

NEW WAYS FOR CITIES TO TACKLE CLIMATE CHANGE

Cities, which are home to half of the world's population, are on the front lines of climate change. Extreme temperatures, storms, and floods have a higher impact in crowded urban areas. And cities in emerging economies will bear an even greater burden of climate change threats. Given their vulnerability, as well as their ability to affect change, cities will be key players in shaping efforts to lessen the impact of climate change. Now a number of new initiatives are helping urban leaders better assess and respond to climate risks.

In addition to the human and environmental cost of the changing climate and warmer temperatures, cities must also contend with major financial losses when natural disasters hit. About half of the world's population lives in urban areas, which are hubs of economic activity. These areas produce about 80 percent of the world's gross domestic product and nearly 70 percent of global emissions.¹ As a result, a single major storm can cause billions of dollars in economic losses, not to mention the devastating loss of life in urban areas to events such as heat waves.

Well planned urban growth and infrastructure development allow cities to prepare themselves for climate change. But the opposite is also true: Unmitigated and haphazard growth can contribute to and exacerbate climate change risks for cities.

People, transport, energy, water, and communication systems are especially interconnected in urban areas, meaning that the failure

of any one of these systems threatens all of them.² In emerging countries this interdependence will grow as the size of cities themselves explodes.

By 2030 the world will be home to 41 megacities, each with more than 10 million residents, and 90 percent of these megacities will be in emerging economies.³ Of the top 20 cities at risk from natural disasters such as droughts, floods, and heat waves, 13 are in emerging economies, including seven in China, according to the Lloyd's of London City Risk Index.⁴ By 2060, more than a billion people will be living in cities in low-lying coastal zones, the vast majority in developing countries.⁵

A Multi-Layered Approach

Because of their complexity, cities will need to tackle the threats from climate change on multiple fronts, finding ways to protect transport, water, energy, buildings, and other infrastructure. Upfront investment in cleaner energy, transportation, and resilient infrastructure projects can ensure that a severe event doesn't become a physical or financial disaster. This upfront investment can help minimize emissions and the climate impact of urban growth across water, transport, buildings, and other infrastructure critical for well-managed urban development.

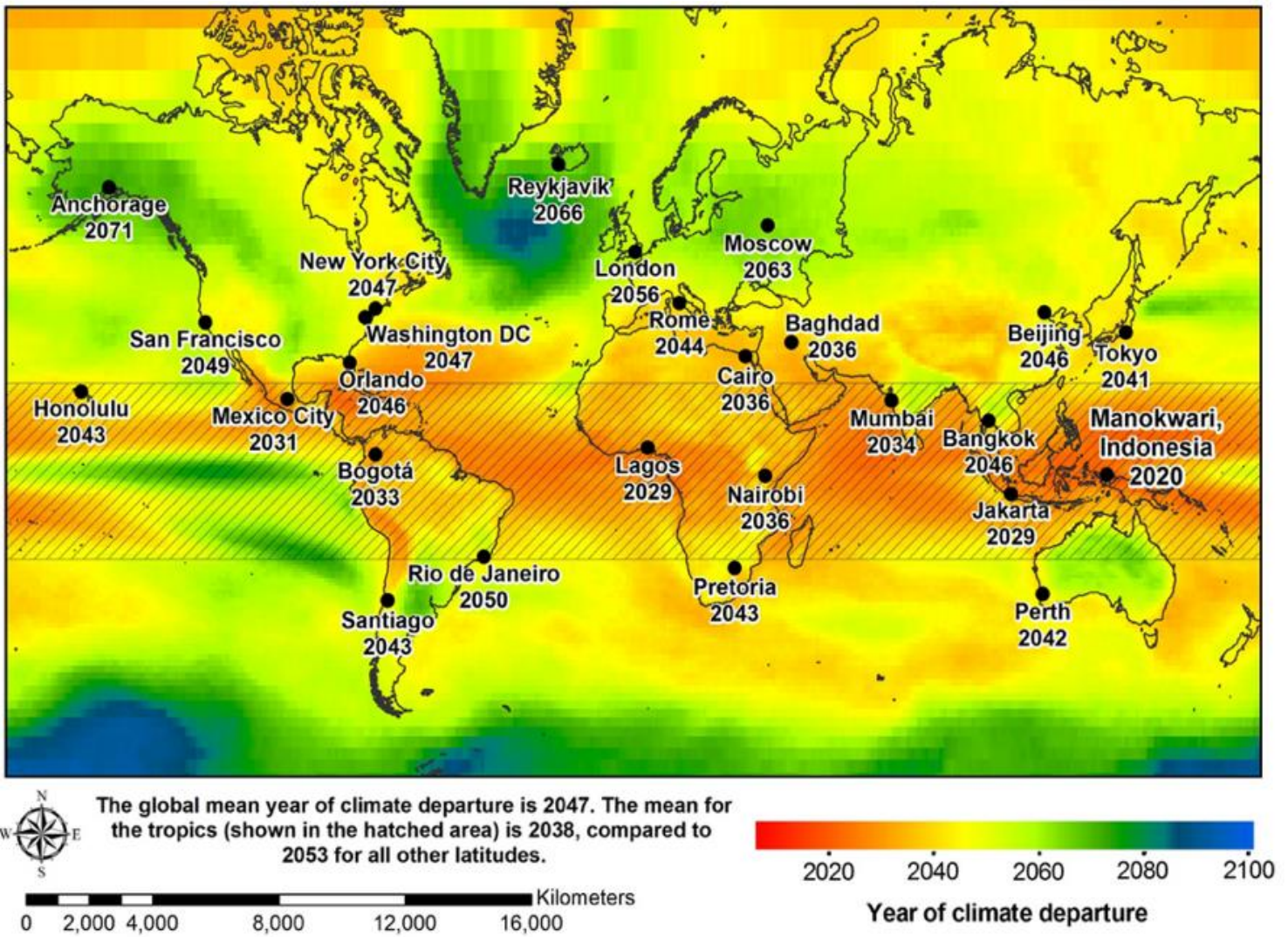
For example, a range of design and construction measures can protect buildings against climate change in the initial planning stage. Some of these measures are simple and low-cost, such as better insulation and windows on all buildings; more efficient heating and cooling systems; the adoption of small-scale renewable energy sources, particularly on rooftops; making sure doors open out to be less vulnerable to high winds; closely spacing

The Climate Departure Date and Emerging Markets

The climate departure date indicates the future date in which the average temperature of the coolest year is projected to be warmer than the average temperature of the hottest year between 1960 and 2005. Essentially it marks the date when the shift to a new climate—as a result of global warming—is complete. For the earth as a whole that date will be 2047. But emerging market cities face more intense consequences from climate change. For major cities in emerging countries, the climate departure date will occur years earlier—2029 in Lagos, 2034 in Mumbai, and 2036 in Cairo.

Source: Max Fisher, "Map: These are the cities that climate change will hit first," *Washington Post*, October 9, 2013.

Climate Departure Dates around the World



Source: Max Fisher, "Map: These are the cities that climate change will hit first," *Washington Post*, October 9, 2013.

nails in new construction projects; or installing critical building components on higher levels above flood heights.

Others, such as using fireproof materials or restricting development altogether in some areas, are more politically complex and expensive—but even so, they may be worthwhile investments that are justified in economic terms. In particular, poor transportation planning can lead to increased congestion and pollution. But a number of initiatives can help keep cars off of the road and lower overall emissions. City leaders can invest in a range of climate-smart public transportation initiatives such as

light rail and bike lanes. In addition, they can promote the use of efficient vehicles and cleaner fuels.

For water—and especially wastewater—cities can lower the effects of climate change through increased recycling and efficiency measures. They can even convert gas produced by landfills into energy. Coordinated governance and planning will be critical to ensuring that cities grow in a way that decreases climate risk and increases sustainability. By creating standards and strengthening regulations, urban leaders can encourage developers to include measures that integrate climate considerations into their projects. Green building programs, for

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example, have helped improve the energy efficiency of homes and offices. New standards that make structures more resilient to climate change could be incorporated into existing green building programs. Urban leaders, especially in emerging economies, can also more strongly enforce existing development regulations, including building codes and land use controls, among others.

The World Bank and the Global Facility for Disaster Reduction and Recovery developed the CityStrength Diagnostic to help city planners and other stakeholders identify the increasingly complex range of climate shocks and stresses that a city may face. This diagnostic also identifies high-priority actions and investments that can help make a city more resilient to climate change. The diagnostic identifies critical gaps and potential weaknesses within a city, regardless of its size, institutional capacity, or phase of development.

Once disaster strikes, however, insurance can help cities buffer the economic and financial costs of climate change. With regulations and incentives that encourage insurers to design and price policies to be effective against climate change, policymakers in emerging countries can help protect against these threats. Insurance can also provide coverage for business continuity and the potential loss of revenue for private companies and for the public sector in terms of tax revenue losses. Both features are included in the World Bank Group's Pandemic Emergency Facility.

International cooperation

City leaders from around the world are cooperating to share experiences and strategies to address climate change. The 100 Resilient Cities program supports cities selected through a competitive process with expertise, a resilience strategy, and a network for sharing experience with other member cities. The R20 Regions of Climate Action, the C40 Cities Climate Leadership Group, and the ICLEI network are other **similar** programs.

The R20, for example, set up a large-scale efficient street lighting program in Brazil in 2013. The program installed locally manufactured light emitting diode lamps that can cut utility bills by up to 65 percent. The savings from the program outweighed the costs to city budgets. R20 plans to replicate the program in 13 cities across the country.

The Sendai Framework for Disaster Risk 2015-2030 sets specific targets for cities to meet in order to better protect against natural disasters and warming temperatures. The United Nations Office for Disaster Risk Reduction's Making Cities Resilient Campaign provides a 10-point checklist for measuring the progress of local governments. It also helps cities work with the private sector to meet climate change goals.

While creditworthiness seems at first to have little to do with helping cities deal with climate change, good credit ratings are essential for accessing the capital that cities need for infrastructure projects, including public transit, water, and sanitation systems. Many emerging nations in the Caribbean and Southeast Asia could come under financial pressure because of climate events, according to Standard & Poor's.⁶ Only about 4 percent of the largest 500 cities in emerging markets are currently creditworthy in international financial markets.⁷ The ability to access finance can have a significant impact on a city's ability to invest in measures to mitigate climate change.

The World Bank's City Creditworthiness Initiative is a multi-agency effort with support from the Rockefeller Foundation, which addresses credit barriers to green growth in 300 cities in 60 low and middle-income countries. As of 2016, representatives from more than 80 cities in more than 20 countries have attended one of the program's City Creditworthiness sessions, which include in-depth training on climate-smart capital investment plans and actions to enhance credit ratings of cities.

The Green Climate Fund is also funding projects that allow cities to invest in infrastructure projects that help them mitigate the effects of climate change. One of its first projects is in the Satkhira district in Bangladesh. The fund plans to invest in measures that benefit the lowest-income groups such as projects that improve city drainage, flood protection, water supply, sanitation, and transport in slums.

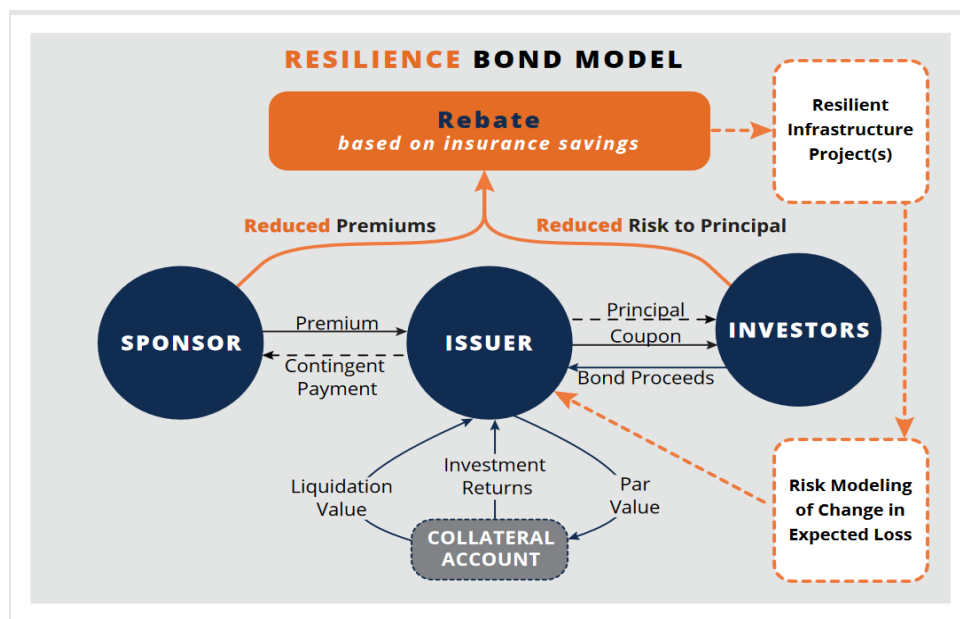
City efforts

With most of the global population and capital goods concentrated in urban areas, cities are key to social development and economic prosperity. They are drivers of national economic growth and innovation and act as cultural and creative centers. But urbanization also brings challenges.

In 2015 design firm re:focus partners created the RE.bound program, which supports efforts to raise private financing for infrastructure investments to mitigate the effects of climate change. The program, designed by re:focus in partnership with private financial institutions, adapts the model of catastrophe bonds to climate risk, creating resilience bonds. It starts with an analysis that identifies potential improvements to a design project and then examines the financial benefits of those improvements for various stakeholders such as bond sponsors, project developers, investors, and other public and private players. The program compares costs to a city if a particular trigger event occurs with and without the project.

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Resilience bonds use the model of a catastrophe bond to help cities finance infrastructure projects that reduce the threat of climate change.



Source: re:focus partners

In a coastal protection project, for example, re:focus would look at how various locations and design parameters would change the effectiveness of a wall to protect a city against storm surges and whether the project would lower losses after a flood.⁸

In July 2014 Washington D.C.'s water authority issued a \$350 million bond with a 100-year maturity in order to upgrade its water and sewer system. The bond, the first municipal century bond issued by a U.S. water utility, won a green certification because of its environmental benefits, which include reducing sewer outflows to improve water quality, lowering flooding risks, and boosting waterfront biodiversity.⁹ The concept of bonds for improving urban resilience is growing as part of the

¹ K. Seto, S. Shakal, A. Bigio, H. Blanco, et al, "Chapter 12: Human Settlements, Infrastructure and Spatial Planning," in *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2014.

² Nick Mabey, Rosalind Cook, Sabrina Schulz, and Julian Schwartzkopf, E3G, "Underfunded, Underprepared, Underwater? Cities at Risk," 2014.

³ United Nations, Department of Economic and Social Affairs, Population Division, *World Urbanization Prospects: The 2014 Revision*.

⁴ Lloyd's City Risk Index, 2015-2025.

⁵ Barbara Neumann, Athanasios T. Vafeidis, Juliane Zimmermann, and Robert Nicholls, "Future Coastal Population Growth and Exposure to Sea-Level Rise and Coastal Flooding," *PLOS ONE*, 2015.

Conclusion

Cities are already on the front lines of responding to climate change. As they become home to a steadily greater share of the world's population in coming decades, the risks they face will only grow. In response, urban leaders have become vocal champions for climate action, preparing their cities against climate change threats with a range of public and private initiatives. ■

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⁶ S&P Global Market Intelligence, "Storm Alert: Natural Disasters Can Damage Sovereign Creditworthiness," September 2015.

⁷ The Global Commission on the Economy Climate, "Better Growth, Better Climate: The New Climate Economy Report," 2014.

⁸ re:focus partners, "Re.bound Program Report," December 2015.

⁹ DC Water and Sewer Authority, July 2014.

¹⁰ Cecilia Reyes, "Cities and Climate Change – the Funding Gap," Environmental Finance, August 26, 2016

¹¹ Katie Jenkins, Swenja Surminski, Jim Hall, and Florence Crick, "Assessing surface water flood risk and management strategies under future climate change: an agent-based model approach," Centre for Climate Change Economics and Policy, February 2016.

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