

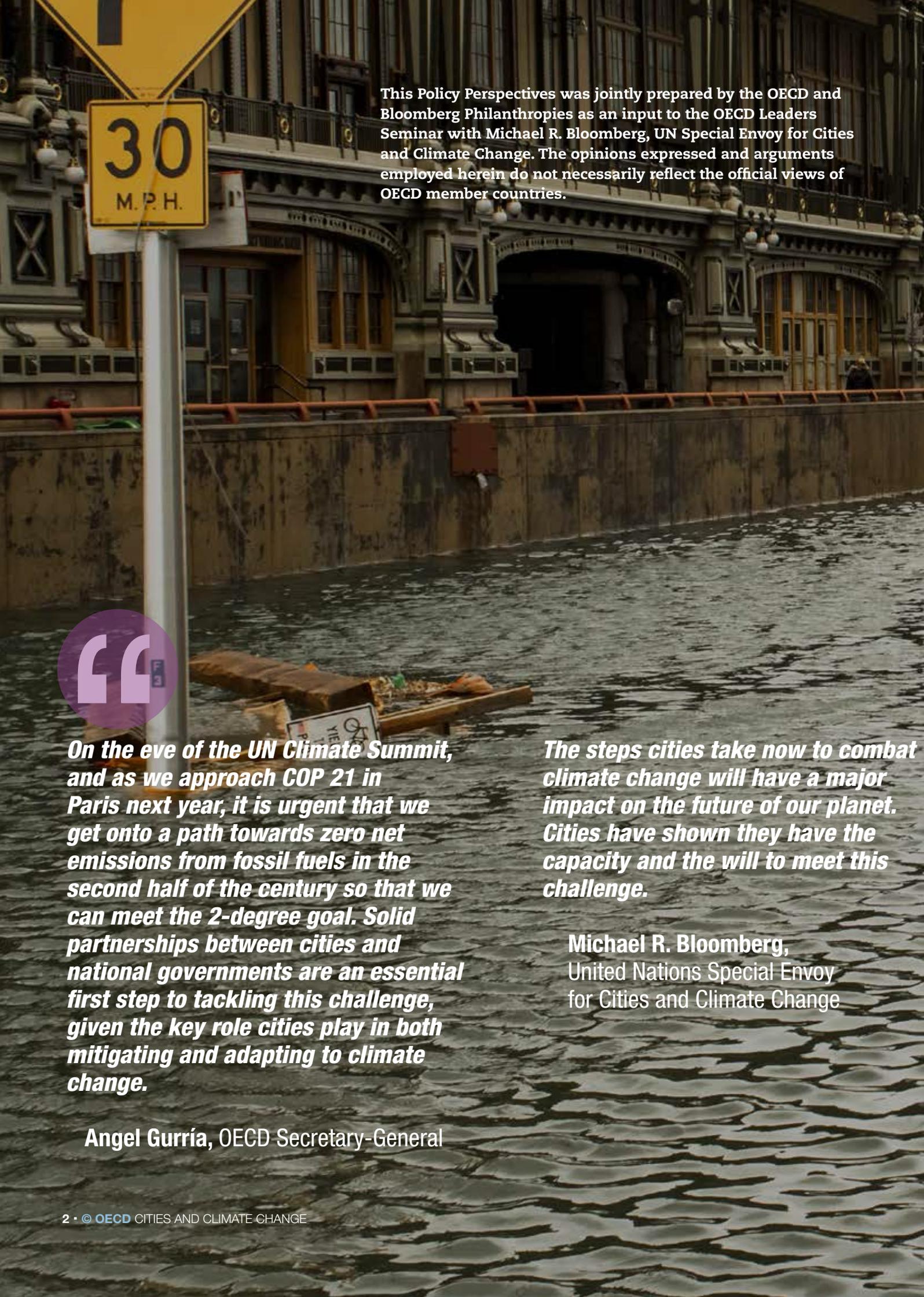
# Cities and Climate Change

POLICY PERSPECTIVES

National governments  
enabling local action



**Bloomberg  
Philanthropies**



This Policy Perspectives was jointly prepared by the OECD and Bloomberg Philanthropies as an input to the OECD Leaders Seminar with Michael R. Bloomberg, UN Special Envoy for Cities and Climate Change. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.



***On the eve of the UN Climate Summit, and as we approach COP 21 in Paris next year, it is urgent that we get onto a path towards zero net emissions from fossil fuels in the second half of the century so that we can meet the 2-degree goal. Solid partnerships between cities and national governments are an essential first step to tackling this challenge, given the key role cities play in both mitigating and adapting to climate change.***

**Angel Gurría, OECD Secretary-General**

***The steps cities take now to combat climate change will have a major impact on the future of our planet. Cities have shown they have the capacity and the will to meet this challenge.***

**Michael R. Bloomberg,**  
United Nations Special Envoy  
for Cities and Climate Change

This Policy Perspectives explores how enabling policy frameworks at the national level can support critical urban action to combat climate change.

## Key Messages

- Cities have a unique ability to address global climate change challenges. Choices made in cities today about long-lived urban infrastructure will determine the extent and impact of climate change, our ability to achieve emission reductions and our capacity to adapt to changing circumstances.
- Local action takes place in the context of broader national frameworks that can either empower or slow down city-level action; therefore, supportive national and regional policies and incentives are required to ensure city-level initiatives have sufficient resources and potential to effect meaningful change.
- National policies often establish what cities can and cannot do in terms of climate policy action (e.g. access to financial resources). As such, national and regional governments should ensure that their policy frameworks are well-aligned and work to support city-level action.
- National support is needed to help cities establish policy frameworks and minimum standards and to garner the required resources and technical information. By building environmental goals and incentives into national policies, governments can ensure that competition among cities results in a “race to the top”.
- Identifying national policies that conflict with or prevent local climate action is an important way in which national governments can improve their alignment with local climate initiatives.
- Investing in low-carbon, climate-resilient urban infrastructure has low incremental costs and provides multiple local benefits, e.g. sustainable urban transport projects can reduce traffic congestion and local air pollution as well as greenhouse gas emissions.
- Public sector financing will not be sufficient; therefore, cities need to mobilise private capital to fill funding gaps for green urban infrastructure projects. Encouraging private sector investment requires national level policies that improve the enabling environment for private investments in green urban infrastructure and the risk-return profile of these investments.

# 1 Cities are particularly vulnerable to climate change

Cities have a key role to play in addressing the global climate change challenge.

- Cities are home to more than half of the world's population and much of the world's industry. By 2050, more than 70% of the population – 6.4 billion people – is projected to live in urban areas. Most of the absolute growth in population is projected to occur in emerging Asia (Figure 1), although developing countries outside of Asia are estimated to make significant and increasing contributions over time.
- Increasing urbanisation has significant implications for climate change; air quality; water availability and quality; land use; and waste management. Provided that the right policies are put in place, the current wave of rapid urbanisation offers an unprecedented opportunity to create sustainable, liveable and dynamic cities.
- Cities are also particularly vulnerable to climate change – both because extreme weather events can be especially disruptive to complex urban systems and because so much of the world's urban population live in low-lying coastal areas, particularly in Asia (Box 1). Vulnerability to storm surges and rising sea levels is set to increase rapidly over the coming decades, as much urban growth is concentrated in Asia.



As a result, co-benefits of climate change mitigation and adaptation are largest in cities. Exceptional opportunities exist for cities to pursue climate action in ways that generate growth, employment, increased well-being for urban dwellers and significant savings from avoided health costs and expenditures on fossil fuels.

Figure 1: **Growth of world urban population in absolute numbers of new urban dwellers, 1950-2050**

Source: UNDESA Population Division (2012), World Urbanization Prospects: The 2011 Revision.

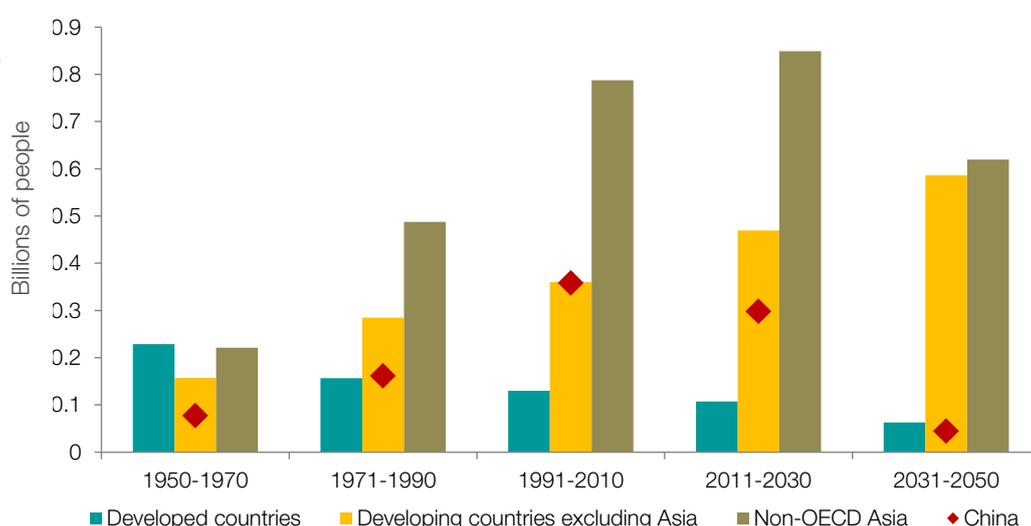
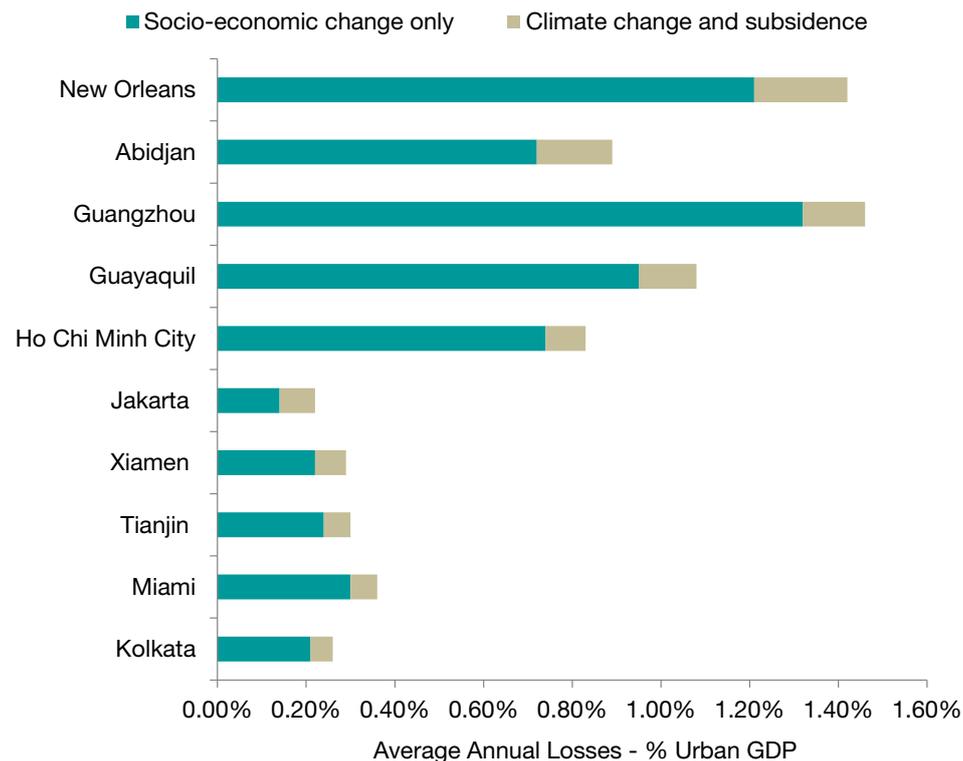


Figure 2: **Ten cities with highest projected flood losses in 2050**

(Average annual losses from socio-economic change, climate change and subsidence, measured as % of urban GDP)



“  
*Exceptional opportunities exist for cities to pursue climate action in ways that generate growth, employment, increased well-being for urban dwellers*



Source: Hallegatte et al., 2013; Nicholls, et al., 2008.

**Box 1: Flood losses and cities at risk**

Rapidly growing coastal cities are particularly at risk to rising sea levels and storm surges due to climate change:

- Average global flood losses, estimated at about USD 6 billion per year in 2005, could increase to USD 52 billion by 2050 in 136 of the world’s largest coastal cities, even in the absence of climate change – as projected socio-economic change (i.e. growing populations and assets) alone will lead to heightened vulnerability.
- The cities ranked most “at risk” today (as measured by annual average losses due to floods) span developed and developing countries: Guangzhou, Miami, New York, New Orleans, Mumbai, Nagoya, Tampa-St. Petersburg, Boston, Shenzhen, Osaka-Kobe and Vancouver.
- Altogether, the ten countries with the largest populations in low-lying coastal zones host some 400 million inhabitants today.
- In the future, the cities projected to be most at risk in terms of absolute average annual flood losses (Figure 2) are those growing quickly and located in deltaic regions of developed and developing countries, where subsidence influences local sea level in 2050 (although socio-economic change remains the biggest driving force of risk). Land subsidence is caused in part by unsustainable groundwater management practices, where groundwater withdrawal, to meet growing urban demand for freshwater, exceeds replenishment rates.

Source: Hallegatte et al. (2013), Nicholls, R. J., et al. (2008).

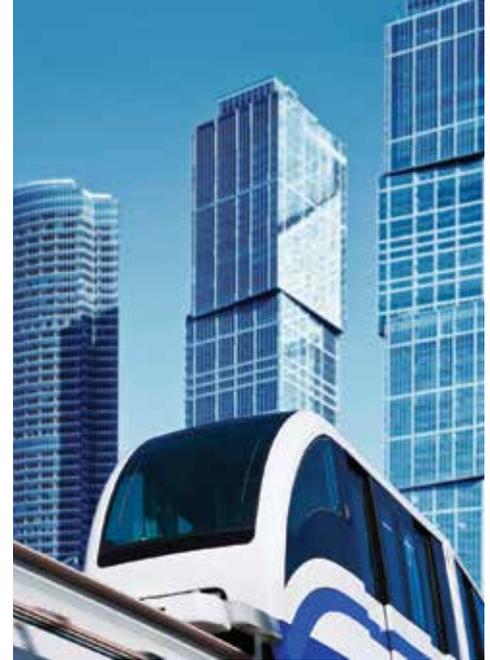


# 2 Investing in low-carbon, climate-resilient urban infrastructure has low incremental costs and provides additional benefits

By 2025, one billion urban residents will be added to the global “consuming class”.<sup>1</sup> Six-hundred million of them will be concentrated in 440 cities in emerging economies that are projected to account for nearly half of global GDP growth between 2010 and 2025. As urban populations grow, trillions of dollars will be spent on expanding and renewing urban infrastructure. Meeting increasing demand will require more than doubling annual physical capital investment to over USD 20 trillion by 2025, mostly in emerging economies.<sup>2</sup>

Choices made today about the types, features and location of long-lived infrastructure will determine the extent and impact of climate change, and the vulnerability or resilience of societies to it. A range of studies consider the cumulative investment needs for infrastructure but there is little assessment of these issues at the urban level. In most assessments, the infrastructure investment gap is estimated to be much larger than the increment required to address climate change. That is, to shift onto a path to achieve the two-degree goal and to adapt to climate change, the additional investment required is estimated to be a small fraction (e.g. in the area of 10% or less) of total investment requirements.<sup>3</sup> The IEA estimates that cumulative investment needs in energy supply and in energy efficiency will reach USD 53 trillion by 2035 to get the world on a path to achieve a two-degree goal, compared with USD 48 trillion based on today’s policies. These figures do not consider avoided fuel costs, which are significant and offset increased investment needs in the power sector by 2035 in the IEA’s “two-degree scenario”.<sup>4</sup>

The estimates of additional investment requirements also typically do not consider returns on investment through lower operating costs due to energy savings from efficiency



## Did you know...

**As urban populations grow, trillions of dollars will be spent on expanding and renewing urban infrastructure. Meeting increasing demand will require more than doubling annual physical capital investment to over USD 20 trillion by 2025, mostly in emerging economies**

investments or lower fuel costs in the case of renewable energy replacing fossil energy. They also do not consider other benefits such as avoided health costs. One study<sup>5</sup> estimates that shifting to low-carbon and climate-resilient infrastructure could result in systemic change that raises only slightly, or even lowers, overall investment costs.

Overall these analyses point to an opportunity to adapt and mitigate climate change when filling what is already a large investment gap for basic infrastructure in urban areas.

# 3 Enabling national policies are necessary to advance climate action at the city level



Local governments have often been named as key actors in the transformation towards a more sustainable society. Many local decisions can directly affect the environment, such as local authorities' regulation of transportation, building construction, spatial planning, and economic matters.<sup>6</sup>

Additionally, because they are in close contact with citizens and local businesses, local governments are often in a better position to influence consumer and producer behaviour by implementing nationally-driven emission-reduction policies at the urban level, based on their knowledge of local conditions and capabilities. Cities can also act as laboratories of social and technical innovation, and provide essential experience at the local level that could be scaled up at the national level.

However, while cities can develop and implement a wide range of climate policies in their own right, it is clear that much local action takes place in the context of broader national frameworks that can either empower or slow down city-level action. This is because:

- National policies typically determine what cities can do: their responsibilities and their resources are largely defined by legislation adopted at national or, in federal systems, intermediate levels.

## Notes

1. McKinsey Global Institute (2012). "Global consuming class" is defined as those with annual income of more than USD 3 600 or USD 10 per day, at PPP using constant 2005 PPP dollars.
2. McKinsey Global Institute (2012).
3. Kennedy and Corfee-Morlot (2013).
4. IEA (2014a).
5. Kennedy and Corfee-Morlot (2012).
6. Arup and C40 Cities (2014).



- National policies also affect what cities have an incentive to do. A strong national framework based on carbon pricing will broaden the range of environmentally and economically effective options available to cities.

Supportive national policies and incentives are required to ensure city-level initiatives have sufficient resources and potential to effect meaningful change. Governments need to work

together across all levels and policy domains. National support is needed to help cities establish policy frameworks and minimum standards, to garner the required resources, relevant tools and technical information, and to fully engage civil society and other key stakeholders to combat climate change. By building environmental goals and incentives into national and urban policies, governments can ensure that competition among cities results in a “race to the top” rather than the bottom.

## Financing investments in low-carbon and climate-resilient infrastructure

### *Challenges and opportunities*

Scaling-up finance and investment in low-carbon, climate-resilient infrastructure in cities (e.g. for adaptation, building retrofits, protection for the built environment and new mass transit solutions) involves a number of opportunities and challenges specific to the urban context.

Local governments typically have authority over the selection of infrastructure projects made at the municipal level and over land-use decisions, which in turn determine infrastructure needs and associated investment requirements. As a result, they have a range of policy tools available to achieve sustainability and scale-up investment in low-carbon, climate-resilient infrastructure.

However, city-level decisions on infrastructure investment and financing are constrained by the ongoing financing challenge for cities, largely as a result of the global financial crisis and a chronic deficit of infrastructure financing. Investment at the sub-national level has declined significantly in recent years, with implications for city-level infrastructure investment and maintenance. Cities generally have lower credit ratings than their respective national governments, as their default risk is considered to be higher (Box 3). In addition, national and sub-national governments set sovereign limits on how much or if a city can borrow from the private sector. These constraints on the ability of cities to increase public infrastructure spending is a particular concern, as local governments in OECD countries are typically responsible for 70% of public investment and 50% of public spending on the environment.

National policy action and support is needed to improve the financial viability of cities and target additional revenue sources.<sup>7</sup> Public sector financing will not be sufficient and cities need to mobilise private capital to fill funding gaps for green urban infrastructure projects. Encouraging private sector investment requires national-level policies that improve the enabling environment for private investments in green urban infrastructure and the risk-return profile of these investments.

#### Note

7. OECD (2010).



## Box 2: Financing urban adaptation to climate change

Financial resources for urban adaptation action can come from public and private sectors, domestic and international sources of funding. The scale and source of funds contributing to climate adaptation varies widely by location. According to a survey (Carmin et al., 2012) of 468 cities across OECD and non-OECD countries:

- Most cities (60%) do not receive any financial support from other partners for their adaptation actions.
- National governments (24%) represent the most common source of financial support for adaptation.
- A smaller number of cities (9%) reported funding from sub-national governments while others (8%) reported support from private foundations and non-profit organisations.
- Only 2-4% of the cities and specifically those in developing countries, reported funding from international financial institutions such as multilateral development banks (MDBs), with large variations across regions. In Latin America for instance, studies show that MDBs are the most prevalent source of funding for adaptation (21%).

The ability of cities to finance climate adaptation depends on the extent to which local authorities can tax residents, property owners and businesses. In developing countries this capacity varies widely. In Latin America, decentralisation has strengthened fiscal bases for cities and supported environmental innovation over the last 20 years (along with more elected mayors and more accountable city governments). Conversely, in Africa and Asia, a high proportion of urban governments still have very limited investment capacities as most of their revenues go to salaries and other recurrent expenditures. Research has highlighted the large difference in annual expenditure per person by local governments, ranging from over USD 6 000 in some high-income nations to less than USD 20 in most low-income nations (UCLG, 2010).

Source: Revi et al., 2014; Carmin et al. 2012, p. 30; UCLG, 2010; UCLG, 2011, p. 384.



## National policies and enabling conditions

---

To stimulate the shift to and significant scaling-up of investment in low-carbon, climate-resilient urban infrastructure, a critical step for national governments is to engage the private sector and mobilise investment for urban green infrastructure projects. Key enabling conditions and national policies include:<sup>8</sup>

- Establishing market instruments and other policies to directly incentivise green urban investment such as energy-efficient buildings (e.g. through carbon pricing to make greener alternatives competitive with carbon-intensive options, and regulations such as performance standards).
  - Establishing sound investment policies to protect property rights, stimulate international trade and ensure fair competition among local and international suppliers or investors.
  - Strengthening financial market policies that can help to mitigate risk and improve returns
- by supplementing local capital markets with low-interest lending or loan guarantees, developing green bonds or setting up green investment banks (Box 4).
  - Funding programmes and instituting policies to provide training and technical support to enhance access to private capital markets and build expertise needed for climate actions (e.g. in local financial and industrial sectors).
  - Passing legislation concerning municipal finance to expand cities' authorities to tax and to enable cities to establish and improve their creditworthiness; reforming rules governing the use of transfers from senior governments (especially where they limit the ability of cities to mix funds from different sources and thereby impede the adoption of integrated solutions cutting across policies); and ensuring that regulations governing cities' indebtedness, participation in PPPs, etc., encourage cities to make the best use of available financing mechanisms. National governments could play a key role in greening urban finance by redesigning sub-national taxes and grants, especially those with an impact on the built-in environment.

### Box 3: Improving creditworthiness of cities

Access to credit and finance is one of the key challenges cities have to face today to finance their infrastructure base. The nature of the challenge differs depending on country conditions, and instruments and tools implemented to facilitate access to finance will vary. Some instruments are more appropriate for cities in industrialised and medium-income countries than lower-income developing countries, for which grants, loans and other development finance instruments could be more relevant.

One of the key problems in developing countries is linked to the absence of creditworthiness. The World Bank estimates that only 4% of the 500 largest cities in developing countries are deemed creditworthy in international financial markets and only 20% in local markets. A first step to get finance flowing for low-carbon infrastructure is to make municipalities more attractive to private investors and help them access markets. The World Bank's City Creditworthiness Program helps cities conduct thorough reviews of their municipal revenue management systems as a first step to qualify for a credit rating.

Improving credit worthiness is also critical. Most cities in OECD countries have a credit rating, but such ratings are generally lower than those of their respective national governments as their default risk is considered to be higher. Cities, with the support of national governments or international financing institutions, can access innovative financing solutions to develop mechanisms to attract more private capital to the sub-sovereign market. Examples of such mechanisms include mechanisms to pool financing opportunities and green bonds (Box 4). For example, the US federal government supports municipal bonds through tax exemptions and subsidies, and the World Bank offers green bonds for cities in low- and middle-income countries as part of project financing.

Source: World Bank City Creditworthiness Program, Merck et al., 2012, OECD, 2010.



## Local policies and instruments

A broad range of policies and instruments are often available for local governments to achieve sustainability and to scale up investment in low-carbon, climate-resilient infrastructure. National and sub-national governments can pass enabling legislation to provide local governments with the authority to tax and the ability to use other policy instruments. For their part, local governments can make use of their available authority and leverage their knowledge of local conditions to create new sources of financing for climate action.

### Notes

8. Corfee-Morlot et al. (2012).

9. OECD (2010).

Where the authority exists, local policies can be greened to achieve sustainability and to influence the behaviour of producers and consumers in urban settings, including through:

- Local governments setting congestion charges, variable parking fees and toll lanes.
- Local governments reforming property tax provisions that favour single-family dwellings or otherwise contribute to sprawl, and greening the local tax system (the Netherlands). Both local and national taxation policies can shape behaviour and environmental outcomes.
- Local governments receiving inter-governmental grants for environmental spending (Portugal, Germany, Brazil, Sweden and the US).<sup>9</sup>

### Box 4: What are green bonds and why are they important for cities and climate change?

Cities could benefit from the development of new and innovative financial instruments such as green bonds. Green bonds can be particularly attractive to institutional investors (e.g. pension funds and insurance companies) and help increase their participation in green infrastructure investments, given the large allocations they make for bonds within their portfolios. In 2012, the total amount of capital held in global bond markets owned by all types of investors was around USD 78 trillion (BIS, 2012).

“Green” or “climate” bonds are broadly defined as fixed-income securities issued by governments (in some cases local governments), multi-national banks or corporations to raise the necessary capital for a project which contributes to a low-carbon, climate-resilient economy. According to the OECD, a total of USD 15.6 billion of green bonds had been issued as of 2012. As of June 2014, USD 20 billion had been issued in 2014 alone, compared to a total of USD 502.6 billion of green bonds outstanding. To date, USD 489 million worth of green bonds have been issued specifically by cities (Gothenburg and Johannesburg) and USD 1.65 billion by regions around cities (Ile de France, Pas de Calais and Provence, France and Massachusetts, US) (HSBC, 2014).

The OECD has called for common standards and issuing principles which are essential for growing bond markets and ensuring that green bond investments address climate change. Progress is being made on this front by organisations such as the Climate Bonds Initiative with their Climate Bonds Standard and the Green Bond Principles overseen by the International Capital Markets Association.

Source: Bank of International Settlements Quarterly Review, 2012; Merk, O., et al. 2012; Kaminker et al., 2014 forthcoming; HSBC and Climate Bonds Initiative, 2014.

# The case of urban sustainable transport

To meet the two-degree goal, it will be critical to address fast-growing global transport emissions. In 2010, more than half of all transport emissions occurred in urban areas. The challenge is especially significant in rapidly urbanising countries, where auto-based urban sprawl has in many cases given rise to significant environmental challenges. Developing sustainable urban transport can be promoted through better co-ordination of urban transport investment across levels of government and with the private sector, more integrated transport and land-use planning, efforts to bring about changes in transport modal share (e.g. more trips via public transport, walking and cycling; fewer trips via personal vehicles) and improvements in energy intensity and fuel type.<sup>10</sup>

To ensure more efficient and sustainable mobility at the city level, national governments need to enact policies which directly impact the attractiveness of investments in sustainable urban transport infrastructure, as well as policies which enable local governments to implement policies to promote sustainable urban transport. National and local governments should work together to:

- Integrate land-use and transport planning. Developed countries have the significant challenge of retrofitting existing urban patterns to improve transport energy efficiency. Many developing country cities have the rare opportunity to direct land-use and travel growth toward more energy-efficient transport systems before urban form and transport network development are fully established. Integrated planning can facilitate the development of cities with dense, mixed-use development patterns in urban areas accessible to public transport. However, important governance gaps complicate more integrated planning. In many countries, land-use decisions and urban planning are in the hands of local governments, while transport planning and funding are the

responsibilities of higher levels of government. In such cases, the national government can establish national-local co-ordinating authorities to help align planning across the different levels of government.

- Mobilise private investment in sustainable urban transport. While infrastructure needs continue to grow, public budgets are increasingly constrained. Private investments will be needed to help cities provide accessible, affordable and environmentally sustainable urban passenger transport. This can be achieved through financial tools and risk-sharing mechanisms to improve projects' risk-return profile and facilitate access to financing [e.g. public-private partnerships (PPPs), green bonds (Box 4)]. The ability of cities to access these types of finance is typically determined by higher levels of government.
- Design a comprehensive transport policy package. To create incentives for more sustainable urban transport investment and shift incentives away from fossil-fuel based road transport,



governments should develop pricing instruments such as carbon prices, and fuel and vehicle taxes. These are typically set at the national level, but national governments can provide authority to local governments to tax and use different pricing instruments. Congestion charges can be particularly helpful in cities (e.g. Singapore, London, Stockholm or Milan), though may require enabling legislation from higher levels of government.

- Make greater use of land value capture tools, which can tap into indirect benefits generated by transport infrastructure (e.g. increased real estate value) to finance transport projects. They have been instrumental in funding the construction or renovation of subway or rail networks, such as the Hong Kong metro, Copenhagen metro extension, Hudson Yards subway station and extension in New York City, and Canary Wharf in London. These tools generally also require enabling legislation from national governments.

- Develop more energy-efficient modes of transport through national standards and regulations (e.g. energy efficiency standards for fuels or vehicles).
- Adopt a co-benefit approach for green transport. In addition to helping address the global climate change challenge, policies to support sustainable transport investment also provide tangible benefits at the urban level, such as avoided health costs (Box 5). This illustrates the synergies between economic growth and climate change action at the urban level, and the complementarities of policies at the local scale which help soften or even avoid the trade-offs between economic growth and environmental priorities.



#### Note

10. IEA (2013).

### Box 5: The cost of air pollution

Measures to cut carbon emissions often have co-benefit of cutting local air pollution. National governments can provide data and analysis to local governments to quantify the health benefits of greener transport options, which can be substantial. The new OECD report, *The Cost of Air Pollution: Health Impacts of Road Transport* estimates that:

- The costs of air pollution reached some USD 1.7 trillion in 2010 for the 34 OECD countries (in terms of people's willingness to pay to avoid premature death from air pollution, using the value of statistical life or VSL).
- Road transport accounts for about 50% of this cost in OECD countries, or close to USD 1 trillion.
- The economic cost of the health impacts of outdoor air pollution in China and India combined is larger than the OECD total – about USD 1.4 trillion in China and about USD 0.5 trillion in India in 2010 according to the best available estimate.
- While road transport is responsible for less than half of these costs in China and India, it still represents a large burden.

Source: OECD, 2014a.

# Smart urban design and planning

## Challenges and opportunities

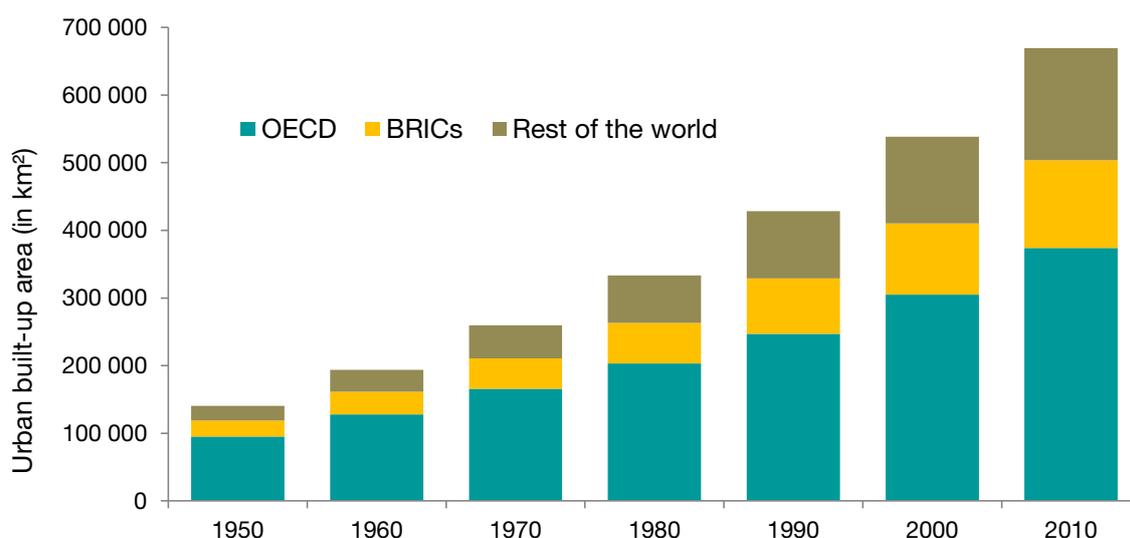
Urban land area in OECD countries has doubled since the mid-1950s, and outside the OECD it has grown five-fold (Figure 3). This has important consequences for climate change, as CO<sub>2</sub> emissions from transport tend to increase as population density decreases (Figure 4).

- Integrated planning, vertically across different levels of government and horizontally across different stakeholders

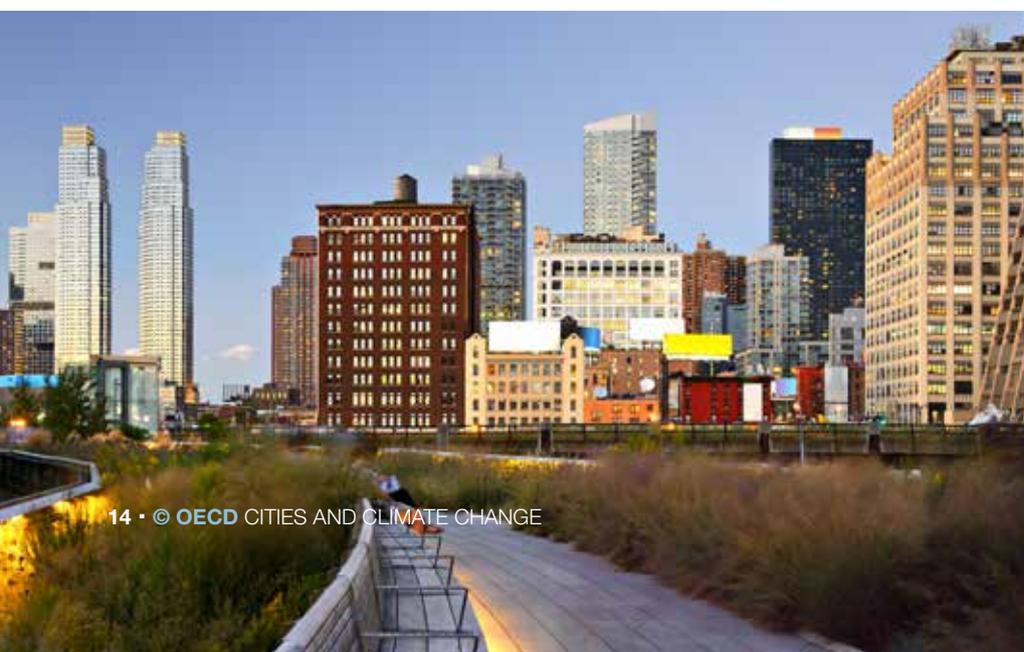
and sectors, offers myriad opportunities to curb greenhouse gas emissions and proactively manage climate change risk and vulnerability through reducing unplanned and uncontrolled urban expansion.

- Integrated land-use and transport planning can encourage the development of cities with dense, mixed-use development patterns in areas that are well connected to public transport.
- Even where explicit policies exist to curb sprawl, there are often other conflicting policies that inadvertently encourage it. These include: property tax provisions that favour single-use and single-family dwellings; zoning rules that limit density; and planning regimes that favour greenfield development over infill development (use of land within a built-up area for further construction).

Figure 3: Changes in built-up areas, 1950-2010



Source: OECD, 2012c.





## National policies and enabling conditions

Efforts by individual cities to curb spatial expansion can prompt firms and households to relocate to more permissive jurisdictions.<sup>11</sup> National governments can limit competition between cities and avoid a “race to the bottom” by setting minimum standards and guidelines to encourage urban infill development and by facilitating metropolitan and/or inter-municipal co-operation. Governments can also improve policy coherence and align the planning and management of national, regional and local infrastructure development.

In large and administratively complex metropolitan areas, addressing climate challenges will often require the co-ordination of adjacent municipalities across the administrative boundaries of individual cities (e.g. on transport and land-use planning). This is necessary in order to avoid outcomes that are both economically inefficient and environmentally harmful. Yet such co-ordination can be extraordinarily difficult in practice, even when local actors recognise the need – in part because the institutional arrangements for such co-ordination do not necessarily exist. Most often, effective co-ordination at metropolitan scale will benefit from central government leadership.

In order for local governments to set the right urban design and planning policies, national governments can take a number of

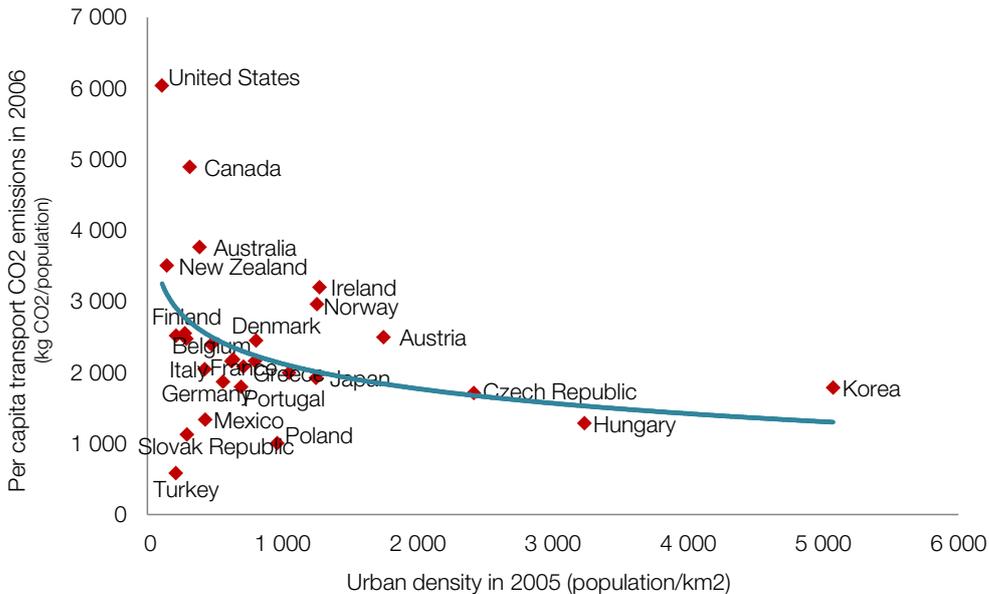
additional actions, including:

- Setting up minimum standards to avoid building in areas most vulnerable to climate change.
- Helping cities provide sufficient enforcement of national standards and building codes.
- Providing capacity building to local governments for long-term urban planning.
- Integrating city design and spatial planning considerations into national adaptation plans.

**Note**

11. Gaigné, et al. (2012).

Figure 4: CO2 emissions from ground transport in large metro areas



Source: OECD, 2013b.

## Local policies and instruments

Effective urban policies can ensure that infrastructure is designed to withstand the expected increase in climate impacts, while simultaneously improving the energy and emission performance of the built environment. For example:

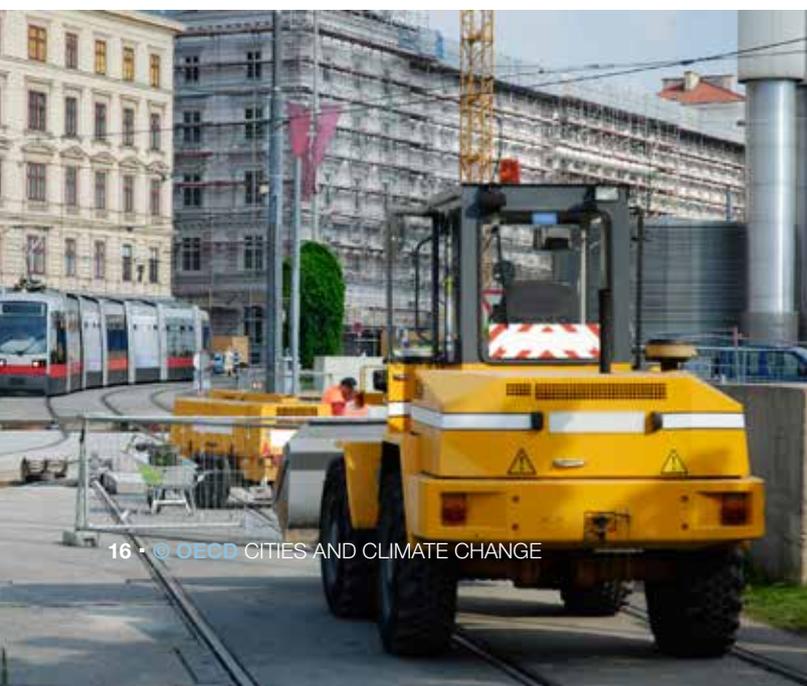
- Land-use planning tools are particularly important to reduce vulnerability to floods and other extreme-weather events. While lower levels of government likely have better knowledge of local conditions, national and regional governments may need to provide guidelines, build technical capacity and facilitate information-sharing across jurisdictions when it comes to better management of climate-related risks.
- A growing number of cities are moving towards smart zoning practices that allow critical public services to be located in residential zones, nearer to where people live, and shifting away from traditional zoning that restricts mixed-use developments and multi-occupancy dwellings in favour of single-family units. The objectives of smarter local land-use decisions should be supported by a broader national legislative and fiscal framework that creates incentives for more compact urban development.

### Did you know...

**Urban land area in the OECD has doubled since the mid-1950s, and outside the OECD it has grown five-fold.**

- Integrated urban planning is central to land use and zoning decisions that may exacerbate or limit the exposure and vulnerability of urban dwellers and infrastructure to the growing threat of climate change. It can also help to reduce distributive impacts of climate change, since poor populations in most countries are often concentrated in parts of cities that are most exposed to climate risks.
- In some fast-urbanising countries, smart urban planning can be achieved by setting credible urban growth boundaries when a strict urban containment policy is unrealistic. These boundaries, however, should be designed in co-operation with neighbouring jurisdictions to limit “leapfrog” development; to this end, support from national and regional governments can be instrumental.

Strategic urban planning provides the framework needed to realise the potential synergies (and, where necessary, to manage the trade-offs) between other policy priorities. For example, decisions regarding the location and density of residential, commercial and industrial land uses, have considerable impact on activities in these sectors. Transport policies are also interlinked with those on zoning, natural resources management and use of renewable energy; they affect the amount and type of energy required to travel within a metropolitan region as well as the impact and vulnerability of transport infrastructure relative to the surrounding environment.



# Building energy-efficient cities



## Challenges and opportunities

Cities offer significant potential for energy-efficiency improvements. The IEA estimates that 38% of the cumulative emission reductions required to meet the 2 degree goal by 2050 could come from increased energy efficiency.<sup>12</sup> With cities accounting for 60% to 80% of energy consumption worldwide, much of the potential for energy efficiency improvements lies in cities. There is substantial scope for increasing energy-efficiency in cities at relatively modest cost in ways that could substantially reduce both the economic and social cost of emissions reduction and the transition to a low-carbon economy.

Reducing energy consumption in the construction, maintenance and refurbishment of buildings can offer important economic and employment opportunities, improve energy security and realise cost savings. Although many local governments want to increase investment in energy efficiency of their buildings, the small scale of projects, difficulties in accessing capital, the presence of information asymmetries and split incentives between landlords and tenants can often stand in the way. Financial barriers, including the initial cost, the need for short pay-back periods from energy cost savings, and the inadequacy of financing mechanisms are also significant obstacles.



## National policies and enabling conditions

Strong regulations at the national level on building codes associated with national or local public subsidies and incentives are necessary to empower city-level action. But these are not likely to be sufficient. Policies to create and sustain demand for energy-efficiency investments, and the supply of innovative financial instruments to aggregate and de-risk energy efficiency projects are critical to leverage private investment. Finally, data collection and monitoring and evaluation of projects will also play an important role to develop innovative financing models for energy-efficiency measures.

Key national enabling conditions and policies include:

- Energy-efficiency standards for new buildings and renovation. These may be incorporated into building codes or in a separate regulation establishing minimum energy-efficiency requirements. Codes and standards are generally set at national level, but may allow for adjustment to local conditions in countries with large climatic differences. In recent years there has been supranational collaboration to develop international energy efficiency requirements or standards (e.g. a standard for Europe, and another for U.S. and Canada).<sup>13</sup>

### Note

12. IEA (2014b).

13. IEA (2008).

- National funding sources for energy-efficiency programs implemented at the regional or local level.<sup>14</sup>
- National legislation and regulation to support innovative financing mechanisms, such as Property Assessed Clean Energy (PACE).<sup>15</sup>

Additional enabling policies and support for energy efficiency may also be provided at the international level. For example, the European Energy Efficiency Fund (EEEF) was launched on 1 July 2011 with a global volume of EUR 265 million, providing tailor-made debt and equity instruments to local, regional and (if justified) national public authorities or public or private entities acting on their behalf. EEEF aims at financing bankable projects in energy efficiency (70%), renewable energy (20%) and clean urban transport (10%) through innovative instruments.<sup>16</sup>

## *Local policies and instruments*

While national policies play an important role in designing energy efficiency policies, local policies give communities the opportunity to innovate and develop the plans that work best for their unique geographical and economic needs. Local governments play a key role in implementing national energy efficiency policies. For example, many city authorities are often responsible for implementing the energy efficiency requirements of national or regional building codes. They can also influence energy use more directly, principally through urban planning functions and its consequent impact on urban form and transport infrastructure. City authorities are also significant energy users in their own right to provide urban services to their constituencies.

Several policies are used to improve energy efficiency in buildings, industry and households, including:

- Projects to retrofit existing buildings with energy efficiency technologies.
- Property tax deductions for low-carbon buildings.

In addition to reducing fuel consumption and increasing energy security, energy efficiency can also provide adaptation and mitigation win-wins. For example, better building insulation will reduce emissions, protect against extreme temperatures, and lower cooling costs as temperatures rise.



### Note

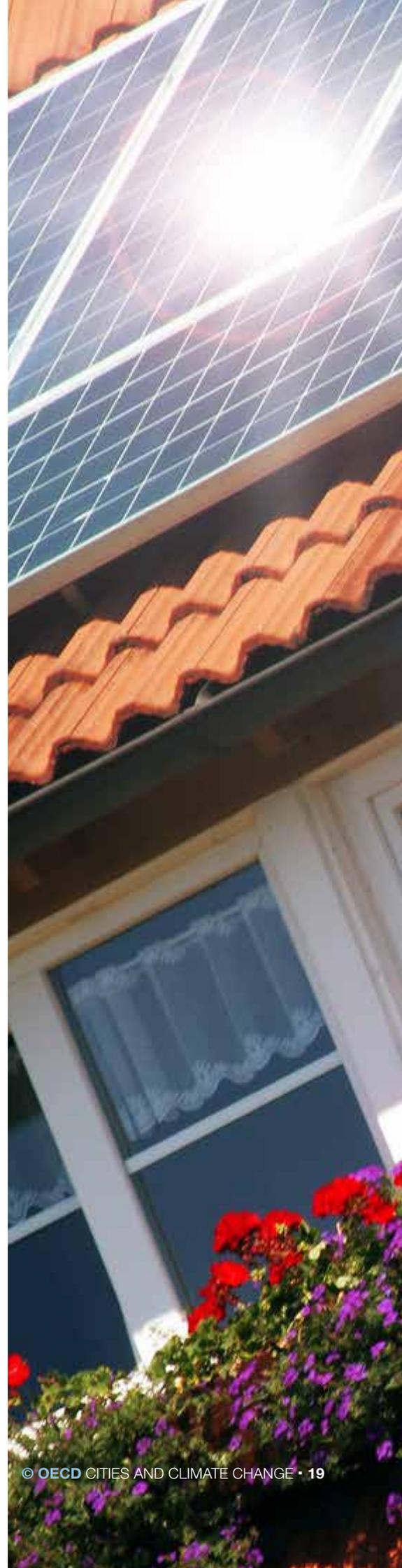
14. ACEEE, 2014.

15. ACEEE, 2014.

16. <http://www.eeef.eu/>, accessed 4 September 2014.

# 4 Key national policy recommendations

- Improve policy coherence and align the planning and management of regional, national and local infrastructure development.
- Set market instruments and regulations to directly incentivise green urban investment by pricing environmental bads and setting regulations such as performance standards for energy efficiency in buildings and transport.
- Establish sound investment policies to protect property rights, stimulate international trade and ensure fair competition among local and international suppliers or investors.
- Strengthen financial market policies that can help to mitigate risk and improve returns by supplementing local capital markets with low-interest lending or loan guarantees, develop green bonds or establish green investment banks.
- Review legislation concerning municipal finance to make sure cities can access the necessary resources and establish and improve their creditworthiness in order to finance low-carbon infrastructure.
- Co-ordinate metropolitan governance and limit the scope for inter-jurisdictional competition to ensure that competition among cities results in a “race to the top”.
- Fund programmes and institute policies to provide training and technical support to enhance access to private capital markets and build expertise needed for climate actions (e.g. in local financial and industrial sectors).
- Incorporate climate change issues in regulatory impact assessment at the national level to identify misalignments and perverse signals and incentives across different policy areas.



## REFERENCES

- ACEEE (American Council for an Energy Efficient Economy) (2014), "Energy Efficiency Policies for Local Communities", *Policy Brief*, June 2014, <http://www.aceee.org/files/pdf/policy-brief/communities-brief-0714.pdf>, website accessed 03/08/2014.
- Ang and Marchal (2013), "Mobilising Private Investment in Sustainable Transport: The Case of Land-based Passenger Transport Infrastructure," *Environmental Working Paper*, No. 56, OECD Publishing, Paris.
- Arup and C40 Cities, 2014, "Climate Action in Megacities: C40 Cities Baseline and Opportunities, Volume 2.0", [http://c40.org/blog\\_posts/CAM2](http://c40.org/blog_posts/CAM2), [http://issuu.com/c40cities/docs/c40\\_climate\\_action\\_in\\_megacities/17?e=10643095/6541335](http://issuu.com/c40cities/docs/c40_climate_action_in_megacities/17?e=10643095/6541335).
- BNEF (Bloomberg New Energy Finance) (2013), "Clean Energy – White Paper, Financial regulation – biased against clean energy and green infrastructure?".
- Carmin, J., N. Nadkarni, and C. Rhie, 2012, "Progress and Challenges in Urban Climate Adaptation Planning: Results of a Global Survey", Massachusetts Institute of Technology (MIT), Cambridge, MA.
- Corfee-Morlot, J., et al. (2012), "Towards a Green Investment Policy Framework: The Case of Low-Carbon, Climate-Resilient Infrastructure", *OECD Environment Working Papers*, No. 48, OECD Publishing, Paris.
- Della Croce, R., C. Kaminker and F. Stewart (2011), "The Role of Pension Funds in Financing Green Growth Initiatives", *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 10, OECD Publishing, Paris.
- Fuller, B. and P. Romer (2014), "Urbanisation as Opportunity" in *OECD Regional Outlook 2014*, OECD Publishing, Paris.
- Gaigné, C., S. Riou and J-F. Thisse (2012), "Are Compact Cities Environmentally Friendly?", *Journal of Urban Economics* 72, pp. 123–136
- Hallegatte, S., C. Green, R.J. Nicholls and J. Corfee-Morlot (2013), "Future flood losses in major coastal cities", *Nature Climate Change*, 3, pp. 802–806.
- HSBC and Climate Bonds Initiative (2014), "Bonds and climate change: The state of the market in 2014", <http://www.climatebonds.net/files/files/-CB-HSBC-15July2014-A4-final.pdf>.
- IEA (2014a), *World Energy Investment Outlook*, OECD/IEA Publishing, Paris.
- IEA (2014b), *Energy Technology Perspectives 2014*, OECD/IEA Publishing, Paris.
- IEA (2013), *A Tale of Renewed Cities: A policy guide on how to transform cities by improving energy efficiency in urban transport systems*, OECD/IEA Publishing, Paris.
- IEA (2008), "Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings," IEA Information paper in support of the G8 Plan of Action, ©OECD/IEA, March 2008.
- Kaminker, C., et al. (2014 forthcoming), *Mobilising institutional investment for sustainable energy infrastructure: defining channels and approaches*, OECD Publishing, Paris.
- Kaminker, C., et al. (2013), "Institutional Investors and Green Infrastructure Investments: Selected Case Studies", *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 35, OECD Publishing, Paris.
- Kennedy, C. and J. Corfee-Morlot (2013), "Past performance and future needs for low carbon climate resilient infrastructure – An investment perspective", *Energy Policy* 59 (2013), 773-783.
- McKinsey Global Institute (2012), "Urban world: Cities and the rise of the consuming class", [www.mckinsey.com/insights/urbanization/urban\\_world\\_cities\\_and\\_the\\_rise\\_of\\_the\\_consuming\\_class](http://www.mckinsey.com/insights/urbanization/urban_world_cities_and_the_rise_of_the_consuming_class).
- Merk, O., Saussier, S., Staropoli, C., Slack, E., Kim, J-H (2012), "Financing Green Urban Infrastructure", *OECD Regional Development Working Papers*, 2012/10, OECD Publishing, Paris.
- Nicholls, R., S. Hanson, C. Herweijer, N. Patmore, S. Hallegatte, J. Corfee-Morlot, J. Chateau, and R. Muir-Wood (2008), "Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates", *OECD Environment Working Paper*, 1, OECD, Paris. Executive Summary. Supplemental scenario data.
- OECD (2013c), "Policy Guidance for Investment in Clean Energy Infrastructure - Expanding access to clean energy for green growth and development", An OECD report to the G20, with contributions by the World Bank and UNDP.
- OECD (2013d), "Annual Survey of Large Pension Funds and Public Pension Reserve Funds: Report on pension funds' long-term investments", OECD Publishing, Paris.
- OECD (2012a), *OECD Environmental Outlook to 2050*, OECD Publishing, Paris.
- OECD (2012b), *Investing Together: Working Effectively Across Levels of Government*, OECD Publishing, Paris.
- OECD (2012c), *Compact City Policies: A Comparative Assessment*, OECD Green Growth Studies, OECD Publishing, Paris.
- OECD (2010), *Cities and Climate Change*, OECD Publishing, Paris.
- OECD/ITF (2010), "Implementing Congestion Charges", *ITF Round Tables*, No. 147, OECD Publishing, Paris.
- Revi, A. et al., 2014, "Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change", <http://www.ipcc.ch/report/ar5/wg2/>.
- UCLG, 2011, "Local Government Finance: The Challenges of the 21st Century", Second Global Report of United Cities and Local Governments Edward Elgar, Cheltenham.
- UCLG, 2010, "Local Governments in the World: Basic Facts on 96 Selected Countries," United Cities and Local Government, Barcelona.
- World Bank City Creditworthiness Program, <http://www.worldbank.org/en/news/feature/2013/10/24/financing-sustainable-cities-africa-creditworthy>, accessed 29-08-2014.
- World Bank (2011), *Economics of Adaptation to Climate Change*, World Bank, Washington DC.



For more information:

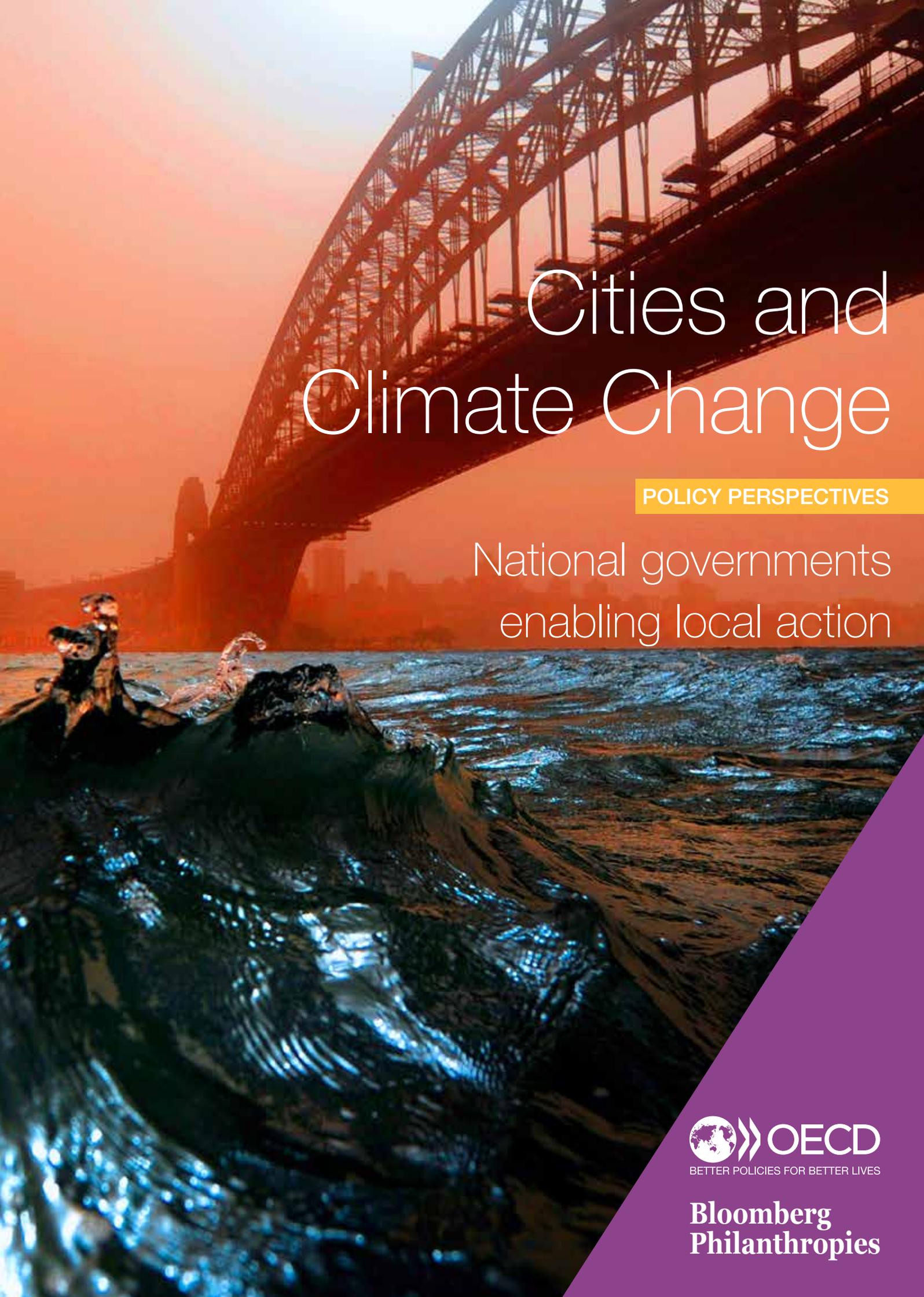
<http://www.oecd.org/>

<http://www.oecd.org/environment/>

### Photo credits

© Sydney Foto Zombie, © Deep-in-thought,  
© Patrick McFall, © Umasa, © Official NexAmCity  
© Todd Anderson, © David Dodge  
(Flickr creative commons)

September 2014



# Cities and Climate Change

POLICY PERSPECTIVES

National governments  
enabling local action



**Bloomberg  
Philanthropies**