Energy include increasing support for local activities; providing a platform for greater engagement and networking by cities; and raising public awareness about mitigation and adaptation and the measures needed. In June 2016, the EU Covenant and the Compact of Mayors (an initiative launched in 2014 by the UN Secretary-General, the UN Secretary-General's Special Envoy for Cities and Climate Change and mayors from global city networks [C40](#), [ICLEI](#) and [UCLG](#)) decided to join forces in a [global coalition](#), in order to accelerate climate action at local level worldwide.

[Research](#) into low-carbon urban development shows that global cooperation of this kind is key to disseminate best practice, ensure rapid collective learning, increase ambition through credible monitoring, reporting and verification, and mobilise higher levels of investment.

Further climate-relevant initiatives

Initiatives in the field of urban transport include platforms for sharing best practice such as [CIVITAS,](#) dedicated to cleaner and better transport in cities; [ELTIS](#), the urban mobility observatory, and the [European Platform on Sustainable Urban Mobility Plans.](#)[15]

The European Innovation Partnership (EIP-SCC) on Smart Cities and Communities focuses on areas where energy production, distribution and use; mobility and transport; and ICT are intimately linked; and offer potential to improve urban services while reducing energy and resource consumption and cutting GHG emissions. It brings together city leaders, businesses, researchers and community representatives, providing them with a forum for the identification, development and deployment of innovative urban technology solutions, with a view to possible scale-up and further replication across Europe.

The European Green Capital initiative allows cities to showcase their environmental performance. The European Green Capital Award is granted each year to a city that is leading the way in environmentally friendly urban living. By sharing concrete examples, the winner can act as a role-model for other cities. A similar initiative, the European Green Leaf Award, exists for towns and smaller cities of between 20 000 and 100 000 inhabitants.
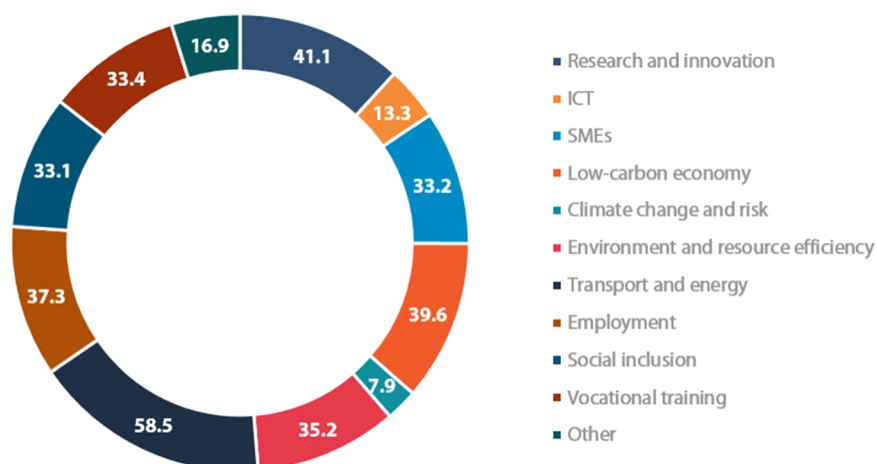
Some of the 12 thematic partnerships defined under the 2016 Urban Agenda for the EU are devoted to climate-related issues, notably those on urban mobility, energy transition and climate adaptation. Each partnership involves representatives of the European Commission, Member States, local authorities, city networks and other stakeholders, on a voluntary and equal basis. Together, they work on the development and implementation of an action plan, which identifies bottlenecks and makes proposals for improvement in three areas: regulation, funding, and knowledge exchange.

Funding

At least 20 % of the overall EU budget for 2014 to 2020 is set aside for climate-related projects, including both mitigation and adaptation.

Cohesion policy is the EU's main investment policy for regions and cities. It is delivered through three main funds: the European Regional Development Fund (ERDF), the Cohesion Fund (CF) and the European Social Fund (ESF). Fostering the shift towards a low-carbon economy; promoting climate change adaptation, resource efficiency and sustainable transport are among the priorities of current EU's cohesion policy[16] (see Figure 2). €12 billion is for instance devoted to low-carbon and sustainable urban mobility.

Figure 2 – What EU cohesion policy finances (in billion €)

- Research and innovation
- ICT
- SMEs
- Low-carbon economy
- Climate change and risk
- Environment and resource efficiency
- Transport and energy
- Employment
- Social inclusion
- Vocational training
- Other

Data source: European Commission, 2017.

Some €15 billion of the ERDF is set aside for integrated urban development strategies designed by the cities themselves, which have control over the selection of projects. The

European Regional Development Fund also finances [urban innovative actions](#) (total budget: €372 million for 2014 to 2020), enabling urban areas to test new and unproven solutions to address urban challenges. Furthermore, it contributes, with around €74 million, to the European territorial cooperation programme [URBACT III](#).

Various other opportunities[17] exist for financing urban action, e.g. the [LIFE programme](#), the Connecting Europe Facility ([CEF](#)) and the EU Research and Innovation programme [Horizon 2020](#). Examples of climate-relevant projects funded by Horizon 2020 include the [JIVE](#) initiative, which promotes the deployment of fuel cell buses, and the [ELIPTIC](#) project on the electrification of public transport, involving 11 European cities. Instruments of the European Investment Bank (EIB), such as the European Local Energy Assistance ([ELENA](#)) or the [Natural Capital Financing Facility](#), can also be helpful.

Outlook

Giving cities the means to act

Cities have a crucial role to play in addressing the climate change challenge, and many European cities are leading the way in this regard. However, since city-level action takes place in the context of broader frameworks, supportive regional and national policies and incentives are essential to ensure city-level initiatives have enough resources and potential to effect meaningful change.[18] The main demands of European city representatives and organisations, most prominently the [European Committee of the Regions](#) (CoR), include a strengthened role for cities in climate governance and easier access to climate funding.

Matching local ambition with appropriate and adequate financing represents a major challenge. In a June 2017 [statement](#), five organisations, including the city networks Eurocities, Energy-Cities and Climate Alliance, called for the EU energy efficiency financing framework to put local climate action at its core. They asked, not least, for better support for the establishment and implementation of local energy renovation programmes through the structural funds. In its 2017 [opinion](#) on climate change adaptation, the CoR calls for further guidance and support on how to access and possibly combine EU financing instruments in support of climate action. It also suggests further exploring the idea of fast-stream access to financial instruments for particular local and regional authorities, such as those that have already committed publicly to comprehensive adaptation (e.g. through the Covenant of Mayors), carried out a comprehensive risk and vulnerability assessment, and developed an action plan.

The question of the role played by cities in EU energy and climate governance is all the more relevant and pressing given that a legislative proposal on the [governance of the energy union](#), part of the Clean Energy for all Europeans package, is currently under discussion. [Eurocities](#) advocates a strong governance mechanism acknowledging the role and ambitions of city authorities in the delivery of energy union objectives. The network recommends, in particular, that in their national energy and climate plans (NECPs), Member States should integrate and report on commitments made by cities, such as action plans for signatories of the Covenant of Mayors. Along the same lines, [Energy-cities](#) stresses the need to frame EU energy union governance in such a way that leaves room for a strong role for cities, placing them on an equal footing with Member States and EU institutions.

European Parliament

The role of cities will be in the spotlight in the coming months. The draft report on the proposal for a regulation on energy union governance (rapporteurs: Michèle Rivasi, Greens/EFA, France, and Claude Turmes, Greens/EFA, Luxembourg) is scheduled for a vote in committee in November 2017. Two own-initiative reports are also in preparation: one devoted to the role of EU regions and cities in implementing the COP 21 Paris Agreement on climate change (rapporteur: Angela Vallina, GUE/NGL, Spain), and the other on the role of cities in the institutional framework of the EU (rapporteur: Kazimierz Michał Ujazdowski, ECR, Poland).

Main references

European Commission, The State of European Cities 2016. Cities leading the way to a better future, 2016.

European Environment Agency, Urban adaptation to climate change in Europe 2016 – Transforming cities in a changing climate, EEA Report No 12/2016, 2016.

Endnotes

[1] According to Eurostat, a city is a local administrative unit (LAU) where the majority of the population lives in an urban centre of at least 50 000 inhabitants.

[2] The international association of public transport UITP estimates that on average, public transport consumes 3 to 4 times less energy and emits 3.5 times less greenhouse gases per passenger than cars for every kilometre travelled. The latest data indicate that in 2015, 49 % of people used public transport for getting to work in the larger cities of the EU (Eurostat regional yearbook, 2017 edition, p.240).

[3] For a comprehensive analysis of the existing schemes, see M. Kamargianni et al., 'A critical review of new mobility services for urban transport', *Transportation Research Procedia* 14 (2016), pp. 3294-3303.

[4] Those are selected examples. For a complete overview, see Plan Amsterdam. The Electric City, September 2016.

[5] The importance and implications of improving energy efficiency, as well as the policy context, are addressed in detail in the EPRS briefing on Energy efficiency of buildings. A nearly zero-energy future? by N. Šajn (May 2016). On the revision of the 2010 Directive on the energy performance of buildings, see the corresponding legislative train.

[6] Denmark, Finland, Iceland, Norway and Sweden.

[7] Modern biomass for energy use includes wood from forestry or wood processing; agricultural crops grown specifically for energy applications; residues from agricultural harvesting or processing; food waste; industrial waste and by-products from manufacturing processes. For more details, see D. Bourguignon, Biomass for electricity and heating. Opportunities and challenges, EPRS, European Parliament, September 2015.

[8] E. Rapoport, 'Utopian Visions and Real Estate Dreams: The Eco-city Past, Present and Future', *Geography Compass*, Vol. 8, Issue 2, February 2014, pp. 137-149.

[9] S. Joss et al, Eco-Cities. A Global Survey 2011. Eco-city profiles, University of Westminster: London, 2011.

[10] A variety of definitions can be found in academic literature. Those three categories, as well as the three criteria for identifying eco-cities, derive from S. Joss, 'Eco-cities: the mainstreaming of urban sustainability; key characteristics and driving factors', *International Journal of Sustainable Development and Planning*, 6 (3), 2011, pp. 268-285.

[11] E. Rapoport, *op.cit*.

[12] Mapping smart cities in the EU, study requested by the European Parliament's Committee on Industry, Research and Energy, Policy Department A: Economic and Scientific Policy, January 2014.

[13] D. Reckien et al, 'Climate change response in Europe: What's the reality? Analysis of adaptation and mitigation plans from 200 urban areas in 11 countries', *Climatic Change*, 122(1-2), pp. 331-340.

[14] Data from 21 September 2017.

[15] On this topic, see M. Pape, Sustainable urban mobility gaining ground, EPRS, European Parliament, March 2016.

[16] For an analysis of climate mainstreaming in cohesion policy, see Research for REGI Committee – Cohesion policy and Paris Agreement Targets, Policy Department for Structural and Cohesion Policies, European Parliament, 2017.

[17] For an overview of the different financing programmes available, see the Covenant of Mayors' quick reference guide on financing opportunities for local climate and energy actions.

[18] OECD, Cities and climate change. National governments enabling local action, September 2014.

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