

SMART CITIES ARE CLIMATE RESILIENT CITIES

A climate vulnerability and
resilience assessment

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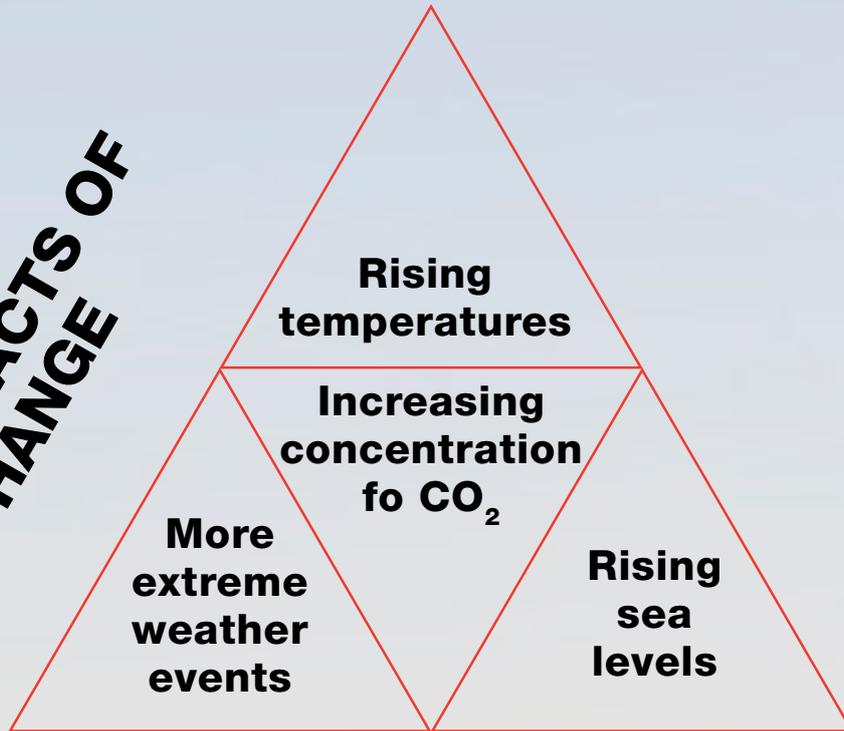
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Cities in a warming world

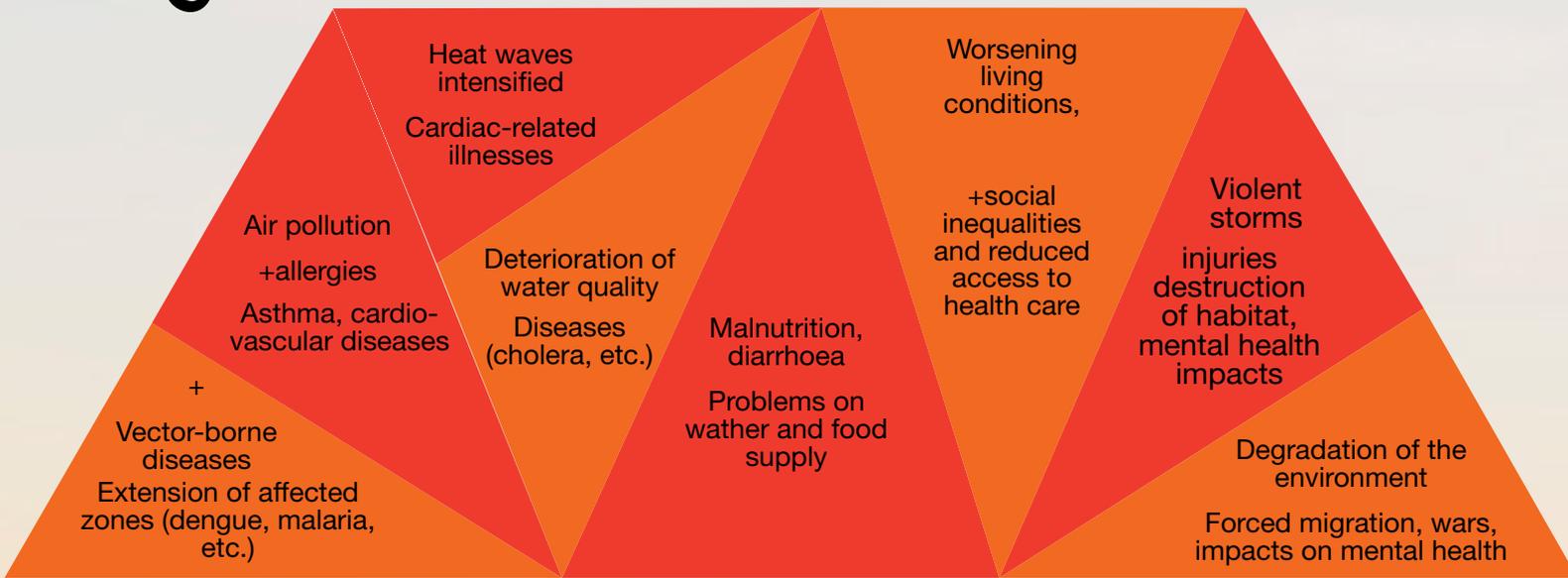
Cities are on the front-line of climate change. On the one hand, they are part of the problem when it comes to global warming. Yet on the other, they are central to the solution in terms of climate mitigation and adaptation. Cities are major producers of greenhouse gasses, responsible for [more than 70% of global emissions by some estimates](#). Urban sprawl, inefficient buildings and construction alone accounts for an estimated [40 percent of all CO2 emissions](#), threatening international climate action efforts. Reducing the carbon footprint of cities and accelerating their adaptation to climate change will determine whether they [thrive or survive](#).

According to the 2021 [IPCC report](#), climate threats to cities are becoming more frequent and intense. Surveys of the world's [largest 800 cities](#) suggest that 90 percent of them face “significant” environmental risks. Over 570 coastal cities are confronting dangerous sea level rise. With at least [4 billion people](#) currently living in cities and [another 2.5 billion more people will move to one by 2050](#), these risks will grow. Within the next three decades at least 7 in 10 people on earth will soon be routinely subjected to extreme heat, water scarcity, air pollution and rising seas. The costs of these shocks and stresses to cities are tremendous, estimated at \$1 trillion annually by 2050.

MULTIPLE IMPACTS OF CLIMATE CHANGE



MAIN CONSEQUENCES



Source: [AFP \(2021\)](#)



Cities built for a different climate era

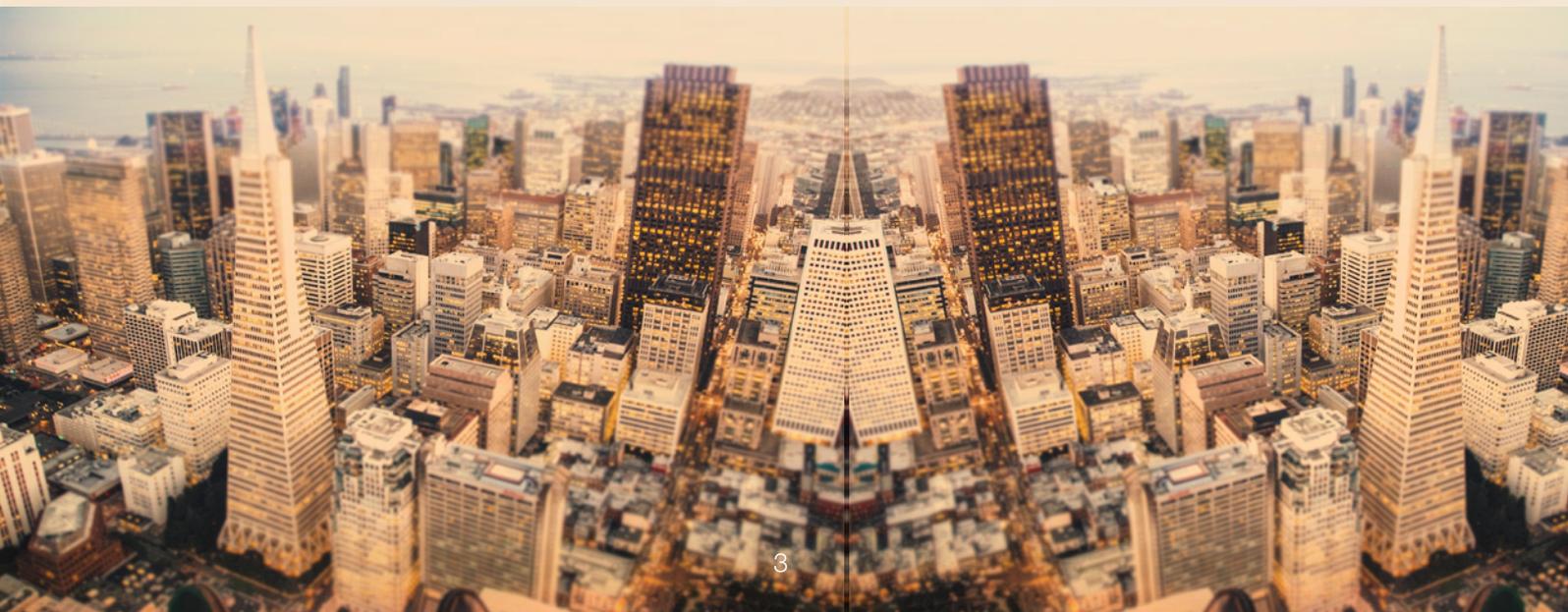
One of the reasons why today's cities are so vulnerable to global warming is because most of their built environment was [designed for an earlier climate](#). Residential and commercial buildings, bridges and roads were installed using design standards and materials to withstand atmospheric, geological and hydrological conditions for another era. Climate change is rapidly creating conditions that exceed these original parameters, including average air temperature and humidity, as well as more intense and severe flooding.

The impacts of climate change on city life are already being felt and will be far-reaching. Commercial and residential properties will be [more likely to overheat](#), putting the health of residents, especially the elderly, infirm and poor, at risk. Entire cities will experience intense flooding and sinking and many will be abandoned. Changes in weather will expand the region for invasive insects [including wood-eating termites](#) and [virus-bearing mosquitos](#). As building materials get hotter, they will pose structural risks to critical infrastructure ranging from sky-scrapers and electricity grids to ports and highways. Wetter weather [corrodes concrete foundations and walls of buildings](#), especially in coastal areas.

Hoping for the best, preparing for the worst

Most cities have yet to prepare a comprehensive climate risk and adaptation plan. Less than [half of the world's cities](#) have quantified the extent of their exposure to global warming. Very few have prepared data-driven strategies to anticipate, recover and rebound from short-term shocks and longer-term stresses. Cities that do so are dramatically more likely to take practical steps to reduce their emissions and adopt adaptive measures. This is key to [minimize exposure to risk](#) and maximize spending in an era of reduced revenue and major liabilities.

Some first mover cities are investing in climate-proofing. They are [developing plans](#) to ensure everything from procurement to service delivery is not just sustainable but also resilient. Cities such as Amsterdam, Helsinki, New York, Melbourne and Singapore are experimenting with circular and regenerative systems. There is growing emphasis on [nature-based solutions](#), accelerating the green transition, micro-mobility options, and fostering open digital commons. Ideas like the 15-minute city and [doughnut economics](#) are increasingly mainstream and the massive shift toward digitalization is redefining what resilience means in the twenty-first century.



Accelerating mitigation and adaptation

The first priority for cities is to understand the many cascading and interconnected risks associated with climate change. Most of them will need to assess how and when assets will be at risk and leverage real-time data and analysis to make informed choices. Today's fast-changing environment will require planning for the short, medium and longer-term. SecDev Group helps cultivate foresight and forecasting through the design and deployment of data-driven analytics designed for city governments, businesses and nonprofits. SecDev equips urban leaders with the tools and skills to continuously assess and update their risk frameworks to meet the moment.

SecDev works with city stakeholders to help strengthen their resilience to current and future climate threats. This starts with a climate vulnerability and resilience assessment to understand what, where, when and how institutions and assets are at risk. These diagnostics:

- Measure physical, social and digital infrastructures at risk from climate change;
- Assess public, private and non-profit preparedness and planning capacities;
- Builds benchmarks and KPIs for risk reduction and resilience promotion;
- Co-develops approaches to anticipate, manage, rebound and learn from climate risks, including through both short-term and longer-term measures.

SecDev leverages an array of data-driven and geospatial platforms to develop these assessments. They include a climate risk assessment, a climate change mitigation map and climate change adaptation maps. SecDev works with city clients to ensure they have the skills and know-how to update their diagnostics as conditions evolve.

Climate change risk preparedness, management and reduction are not optional extras for cities. At a minimum, cities in all geographies must prepare and regularly update a climate mitigation and adaptation plan. Plans will need to focus on everything from green energy and ecosystem adaptation to food supply chains, affordable housing and resilient infrastructure and services. SecDev deploys teams of leading climate specialists, urbanists and urban economists to support cities develop such plans. It leverages its deep experience working with city networks such as the C40, Metropolis, the Mayors Migration Council, the Global Parliament of Mayors and the World Economic Forum to apply cutting-edge insight and experience.

Preparing a climate vulnerability and resilience assessment

	Priorities	Approach	Activities
<p>Assess climate risks: Assess shocks and stresses</p>	<p>Quantify current and projected impacts across physical, social and digital infrastructure</p>	<p>Assess and visualize hot spots in relation to multiple climate risks (e.g. floods, drought, heat, water scarcity, sea level rise) across built environment and in relation to socio-economic conditions.</p>	<p>A climate risk assessment applies geo-spatial tools to digitally map specific climate shocks and stresses in relation to city assets. It quantifies the degree of exposure and applies heat maps and statistical assessments of probability.</p> <p>Deliverable: An assessment report and dashboard, technical and policy recommendations, and a baseline to measure progress.</p>
<p>Mitigation Map: Opportunities to reduce GHG footprint</p>	<p>Inventorize and cost opportunities to reduce GHG (e.g. CO₂, NO₂, PM_{2.5}) emissions</p>	<p>Map GHG emissions across multiple sectors - energy, transport, construction - using a combination of satellite- and sensor-based tools.</p>	<p>A climate change mitigation map identifies the sources and scale of emissions in a city jurisdiction (across categories). It also examines emissions across supply chains to inform mitigation opportunities within and outside the city borders.</p> <p>Deliverable: A mitigation map with an inventory of entry-points for mitigation, including associated costs and benefits.</p>
<p>Adaptation Map: Entry-points to strengthen resilience</p>	<p>Identify opportunities across city verticals to strengthen resilience of the built, social and digital domains in relation to climate and environment risks.</p>	<p>Inventorize adaptation opportunities across defined categories - public, residential and commercial space, transport networks and hubs, greenspace and protected areas - relative to risks.</p>	<p>A climate change adaptation map will provide clear evidence of opportunities for adaptation in relation to priority city risks. It will include a shortlist of entry-points, including costs and benefits.</p> <p>Deliverable: An interactive climate adaptation map with accompany menu of options</p>

About SecDev

SecDev is an agile research and innovation firm helping clients navigate digital-geopolitical, geospatial and geodigital risk. Our team of forecasters and data scientists support a wide range of clients including public sector, corporations and international organizations in meeting their need for timely, accurate decisions. We transform data into intelligence and identify opportunities to drive digital transformation. SecDev builds value through strategic foresight, data science on demand and intelligence as a service. We are global in scope, fluent in data collection and analytics, experienced in cutting edge technology and singularly results-oriented. We empower clients to make informed choices in a rapidly digitizing era.



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Layout

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