



Climate Action Guide *for* Urban Planners

**C4O
CITIES**

In partnership with:

**URBAN
SH/FT**



**Community
Jameel**

Foreword

Anne Hidalgo

*Mayor of Paris and former
Chair of C40 Cities*

Urban planning is a powerful tool to tackle the climate crisis and **create sustainable, equitable and resilient cities**. By adjusting their urban planning regulations, local governments can mainstream the climate priorities identified in their Climate Action Plan and transpose them into concrete actions and legally binding policies. When Paris began revising its Urban Plan (Plan Local d'Urbanisme or PLU), I saw this as a key opportunity to **balance urban development with environmental sustainability**. Our new Bioclimatic PLU exemplifies the transformative power of urban planning in combating the climate crisis.

Our plan will set Paris on a lower-carbon pathway. It requires green buildings and limits demolition to promote the reuse of existing construction, it reduces the risks posed by extreme heat and accelerates the greening of Paris, it addresses social inequalities and creates an urban environment where every Parisian can access their essential needs and adopt a more sustainable way of travelling and living in the city. I hope that our bioclimatic PLU, much like this C40 guide, will serve as direction and inspiration for planners around the world to take bold, decisive actions.



Dr. Yousef Al Shawarbeh

Mayor of Amman

Amman has experienced unprecedented growth over the last 100 years, growing from 5,000 inhabitants to more than 4 million.

The citizens of Amman have observed the city's evolution and are aware of the challenges posed by such rapid development. In Amman and cities globally, it is the job of skilled urban planners, to **direct urban expansion in a way that promotes prosperity and fairness** without compromising our shared planet.

Amman is actively addressing this challenge by placing climate action at the heart of its new Zoning and Planning Bylaw. This regulation aims to **align urban planning decisions with the Sustainable Development Goals**. Our efforts in finalising the regulation have been greatly supported by C40 and Community Jameel through our participation in the Jameel C40 Urban Planning Climate Labs.

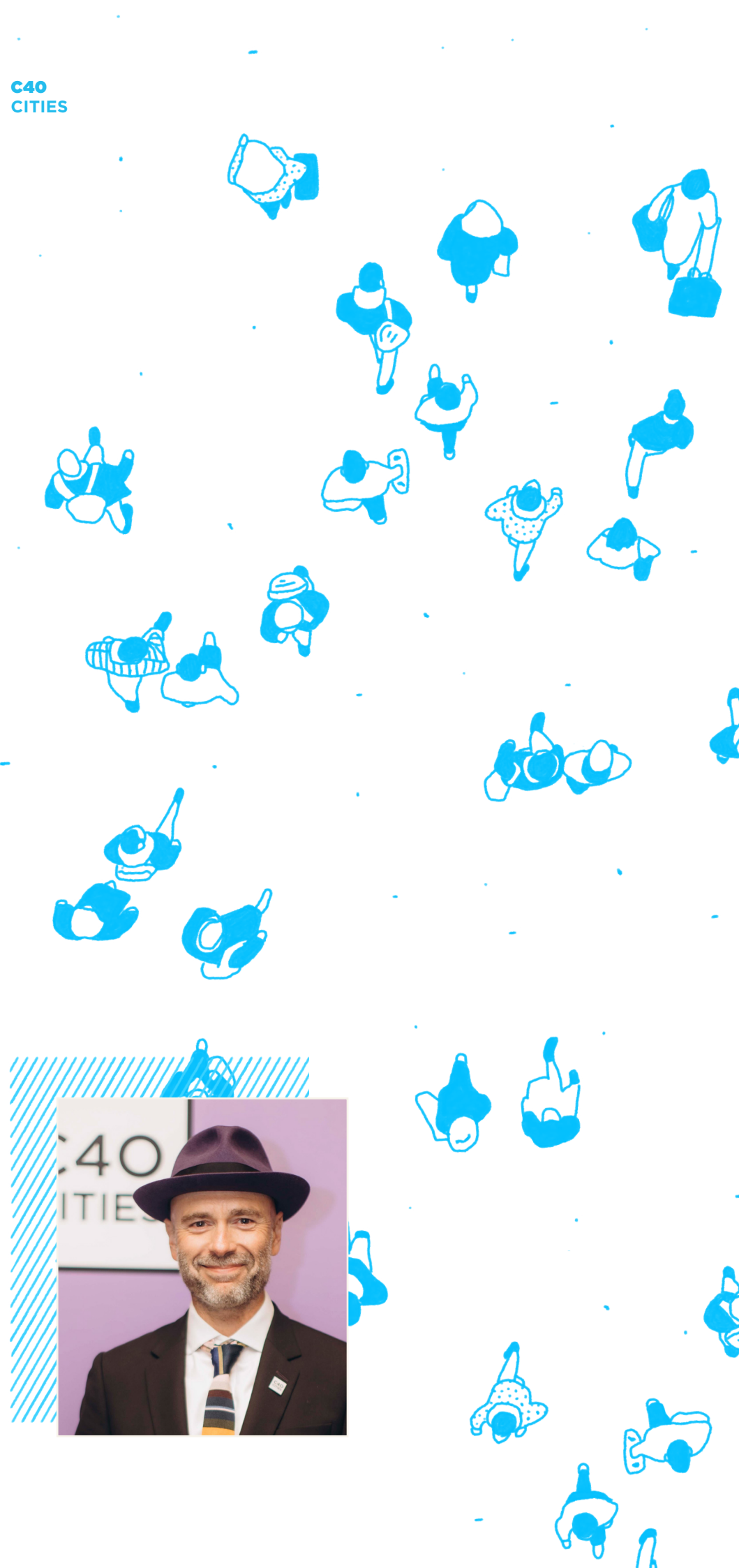


Mark Watts

*Executive Director
of C40 Cities*

As cities stand at the forefront of the climate crisis, the role of urban planners has never been more crucial. Cities are uniquely innovative and agile, so action at the urban level can set the pace for global climate action. To give just a couple of examples, Bogotá increased the amount of its land that is legally protected for its ecological value by 30% in its recent Land Use Plan, while Paris is turning an area the size of 140 football pitches into pedestrian-only zones by 2030 to reorient the city around its people, not cars. These are just two C40 cities taking ambitious action to embed climate action into their urban planning.

This Climate Action Guide for Urban Planners serves as a pivotal resource, equipping those responsible for shaping our urban landscapes with the insights necessary to drive sustainable urban transformation. It underscores the urgent need for cities to adopt integrated, forward-thinking urban planning strategies that prioritise both people and planet. We at C40 are supporting urban planners to achieve this through the [Jameel C40 Urban Planning Climate Labs](#), [UrbanShift](#) and our [Land Use Planning Network](#). I thank Community Jameel and our UrbanShift partners, whose support has made this guide possible.



Contents

1 **Introduction**

2 **Cities and
Climate Action**

3 **Urban Planning
as a Solution**

4 **Integrating a
Climate Plan into
an Urban Plan**

5 **Spotlight on
Planning Policies**

- For flooding, extreme heat and drought
- For nature
- For informal settlements
- For compact cities
- For polycentric cities and proximity
- For mode-shift and TOD
- For sustainable buildings

6 **Key Takeaways**

7 **Further Resources**

8 **Acknowledgement**

9 **Endnotes**

Introduction

Climate change is here. Throughout 2024, the catastrophic extremes that now characterise our rapidly changing climate have affected every continent on Earth. This past June marked the **13th consecutive month of record-breaking temperatures for the planet**. Countries across South and Southeast Asia were scorched by record-breaking temperatures. North America battled an early and intense wildfire season. Brazil's southernmost state suffered from unprecedented rainfall and severe flooding, while Colombian and Mexican cities were forced to ration water as reserves plummeted. Heavy rainfall and deadly flooding affected countries in the Middle East and Africa, while Southern Europe sweltered under heatwaves.

Cities are on the frontline of the climate crisis. Cities and urban inhabitants are drivers behind much of the world's economic power, energy use, material demand and greenhouse gas emissions. Cities are the places where climate impacts are most concentrated and where the largest populations are affected.

Cities are also vanguards for ambitious climate action, with city governments leading the way through innovative policies and advocacy for an equitable and just transition away from fossil fuels. Mayors of the 96 member cities of the C40 network are committed to using a science-based and people-focused approach to help

the world limit global heating to 1.5°C and build healthy, equitable and resilient communities. These efforts are directed by city Climate Action Plans (CAPs), which set out specific actions cities will take to reduce emissions and increase resilience.

Urban planning is a discipline and a tool for the **design and organisation of urban spaces**, including land use, infrastructure, transportation, housing and public amenities, to achieve improved quality of urban life. **It regulates the urban landscape through a framework comprising spatial plans, policies and legislation.** It may be complemented by separate regulations, such as building codes or by-laws.

Sustainable urban planning is about doing this in a way that creates places that enable people to live happy and healthy lives, without compromising the needs of future generations. **Good urban planning practices are therefore fundamentally aligned with climate action.**

Unlike buildings, transport or waste management, urban planning is not an emissions sector per se – therefore, when reporting greenhouse gas (GHG) emissions and climate actions, local and national governments rarely share information on their land-use policies. However, **urban planning is one of the most powerful cross-cutting enablers of emissions reductions and increased resilience.** It is an effective way for local governments to mainstream their climate priorities by transposing them into legally binding policies.

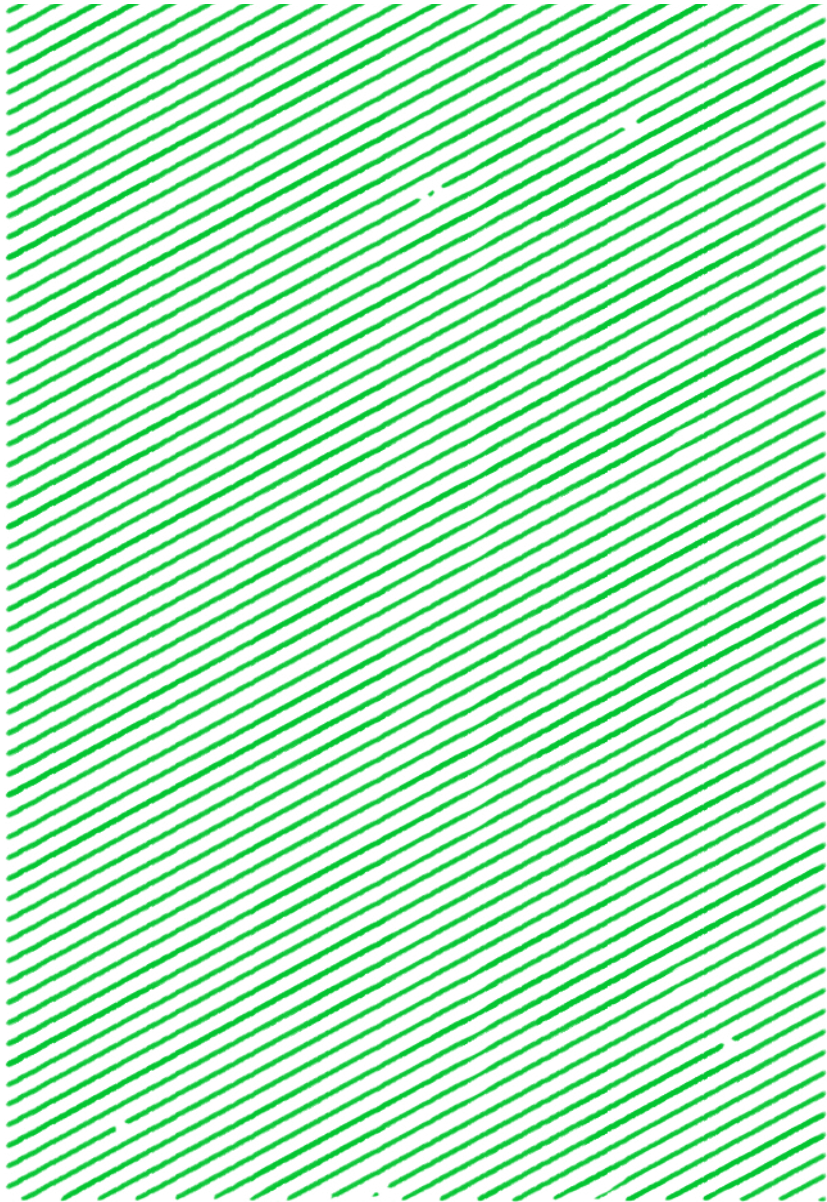
Evidence collected by the Intergovernmental Panel on Climate Change, academics and research institutes shows that adjusting how we plan our cities and towns will define how we face the climate crisis. **To tackle the climate crisis at scale, it is crucial to harness sustainable urban models.** These objectives are intrinsically linked in practice. The impacts of the climate crisis, both shock events like floods and heatwaves and slow stressors like drought, seriously undermine our ability to create liveable places. Similarly, many of the actions necessary to tackle the climate crisis are consistent with creating liveable and inclusive places that support human and ecological health.



Rio de Janeiro, Brazil
Source: Unsplash by Sébastien Goldberg



Kolkata, India
Source: Unsplash by Dibakar Roy



What does this guide do?

C40 have written this guide to **support urban planners globally to play their full part in tackling the climate crisis.** The guide focuses on the preparation and policy content of urban plans - known variously as strategic spatial plans, master plans, land use plans, and more. The guide explains how cities can embed climate action within these plans and policies and is structured as follows:

- 1. Cities and climate action** - first, the guide briefly sets out the need for cities to act in response to the climate crisis. It then explains the role of city CAPs and positions them as an important input for the preparation of any urban plan.
- 2. Urban planning as a solution** - next, it evidences the importance of urban planning as a key function through which cities can drive impactful climate action.
- 3. Integrating climate into an urban plan** - here, it elaborates on how climate change can be embedded into the ten stages commonly followed to prepare an urban plan.
- 4. Spotlight on planning policies** - in this chapter, the guide elaborates on seven key planning policy areas for climate action and showcases some great examples of climate-responsive urban planning policies from cities across the world.
- 5. Key takeaways and further resources** - finally, it concludes by summarising the key messages from within this guide and providing links to additional resources.

Who is this guide for?

Good urban planners are key climate champions. Urban planners work across silos, making them ideal drivers of cross-sectoral action. Accordingly, this guide is written for urban planning staff within local governments. **The advice within this guide is applicable for staff both in cities that have a Climate Action Plan (CAP) and in cities that do not.**

The terms “urban planner”, “city planner” and “planner” are used interchangeably throughout the guide. These terms refer to city staff responsible for developing and implementing spatial plans and policies to manage the organisation and development of urban areas.

Cities *and* Climate Action

The climate crisis in cities

Over half of the world's population live in urban areas and over 75% of energy related emissions are generated by cities. Cities are where most of the world's economic power, energy use, and material demand are. The high rate of urbanisation, particularly in Africa and Asia¹, means the carbon footprint of cities is increasing. Half of the buildings that will exist in 2050 have yet to be built, with most of that new building happening in cities².

As cities grow in population, they typically expand outwards, growing in area and converting more land to urban use. **The footprint of urban areas is growing up to 50% faster than their populations, leading to vast and sprawling cities, often occupying areas vulnerable to climate hazards. Around 90% of urban expansion in Global South countries is happening near hazard-prone areas - and taking the form of informal and unplanned settlements³.**

Cities are also where climate impacts are most concentrated: 80% of cities face significant climate risks from heat and flooding⁴. By 2050, over 970 cities - home to 1.6 billion residents - will be vulnerable to extreme heat and the consequent health impacts. This number represents a 700% increase from 2018⁵. By 2050, some 800 million people will be living in coastal cities at risk of at least 0.5 metres of sea level rise and coastal flooding⁶.



*“The battle to stop **climate breakdown** will be largely won or lost in cities.”*

Antonio Guterres,
United Nations Secretary General
(C40 World Mayors Summit, 2019)

In 2022 alone, 30 million people were displaced from their homes due to extreme weather and climate-related disasters⁷. The International Organisation for Migration estimates that, by 2050, there could be between 25 million and 1 billion people moving - either within their countries or across borders - for climate-related reasons. Most of those displaced by climate will inevitably head to cities and urban areas, given their concentration of jobs and housing, further exacerbating pressures on urban and environmental systems.

City governments are taking their responsibility to act seriously. Nearly all of C40's 96 member cities have Climate Action Plans with equity and inclusion at their core and which are compatible with limiting temperature rise to 1.5°C, as set out in the Paris Agreement.

Given the urgency of the climate crisis, **city governments must now focus on action implementation.** Increasing the use of renewable energy, promoting walking and cycling, retrofitting homes, limiting development in hazardous areas, and expanding green infrastructure are just some of the ways in which city governments are taking action to reduce emissions and increase climate resilience.

Urban planning is a city function which cross-cuts all urban systems, from transport to buildings, natural environment, public space and community development. Embedding climate action into **urban planning offers an unparalleled opportunity to set cities on development pathways that are lower-carbon and more responsive to evolving climate risks.**

Cities' Climate Action Plans

Only through ambitious and pragmatic action planning will cities move rapidly towards the mitigation and resilience goals set out in the Paris Agreement. A climate action plan (CAP) is a strategic document (or series of plans and documents) that is informed by robust evidence and demonstrates how a city will deliver on its commitment to address climate change. Some planners may be very familiar with their city's CAP and might even have played an instrumental role in its preparation, while others may be less familiar or work for a city that has yet to prepare a CAP.

To date, C40 has supported more than 80% of cities within the C40 network to develop CAPs that accord with [C40's Climate Action Planning Framework](#). Launched in 2018, this framework supported cities to develop evidence-based CAPs aligned with the 1.5°C ambition of the Paris Agreement. C40 updated this framework in 2023: the new [Cities Climate Transition Framework](#) has an enhanced focus on climate adaptation, resilience and equity, as well as on governance and decision-making, implementation and monitoring, evaluation and reporting. C40 member cities looking to review and update their CAP - as they are required to do every 5 years - will use this new framework.

A CAP is made up of four key elements: mitigation, adaptation, inclusivity and integration:

1. Climate change mitigation:

Refers to efforts to reduce or prevent the emission of greenhouse gases ([UNEP, 2023](#)).

What does that mean?

It can mean using new technologies and renewable energies, adopting sustainable transportation, making buildings more efficient, changing consumer behaviour, or using land and forests more sustainably.

How to plan for climate mitigation?

1. Establishing baseline data of city emissions (GHG Inventory)
2. Drawing emission trajectories with different future scenarios
3. Defining emission reduction targets
4. Prioritising a set of mitigation actions
5. Monitoring, evaluating, reporting, and tracking progress towards targets



Buenos Aires, Argentina: Climate Action Plan 2050

The city of Buenos Aires, Argentina, developed its [Climate Action Plan 2050](#) and created an online platform to monitor its key targets to become carbon neutral. This platform, [Climate Action BA](#), demonstrates how the city plans to reduce emissions in energy, mobility, and waste, showing updated data on what measures are being taken. In this image, for example, the city is tracking the evolution of the construction of all bicycle lanes, Bus Rapid Transit routes (metrobuses), and pedestrian areas from 2010 to 2020.

Figure 1.
Construction of Bicycle lanes, Metrobuses and
Pedestrian Areas in Buenos Aires, Argentina

- Bicycle Lanes
- Metrobuses
- Pedestrian Areas

2. Climate change adaptation:

Refers to the process of adjusting to current or expected climate change and its effects (UNFCCC, 2023).

What does that mean?

It can mean adapting human responses to observed and projected climate-change impacts, seeking to moderate/avoid harm or exploit beneficial opportunities, and also addressing broader risk-reduction and development objectives.

How to plan for climate adaptation?

1. Conducting a climate risk assessment to prepare for, adapt to, and respond to the climate hazards today
2. Drawing risk scenarios based on scientific projections of future climate conditions
3. Defining adaptation targets
4. Prioritising a set of adaptation actions
5. Monitoring, evaluating, reporting, and tracking progress towards targets

To find out more, visit [C40's guide on how to conduct a climate change risk assessment](#).

3. Inclusivity

In this context, refers to the efforts to address social, economic, and spatial inequalities, which are exacerbated by climate change.

What does that mean?

Inclusivity is the practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalised. It is closely related to equity, which is the absence of avoidable or remediable differences among groups of people.

How to plan for inclusive and equitable climate action?

1. Inclusive process: engage with the community to outline the wider benefits of the plan
2. Inclusive policy: analyse the benefits of climate actions, such as reducing poverty and improving access to energy, health, air quality, job opportunities, cost savings, and economic competitiveness
3. Inclusive impact: establish ways to ensure equitable distribution of these benefits to the population

For more resources and examples on Inclusive Climate Action, see: [C40's Inclusive Climate Action in Practice series](#)

4. Integration

In a climate action planning context, it refers to the collaboration needed to develop the plan and speed up the delivery of targets and actions.

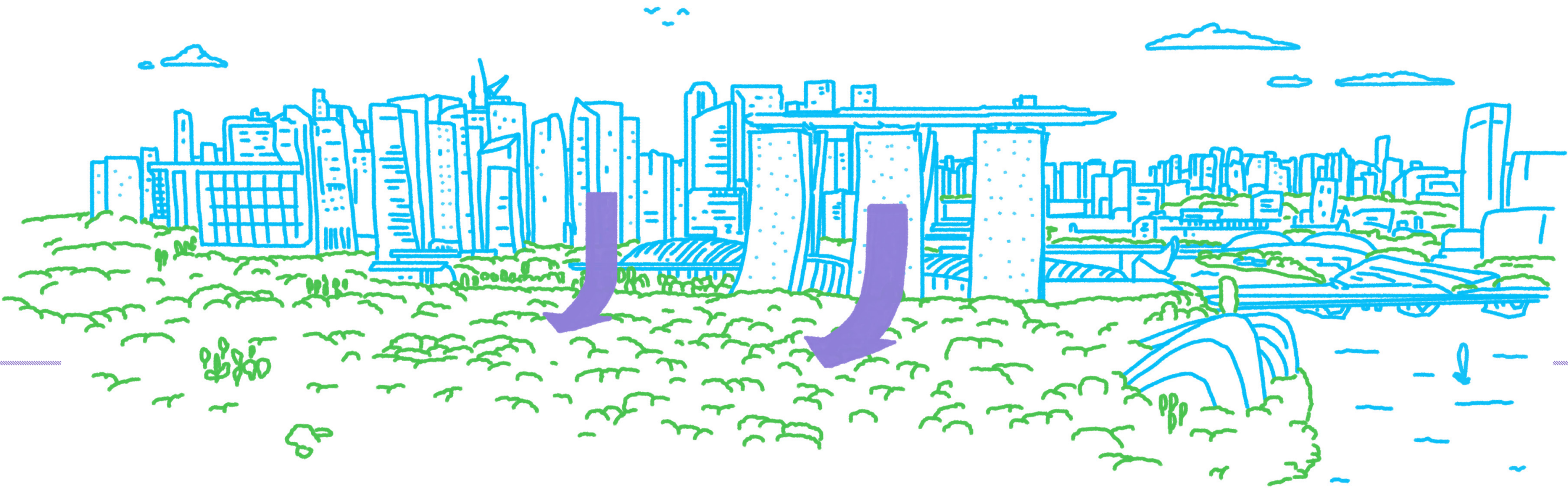
What does that mean?

Integration means 'to incorporate or unite with something else'. It is the alignment of the city's governance, sectors, and key stakeholders to deliver climate action jointly.

How to plan for integrating climate action with urban planning?

The next two sections of this report evidence the role of urban planning in reducing GHGs and vulnerability to climate hazards, before providing advice for planners on how to embed climate considerations into their city's urban plan, whether or not their city has a climate action plan (CAP).

For more information, see the free online course created by C40 and UrbanShift on [Integrated Climate Action Planning](#) (available in English, French, Portuguese, Spanish, Indonesian and Chinese).



Singapore Climate Action Plan 2050

Singapore is a tropical city-country-island that is 100% urban. It is the second most densely populated country in the world. As part of its [Climate Action Plan](#), the city defined key adaptation efforts such as protecting itself from sea level rise, managing water, and conserving green areas to protect biodiversity and reduce extreme heat. Singapore is investing enormous resources to cool itself down – by creating green corridors and designing neighbourhoods with mixed-sized buildings and a natural flow of cool sea breezes.

Figure 2.
Singapore Buildings

Dense skyscrapers in downtown often limit wind flow and trap heat, but here a mix of tall, medium and short buildings works like a sail to capture cool sea breezes and direct them to the pedestrian level.

Urban Planning *as* a Solution

Fundamentally, good urban planning is about sustainable development. Good urban planning seeks to balance environmental, social and economic goals through designing and regulating the use of space within cities. It provides a framework for cities to develop in a way that meets the needs of present and future generations and supports the development of greener, healthier and more equitable cities. It is impossible to achieve this without addressing climate change mitigation and adaptation. Equally, **urban planning is an essential tool for reducing greenhouse gas emissions (mitigation) and reducing vulnerabilities to climate hazards (adaptation).**

Most urban planners do not need convincing to include climate considerations within their planning work; indeed many planners are active champions for climate within their department and beyond. But often, planners need to **build a case** for including climate-responsive measures when presenting their projects and engaging decision-makers and other stakeholders.

How urban planning impacts greenhouse gas emissions

Reducing emissions from buildings through increased density and efficient built form.

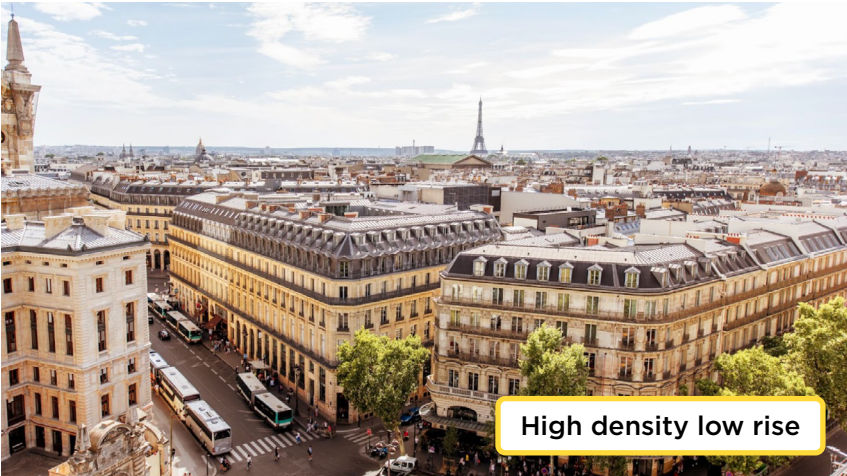
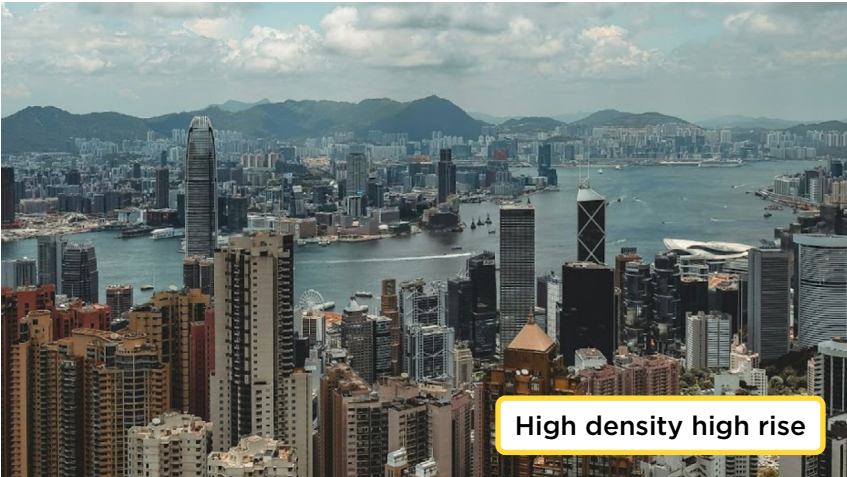
Efficient and compact building and urban form typologies lower demand for heating and cooling, thereby reducing the operational emissions associated with the built environment. More compact cities need less extensive infrastructure networks, reducing associated embodied emissions from construction as well as making infrastructure investments more economically feasible. Efficient typologies - i.e. mid-rise multi-family dwellings or mixed-use buildings - reduce materials use and construction emissions.

“Integrated spatial planning to achieve compact and resource-efficient urban growth through co-location of residences and jobs, mixed land use, and transit-oriented development could **reduce greenhouse gas emissions between 23-26% by 2050** compared to the business-as-usual scenario.”

Intergovernmental Panel on Climate Change, 2022 ⁸

An assessment of four typical urban typologies - high density high rise, low density high rise, high density low rise, and low density low rise - found something in the middle, i.e. **medium density and low-medium rise, to be the optimal form for carbon-efficiency** across both operational and embodied emissions. High rise, high

density cities increase carbon dioxide emissions by 154% compared to low rise, high density ones; while low-density housing requires 142% more land. The conclusion is clear: cities must zone for medium density, medium rise (4-6 storeys) urban environments to drastically lower carbon impact without having to significantly increase land use⁹.

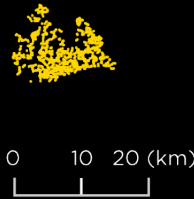


Infrastructure development is most carbon-efficient and cost-effective in compact urban areas because it takes less land, materials and energy to physically connect households and firms when they are closer together. Higher population densities thus reduce the per capita investment needs for network infrastructure such as roads, railways, electricity grids, telecommunications lines, water supplies and sewage systems. A study by the World Bank in sub-Saharan Africa found the capital costs of providing piped water, flush toilets, power and landslide telephones to average US\$325 per person in the highest-density cities, US\$665 in medium-density cities and up to US\$2,837 in remote rural areas¹⁰. This is to say nothing of the savings in per capita operating costs that can arise from higher concentrations of users. From an emissions perspective: if developing countries expand their infrastructure to current average global levels, the production of infrastructure materials alone would generate around 470 billion tonnes of CO₂ emissions by 2050 - much of this to serve sprawling cities¹¹.

Reducing transport emissions by shortening distances and enabling mode-shift.

Compact cities, characterised by relatively high density and mixed land uses, enable residents to travel by walking, cycling or public transport. In contrast, sprawling cities characterised by low densities and segregated land use force reliance on carbon-intensive and air-polluting private cars. Pursuing a polycentric urban model, as promoted by the 15-minute city or similar approaches, where key services and amenities are equitably distributed across a city's neighbourhoods, enables people to meet most of their daily needs through public or active travel modes. Directing growth to areas well-served by public transport means people who want or need to make longer journeys have the option to do so by public transport. Facilitating a wholesale shift away from the most polluting transport options will yield significant health benefits by addressing a major contributor to poor air quality - itself responsible for 6.7 million premature deaths each year¹².

**Barcelona's
Built-Up
Area**



Carbon Emissions: **0.7** Tonnes CO₂ per person
(Public + Private transport)

**Atlanta's
Built-Up
Area**



Carbon Emissions: **7.5** Tonnes CO₂ per person
(Public + Private transport)

Figure 3.
Atlanta vs. Barcelona
built-up density

*Source: Global Commission on
the Economy and Climate¹³*

Barcelona, Spain
Source: Unsplash by Kaspars Upmanis

A well-cited study by Bertraud and Richardson in 2004 assessed the **relationship between urban density and transport use** in low-density cities, like Atlanta (US), and high-density cities, like Barcelona (Spain). These cities had roughly the same population, but the average built-up density of Barcelona was 28 times greater than Atlanta's. The study highlights a strong positive correlation between population density and public transport use, reducing dependence on automobiles. Their findings are complemented by more recent analysis by the Global Commission on the Economy and Climate, which compared the transport-related GHG emissions of Barcelona and Atlanta. They found **the per capita transport emissions in Atlanta to be more than ten times higher than in Barcelona.**

Preserving natural land and its carbon sequestration potential by curbing sprawl and greenfield development.

Concentrating urban growth and regeneration in existing urban areas or within a defined urban boundary helps to preserve natural land adjacent to cities. As well as supporting an efficient urban form, which delivers emissions reductions across both buildings and transport, this planning strategy minimises the loss of natural carbon sinks. Avoiding land use change can also protect biodiversity and crucial ecosystem services such as pollination, soil formation and nutrient recycling.

Meta-analysis by UNEP and IUCN found that protecting intact ecosystems, improving the management of land and restoring degraded ecosystems could deliver emissions reductions and removals of between 5-12 GtCO₂e per year by 2030 - likely exceeding annual emissions from the entire global transportation sector¹⁴. With future urban expansion projected to result in the **loss of 11-33 million hectares of natural habitat by 2100**, managing urban growth effectively is critical for protecting Earth's carbon sinks¹⁵.

How urban planning impacts vulnerability to climate hazards

Reducing exposure to risk by controlling development on hazardous land.

Unplanned and poorly located urbanisation is a major factor in the expansion of cities to areas with increased climate risks, such as coastal or riverine flooding and landslides. Limiting urban expansion onto high-risk lands and adopting an inclusive strategy for reducing risk in high-risk areas where people are already settled is essential. This is strongly linked to ensuring adequate provision of affordable housing in low-risk areas, as risky areas are often the only areas affordable and available for the poorest residents.

Global analysis done by the World Bank of spatial urbanisation patterns and the evolution of flood exposure between 1985 and 2015 shows that, for many regions, **urban growth in flood risk areas has outpaced growth in low risk areas**. This is particularly true in East Asia, where high-hazard settlements have expanded 60% faster than flood-safe ones. The study reinforces the role of risk-informed urban planning to reduce climatic risk exposure in cities.¹⁶

Mitigating the impact of climate events through preserving natural land and prioritising land for nature-based solutions. Concentrating urban growth in existing urban areas helps to preserve natural land and water systems adjacent to cities. The preservation of these ecosystems contributes to climate resilience by protecting natural floodplains, reducing the impacts of storm surges, and safeguarding water catchment areas. Public and private land and buildings within cities can also be harnessed to deliver nature-based solutions to the climate crisis. This means integrating natural elements, such as green roofs, urban forests, sustainable urban drainage features and more, within the built environment. These elements help to manage stormwater, stabilise slopes and reduce heat island effects.

Record rainfall in May 2024 in Rio Grande do Sul, Brazil's southernmost state, resulted in catastrophic flooding, killing over 169 people and leaving at least 500,000 homeless, categorised as the worst climate catastrophe in the country's history. In Porto Alegre, the state capital and one of Brazil's largest urban centres, about 90% of the city was inundated. Researchers from the Hydraulic Research Institute of the Federal University of Rio Grande do Sul have highlighted the natural vegetation of the remaining, unbuilt floodplains of the Guaíba River as essential in preventing even greater devastation. **The floodplain served as a life-saving buffer against the flood wave** - without it, the river swell could have reached almost 2 metres higher than it did and arrived three days earlier, reducing the time for residents to flee to safety.¹⁷



Integrating Climate *into an* Urban Plan

This chapter and the next are intended to inspire and support city planners to embed ambitious climate action within their urban plans and related policies.

Most cities produce some form of urban plan. As a reminder, when we refer to an “urban plan”, we are referring to a document that sets out the strategic vision for the city’s development, as well as policies regulating land use and built form.

Alongside factors like demography, land use, infrastructure capacity and natural environment, climate change is another vital piece of information that should be considered when producing urban plans. This chapter aims to shed light on this process by identifying useful things to think about at each stage of plan preparation, **whether your city has a climate action plan (CAP) or not**. For cities that have a CAP, its evidence and priority actions should be a key evidence base to inform the preparation of the urban plan.

The specific process followed by different city governments to prepare and adopt an urban plan varies significantly. Factors such as local governance structures, national legislation, financial resources, technical capacity and cultural dynamics shape the approach taken. Despite these variations, we have distilled in Figure 4 **ten common stages** involved in preparing and delivering an urban plan.



Urban Plans as the **key policy document**

Many cities have responsibility for urban planning. Indeed, planning departments are often one of the most well-staffed within city authorities. The specific planning powers that rest at the city level will differ from country to country and region to region in accordance with local legislation and policy. In general, city planners are the ones responsible for developing and enforcing the regulatory framework that guides the development of cities. The main resource that planners rely on to make decisions is an “**urban plan**” that comprises the spatial vision and goals for the future of the city and specific policies that govern development in accordance with these goals (some cities will combine these two elements, while others separate them out). The urban plan may also be complemented by separate regulatory documents like building codes or by-laws, more localised urban plans (e.g. district/precinct/borough plans), sector-specific strategies (e.g. parks network master plans), and design guidelines (e.g. public realm design standards).

Plans may be updated frequently (e.g. every 5 or 10 years) or be in place for 20+ years. **Once built, urban landscapes are slow to change. So making sure that your city’s urban plan enables and engenders ambitious and equitable climate action is critical.** The alternative risks locking in carbon-intensive and climate-vulnerable development patterns for decades to come. The rest of this guide is dedicated to explaining and showcasing how city planners are embedding climate action into their urban plans.

Urban planners around the world will be familiar with these stages. What they might be less familiar with is where they can embed the evidence and actions contained within their city’s CAP - so often the product of another city department - into these stages. More obvious to some, but a disconnect between cities’ CAPs and their urban plans is not uncommon. So, for those city planners embarking on or in the process of updating their urban plans, the following is intended to provide useful orientation.

1. Initiation and scoping

- **Secure political buy-in for using the urban plan as a tool for delivering climate action.** To do so, it may be helpful to reference international, national and regional commitments on climate action and highlight the potential contribution of your city’s urban plan to meeting these, moving away from the traditional narrative of urban planning as a tool simply for organising the physical layout of cities for functionality and land efficiency.
- **Include the City Environment Department in the governance of your urban plan.** Your governance system, such as a Steering Board, must include representation from the team responsible for your city’s climate commitments and CAP (typically, the Climate and/or Environment team).



Paris, France:
the Bioclimatic Urban Plan

Ahead of revising the city of Paris’ Urban Plan (known as the Plan Local d’Urbanisme or PLU), the Mayor of Paris - Anne Hidalgo - established that one of the main objectives of the plan should be to better prepare the city for the climate crisis. Specifically, she wanted the plan to balance urban development with environmental sustainability, set Paris on a lower-carbon trajectory and reduce the risk of extreme heat. In response, the City renamed the PLU to be the “bioclimatic PLU”, better reflecting its new objectives and policies. Mayor Hidalgo also put in place an integrated governance system for the PLU, ensuring the Department of Ecological Transition & Climate worked closely with the Department of Urban Planning in preparing the new PLU. The PLU was adopted by the Paris City Council in 2023 and is expected to enter into effect from the end of 2024 or early 2025.

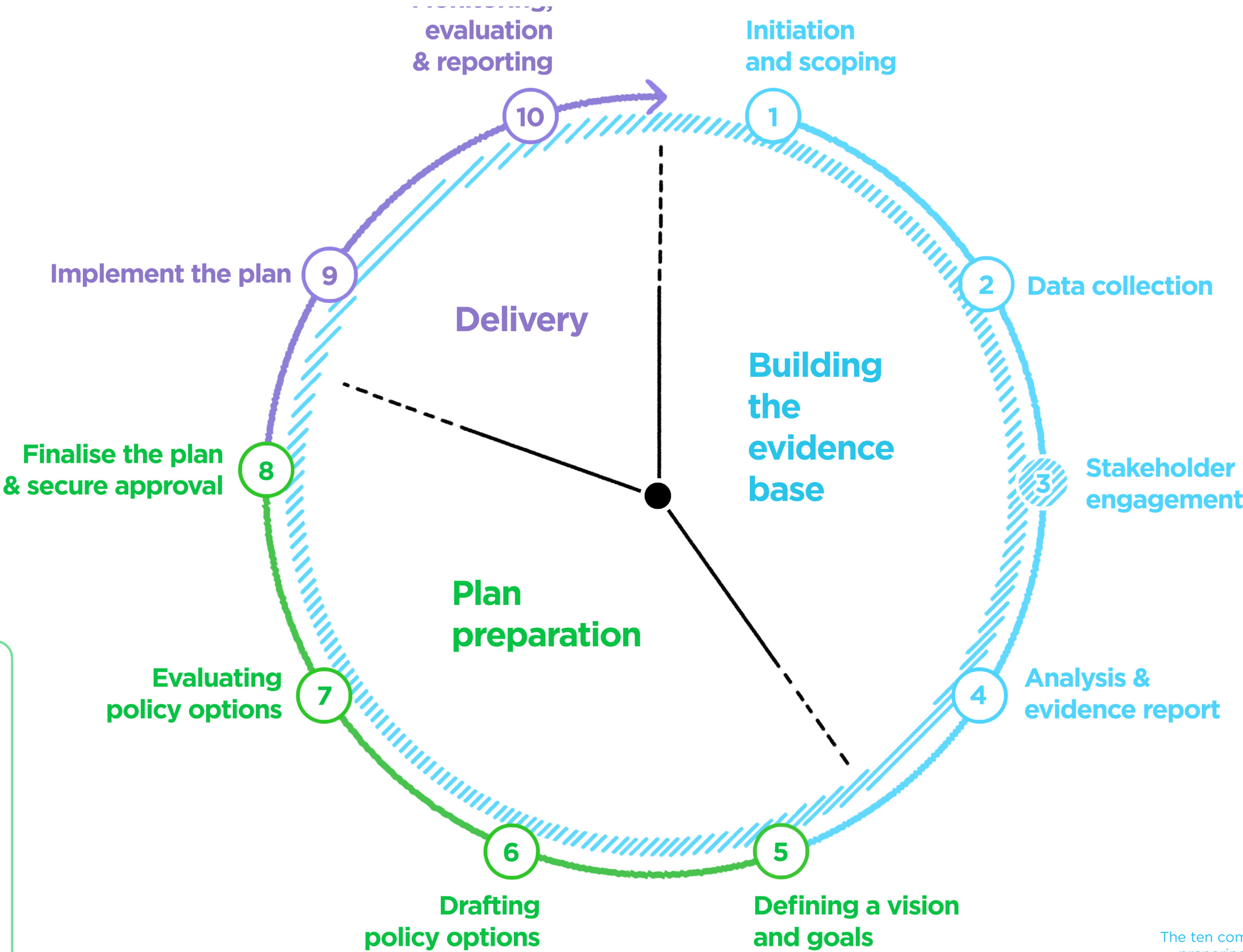


Figure 4.
The ten common stages of
preparing an urban plan

2. Data collection

- **Know the data you have and that which you don't.** Across city departments, all or some of the data needed to inform spatial policies that respond to the climate crisis may already be being collected. This includes data (geo-referenced where possible) on land use and urban form, environmental hazard data, socio-economic data and proximity data (i.e. access to services, facilities, amenities within a defined radius).
- **Know where to look for missing data. If your city has a CAP,** take a look at it and then set up a meeting with colleagues involved in its production. The quality of data may vary, but CAPs are based on two key evidence bases: an inventory of greenhouse gas emissions and a climate change risk and vulnerability assessment. The former gives you an understanding of the main sources of emissions - such as transport, waste, buildings, and agriculture or forestry - while the latter identifies current and future climate hazards and at-risk locations or communities. The former is a useful justification for policies targeting specific emissions sources, such as Transit-Oriented Development policies. The latter allows you to draft and justify policies that restrict certain types of development in at-risk areas or require development to integrate measures that reduce risk (such as sustainable urban drainage systems or shaded walkways).

If your city does not have a CAP, it may still hold useful climate data that could inform spatial policies - such as heat or flooding risk maps that can be used to determine land use suitability. Review city, regional and national climate change and sectoral strategies. These documents may prove an important source of data. Make use of online open source data platforms, although you may want to verify this type of information through ground-sourcing. Finally, prioritise key missing data sets for collection. Means of collection include questionnaires, field observations, focus groups, remote sensing, collaborations with academic institutes and so on.

Seoul, South Korea: the 2040 Master Plan

The Seoul 2040 Master Plan takes a data-driven approach in responding to climate and other environmental hazards. To understand urban sensitivity, a climate change risk and vulnerability assessment was undertaken for the key hazards: heavy rainfall, heatwaves, heavy snowfall, drought and strong winds. The assessment identified and classified risk levels across the city. Factors contributing to vulnerability include hazard exposure, population growth, planned development sites, and topography. The results of this geo-spatial analysis were used as the foundation for the entire plan, with its goals, spatial strategies and land use policies aiming to achieve an approach to urban planning that proactively mitigates risk.

Need help with mapping climate vulnerabilities?

C40 has developed [Climate Change Risk Assessment Guidance](#) to support cities with: developing future climate projections at a local scale; mapping out vulnerable populations, assets and infrastructure; and determining the city's adaptation capacity.



Seoul, South Korea
Source: Unsplash by Janis Rozenfelds



Seoul, South Korea
Source: Unsplash by Andrea De Santis

3. Stakeholder engagement *(on-going process)*

- **Create connections between the Planning Department and other government departments and agencies,** including the Environment/Climate Department. Make the case that good urban planning practices are fundamentally aligned with climate action. Be clear on what data or expertise you need from colleagues in other departments to create and evaluate climate-responsive policy options. Feel comfortable asking for outside expertise and assistance when and where required: climate-responsive planning is not an easy process and you may require technical support from specialists.
- **Connect with external stakeholders, including those communities most vulnerable to climate impacts.** As part of your broader stakeholder engagement strategy for the urban plan, ensure that climate change is on the agenda. Private developers, civil society and the public at large will have knowledge and ideas that you can build upon to draft impactful policy actions. Engaging a diverse range of stakeholders helps to ensure that climate-related policies are equitable and based on a comprehensive understanding of local social, economic and environmental factors. It will also build legitimacy and public buy-in, essential for political approval and smoother policy implementation down the line.

Need help connecting with other departments?

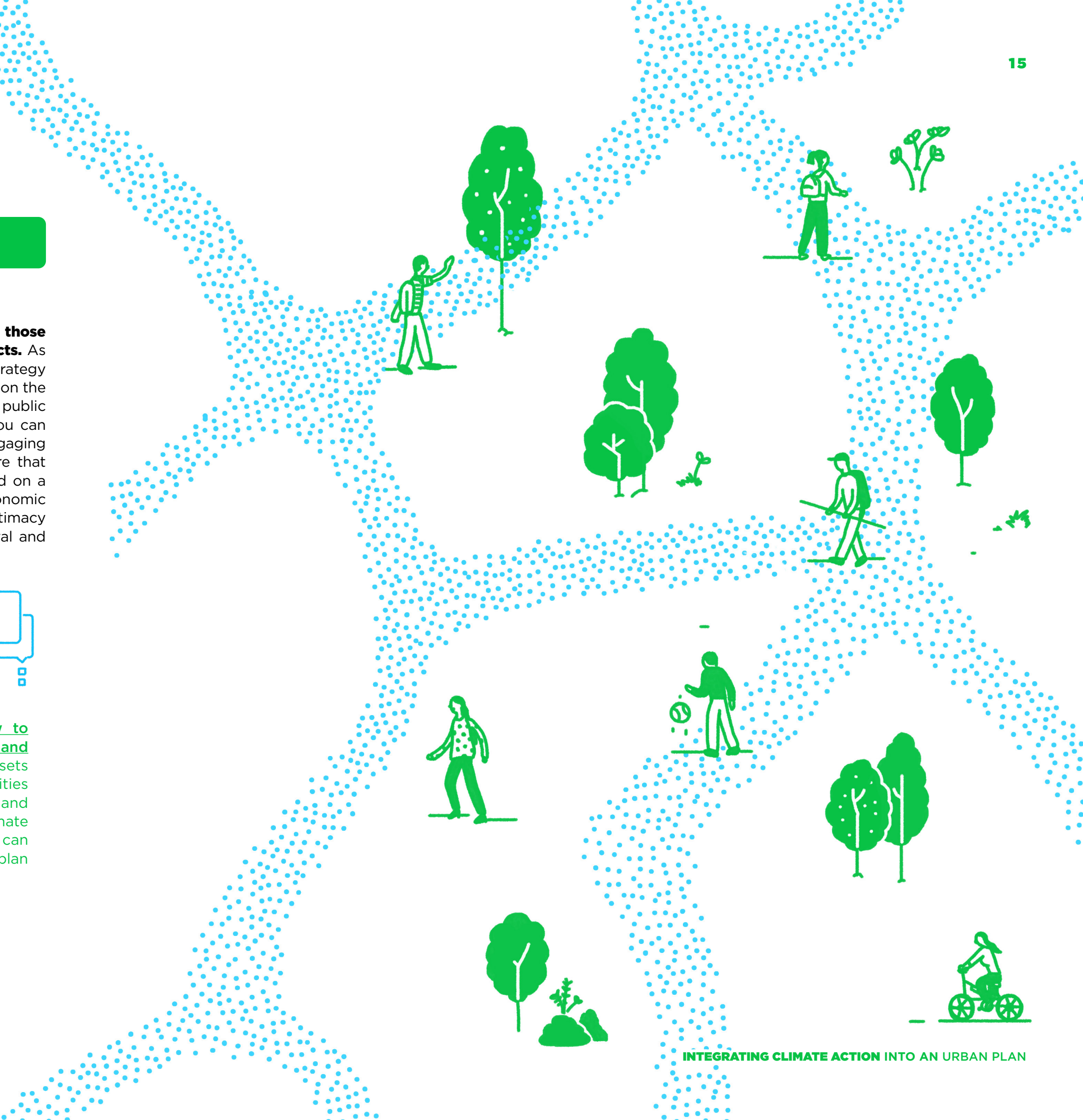


Chapter three of C40's [Climate Adaptation Toolkit for Urban Planners](#) provides ideas, tools and resources for convening and facilitating a workshop between city planners and sustainability staff. It looks at planning the session, ideas for running the session and how to harness momentum after the event. While focussed on climate adaptation action, the advice within applies equally to climate mitigation action.

Need help connecting with external stakeholders?



Take a look at C40's guide on [how to engage stakeholders for powerful and inclusive climate action planning](#). It sets out steps, approaches and tools for cities to design and deliver an inclusive and equitable engagement strategy for climate action planning - techniques which can easily be embedded within the urban plan consultation process.





Kuala Lumpur, Malaysia
Source: Unsplash by Victor Loh

4. Opportunities analysis and diagnostic report

- **Interpret the information** gathered in steps (2) and (3) **to understand the baseline conditions and key climate-related opportunities and challenges** to respond to through your city's urban plan. The challenges or opportunities may be overtly climate-related, such as a growing number of fatalities during extreme heat events, or less direct, such as the potential for new jobs to deliver a street greening programme. This analysis will be one part of a holistic diagnostic of your city, which will, in turn, form the basis for defining a vision and goals (stage 5) and drafting policy options (stage 6).

5. Defining a vision and goals

- **Seek consistency across your climate ambitions and urban plan.** A typical urban plan will start by setting a strategic vision for the area and specific goals that articulate the vision. While the remit of an urban plan is broader than a CAP, the vision and goals in your urban plan should be consistent with the climate action objectives set out in your CAP (or other relevant policy documents). This will help to ensure that your city's CAP and its urban plan are not disjointed but rather working towards complementary outcomes.

Kuala Lumpur, Malaysia: Structure Plan 2040

Kuala Lumpur (KL) City Hall prepared its CAP and KL Structure Plan concurrently. Both documents are heavily informed by the other, with the CAP explicitly recognising the opportunity and need to mainstream its climate-related strategies and targets within the city's spatial plan. Adopting a truly integrated approach, both documents support the same vision of KL as “A City for All”, with climate action being a common thread across the six strategic goals of the Structure Plan.



Thean Hou Temple, Kuala Lumpur.
Source: Unsplash by Ines Sayadi



Kuala Lumpur, Malaysia
Source: Unsplash by Filipe Freitas

6. Drafting policy options

- **Translate the vision and goals into concrete spatial policies** that regulate the use of land and form of the built environment. When doing so, think about how planning policies can be designed so as to achieve these goals whilst also contributing to climate outcomes. The next chapter of this guide details a wide variety of climate-responsive planning policies.
- **Use the climate action identified in your CAP or sectoral plans as the starting point to define your spatial interventions.** If your city has a CAP, it will contain a list of evidence-based climate actions to prioritise. In the absence of a CAP, sectoral plans (covering transport, energy, waste, etc) will contain priority actions. It is likely that many of these can be supported through spatial or built form interventions directed by urban plan policy. You should review these documents for actions that can be supported by planning policy. For example, your CAP or energy plan might contain an action to increase solar energy generation by 25% by 2030. Through your city's urban plan, you can identify and safeguard land solely for the purpose of renewable energy infrastructure. Additionally, you may be able to introduce a requirement for new buildings over a certain size to incorporate solar rooftop panels.

7. Evaluating policy options

- **Assess the expected impacts of policy options on greenhouse gas emissions and climate resilience.** In some countries, there will already be a legislative requirement and standard procedure to follow in evaluating expected policy impacts (such as an Environmental Impact Assessment). When evaluating policy impacts, climate should be one factor considered alongside broader environmental, social and economic outcomes.

Need help with assessing the expected impacts?



C40's [Adaptation and Mitigation Interaction Assessment](#) (AMIA) Tool helps cities identify and compare the potential GHG emissions and adaptation impacts of policies. Several of the policies examined involve urban planning, making this a helpful tool for planners wanting to explore different scenarios and make more informed decisions.

- **Evaluate opportunities to achieve multiple sustainability outcomes.** Having evaluated policy options, consider opportunities to amend policies in order to generate multiple benefits. Ask yourself if there is any way a given policy can be implemented in a way that also reduces greenhouse gas emissions and/or vulnerability to climate impacts.

Need help with identifying the wider benefits of urban planning and design interventions?



C40's new [Healthy Neighbourhood Explorer](#) allows city planners to simulate the health, economic and emissions benefits of actions aligned with "15-minute city" principles.

8. Finalise the plan and secure approval +

9. Implement the plan

- **Develop a realistic budget, explore funding opportunities and assess financial mechanisms.** Consider dividing implementation into phases to manage costs and resources effectively, prioritising projects that address critical needs first. Explore diverse funding sources to meet the budget. Multilateral development banks, philanthropic organisations and many governments offer funding specifically for projects that address climate change. Public-private partnerships can be beneficial for financing large-scale projects, like extensions to the public transport system. Also consider how to raise funds or in-kind contributions directly or indirectly from private development, e.g. through taxes, land value capture or requirements to build-out infrastructure networks.

Need help with understanding the climate finance available to cities?



C40's Knowledge Hub is full of helpful guides on this topic, including [“How to finance urban infrastructure”](#), [“How cities can attract investment for a green and just recovery”](#), [“Financing Transit-Oriented Development with Land Values: adapting land value capture in developing countries”](#), and [“financing the urban transition: policymakers’ summary”](#).

- **Establish departmental roles and responsibilities for implementing climate policies within the plan.** Implementing an urban plan relies on cross-departmental collaboration. The plan will guide infrastructure investment decisions, municipal land acquisitions, and determine which planning applications are approved. There may be a need to build awareness and buy-in across various responsible departments to implement its policies.

London, UK:
the London Plan (2021)

The London Plan introduced a carbon offset fund, which is a financial mechanism designed to compensate for the GHG emissions resulting from energy used to operate buildings. In London, carbon offset funds are established and administered at the borough level. The plan establishes that major development (10+ residential units or 1,000m² floorspace of non-residential) should be net-zero. In other words, the energy used to operate the building must result in no-net release of GHGs into the atmosphere. Where it is clearly demonstrated that net-zero cannot be fully achieved through energy efficiency measures on-site, developers should provide a cash in lieu contribution to the borough’s carbon offset fund. These funds are ring-fenced to fund carbon-saving projects, such as tree planting and retrofitting social housing.

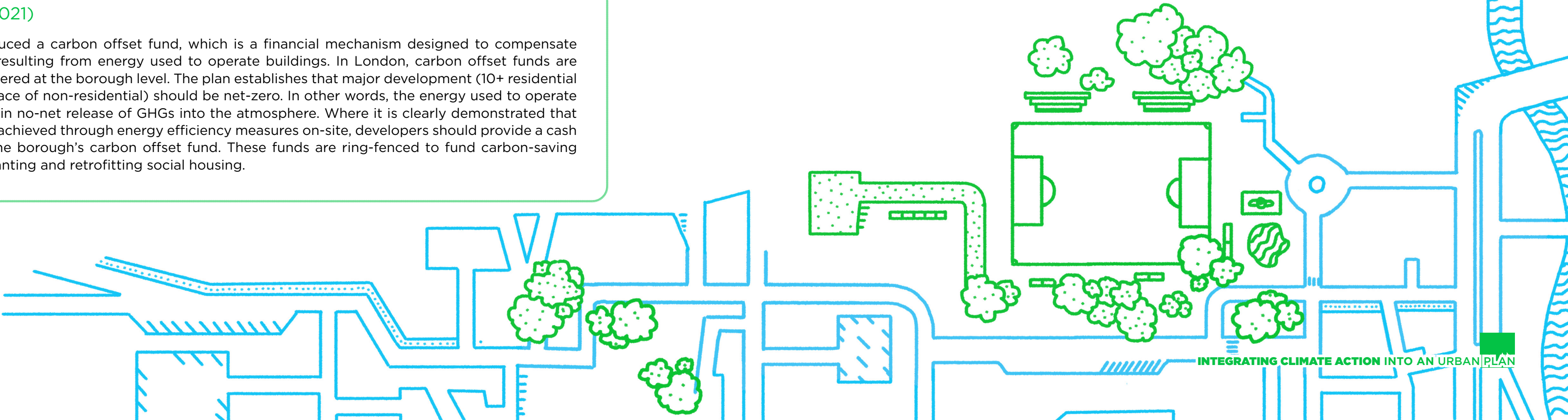
10. Monitoring, evaluation and reporting (MER)

- **Know the indicators you need to measure the impact of climate policies.** When creating the MER framework, work across departments to identify suitable spatial indicators that will allow you to reflect, compare and monitor urban development trends/patterns over time to enable proactive and responsive spatial planning. Remember that other city departments may already collect data of relevance, which will minimise additional work.

Once the plan is adopted, the policies contained within it will guide development management decisions across the city. It is essential to make sure that you have the right policies in place to enable and encourage reductions in emissions and increased resilience against the impacts of the climate crisis. For this reason, the next chapter focuses on seven planning policy areas of particular relevance for climate outcomes.

Cape Town, South Africa:
Spatial Trends Report 2022/23

Cape Town’s Urban Planning and Design Department releases a Spatial Trends Report every three years. The Spatial Trends Report forms part of the monitoring and evaluation framework for the [Metropolitan Spatial Development Framework](#) (MSDF) and the eight [District Spatial Development Frameworks](#) (DSDFs). Data collected to inform the report is linked to indicators which are tied to the MSDF and DSDFs policy objectives in order to monitor their impact on development.



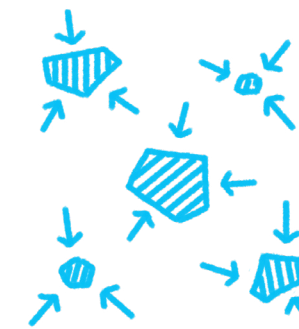
Spotlight *on* Planning Policies

Updating your city's urban plan is the perfect opportunity to reassess all of its policies from a climate change perspective. The same can be said for cities who are not about to undertake a full plan update, but may be ready to revise one or a handful of policies. Looking to other cities around the world often proves a useful source of inspiration.

In this chapter, **seven policy areas** of particular relevance for climate change outcomes are focussed on in turn. For ease of navigability, the seven policy areas have been separated out. In reality, there are lots of overlaps between them. For each policy area, we set out the rationale for action, the typical policy interventions and a few good case studies from C40 member cities around the world.



*Urban Planning
for Nature*



*Urban Planning for
Polycentric Cities
and Proximity*



*Urban Planning for
Tackling Flooding,
Extreme Heat and
Drought*



*Urban Planning for
Resilient Informal
Settlements*



*Urban Planning for
Mode-Shift & Transit-
Oriented Development*



*Urban Planning for
Compact Cities*



*Urban Planning for
Sustainable Buildings*



Urban Planning *for* Tackling Flooding, Extreme Heat and Drought

Climate resilient cities are ones which are better able to withstand, adapt to, and recover from climate-related events, thereby safeguarding communities, livelihoods and economic stability. Taking action to increase climate resilience in cities is increasingly critical, as urban areas face the brunt of the impacts of the climate crisis, such as **extreme temperatures, flooding** and **water scarcity**. These hazards threaten human lives and wellbeing, ecological health, physical assets like buildings and infrastructure, and billions of dollars worth of economic losses.

The risks are heightened for cities in low-income countries, especially those experiencing rapid urban growth. Growth in these cities is often characterised by sprawling and unplanned development and the expansion of informal settlements (in the absence of affordable housing alternatives), often into areas vulnerable to climate impacts. As an example, the population living in low-lying coastal zones across Africa is projected to reach 100 million people by 2030 and double that by 2060.¹⁸

Certain communities within cities, whether in high- or low-income countries, are disproportionately affected by the impacts of the climate crisis. Factors like income, race, age and gender play a determining role in vulnerability levels - and these factors may compound to worsen vulnerability. Equity must therefore be at the heart of any policy aimed at increasing climate resilience. This means that policies must account for and redress inequalities that exacerbate vulnerability as much as possible, thereby fostering just and inclusive urban environments.

Urban planning is instrumental in enhancing climate resilience in cities. By incorporating climate considerations into all aspects of urban development, whether private- or public-led, planners can design cities that are better equipped to handle climate shocks and stresses.

Planning policy actions include:

River, Coastal and Surface Flooding

- **Future-Proofed Flood Risk Zoning:** restricting the types of development that are allowed to take place in flood-prone areas and safeguarding these areas for natural flood buffers. Areas should be identified not just by their current risk level, but accounting for the projected risk level brought about by a changing climate.
- **Flood Risk Design Features:** requiring new construction to meet flood-resilient design standards or guidelines in areas where risk is mitigable.
- **Mandating Sustainable Urban Drainage Systems (SUDS):** requiring new (re)developments to incorporate green infrastructure, such as rain gardens, green roofs, and permeable pavements, to absorb stormwater and reduce flooding risk.
- **Making Space for Water:** safeguarding existing green and blue infrastructure across the city, such as parks, rain gardens, bioswales, retention ponds and rivers, to increase permeability of excess water and decrease water flow rates during an event.



Extreme Heat

- **Planning for Urban Greening:** planning for the protection and expansion of a comprehensive network of green infrastructure throughout the city, particularly in “heat hotspots”. New (re)development can be required or incentivised to deliver a net-increase in tree canopy cover to provide shade and cool urban areas.
- **Requiring Cool Roofs and Pavements:** incentivising or mandating new (re)developments to use materials that reflect more sunlight and absorb less heat.
- **Encouraging Airflow:** designing street grids and urban layouts that facilitate natural airflow and wind circulation. Policies could mandate the creation of street patterns that align with prevailing wind directions to enhance ventilation and reduce heat buildup at street level.
- **Heat-Resistant Design Standards:** establishing standards or guidelines for heat-sensitive architecture and passive cooling to reduce indoor temperatures.

Water Scarcity

- **Water Efficiency Standards:** requiring or incentivising new buildings to be constructed to meet water efficiency standards through water-saving technology, such as low-flow fixtures and greywater reuse systems.
- **Rainwater Harvesting:** requiring or encouraging new (re)developments to incorporate systems for capturing and storing rainwater for uses other than drinking, like irrigation or toilet flushing.

There are many synergies between planning strategies for tackling flooding, extreme heat and drought and those for nature.

For an in-depth resource focussed on urban planning policies for climate resilience, we recommend taking a look at C40’s [Integrating Climate Adaptation: a Toolkit for Urban Planners and Adaptation Practitioners](#) resource. This resource looks at how resilience can be integrated into urban planning policies, including at different planning scales and through different requirements, guidelines or incentives.

Adopting a spatial strategy informed by climate risk Auckland

The challenge

Auckland (a city in New Zealand, also known by its Māori name, Tāmaki Makaurau) comprises urban, rural and coastal environments. The urban area covers approximately 20% of the region’s land mass and is home to over 90% of residents. The urban area is focussed along a narrow north-south axis and is surrounded by extensive rural areas.




Auckland’s former Development Strategy, adopted in 2018, promoted so-called ‘future growth areas’ - i.e. greenfield areas - to accommodate some of the city’s future growth. However, some of these areas were shown to be particularly vulnerable to flooding and landslides during intense storms in January and February 2023. These shock events contributed to Auckland Council’s decision to embed climate adaptation more strongly into the spatial planning framework, so as to protect life and property.

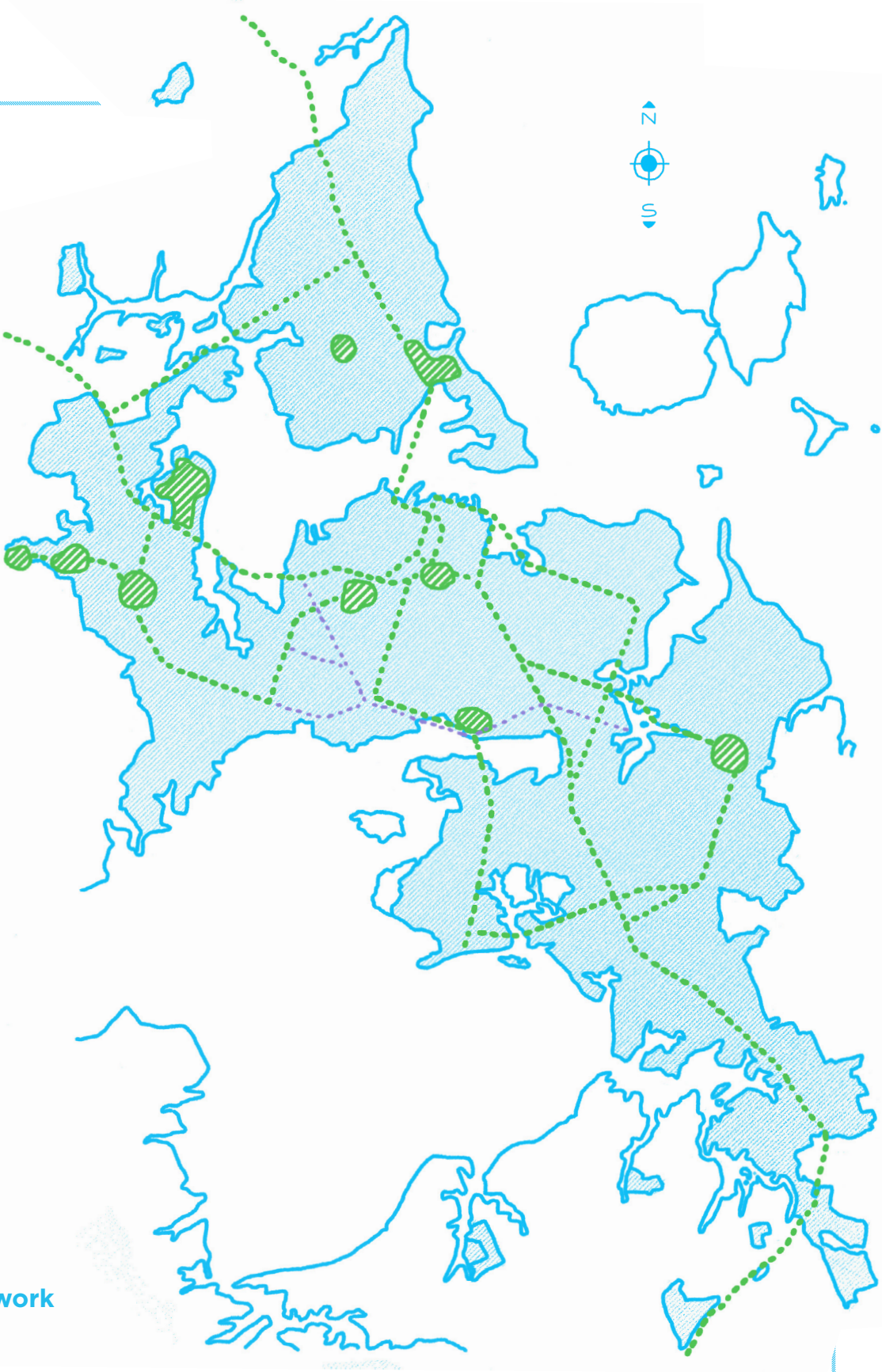
The solution

In 2023, Auckland adopted a new [Future Development Strategy](#) for how the city will grow and develop over the next 30 years. This strategy explicitly prioritises climate adaptation by establishing a growth strategy informed by climate risk. Key elements of the strategy include:

- **Compact city:**
 - » Auckland’s growth will be concentrated in existing urban areas, particularly those with good access. Only some growth will be allowed in ‘future growth areas’ (greenfield) at the edges of the city and limited growth allowed in rural areas. The preservation of rural land adjacent to the city contributes to resilience by protecting natural floodplains and safeguarding water catchment areas.
- **Avoidance of hazardous areas:**
 - » Growth will not be allowed in known hazard areas where people, property, or infrastructure would be exposed to significant risk.
 - » Where historic decisions mean development is already enabled in vulnerable locations, clear direction will be given on where avoidance or impact mitigation is appropriate.
 - » ‘Future growth areas’ will be directed to avoid hazardous locations.
- **Integrated catchment approach:**
 - » Where future development proposals would increase stormwater runoff and impact downstream floodplains and urban areas, provisions will be made for development to assess and incorporate stormwater management solutions.

Figure 5.
Future growth areas
Source: Auckland Council

-  **Future growth area**
-  **Indicative future rapid transit network**
-  **Possible future cross-town routes**



Auckland, New Zealand.
Source: Unsplash, by Gaurav Kumar

Coastal Management Line Cape Town

The CML is integrated into the planning framework through the Municipal and District Spatial Development Framework as the “coastal edge”. Applications for new developments or modifications to existing structures within CML zones are flagged for additional scrutiny by the City and must comply with CML guidelines governing development.

The CML has been a key spatial planning tool for limiting the encroachment of development onto the immediate coastal environment, engendering risk-averse coastal planning that takes into account current and projected climate risks.

The challenge

Cape Town, South Africa has 307 km of coastline. While this coastline is one of the city’s most important assets, it is also a source of risk, given the climate change induced coastal pressures, such as sea-level rise, increased frequency of storm surges and coastal erosion. Cape Town sought a solution that would reduce risks to life, property and infrastructure and protect coastal ecosystems and the services they provide. Additionally, the City of Cape Town sought to design a policy response that would also help to redress legacies of socio-spatial injustice.

The solution

In 2007, the City of Cape Town began developing a Coastal Management Line (CML). Subsequently, South Africa’s principle coastal legislation - the Integrated Coastal Management Act - has established a requirement for all coastal municipalities to adopt a CML.

The purpose of the CML is to guide the city’s decision-makers to more effectively regulate coastal development and to safeguard the coastline against current and future climate change risks. The CML demarcates where development is allowed to occur, based on an understanding of different levels of flood risk and varying socio-economic vulnerability. It encourages protection of habitats and the functional integrity of ecosystems through designating protected coastal ‘green belts’, which also act as natural coastal buffers. At the same time, the CML is promoting restorative socio-spatial justice through identifying and enabling nodal growth areas in historically disadvantaged coastal communities.



Cape Town, South Africa.
Source: Unsplash, by finding_dan

Tackling urban heat and overheating in buildings London

The challenge

Like many cities, London, United Kingdom, is grappling with hotter, drier summers. In its summer months, London is vulnerable to extreme heat episodes and heatwaves. In July 2022, the national weather service issued its first ever Level 4 heat alert - an alert which indicates a national emergency and which is triggered when a heatwave is so severe or prolonged that its effects pose a significant risk to human health across all population groups, not just those with pre-existing vulnerabilities.

Heat risk and the need to cool London are not just a summer issue. Winters are also becoming warmer and wetter winters. Overheating is now a year-round challenge, with many Londoners occupying homes and buildings that were not built for these climate conditions.

The solution

London’s spatial development plan (known as [the London Plan](#)) incorporates policies to manage heat risk through new developments. The plan recognises two heat challenges - the need to counter the urban heat island effect city-wide and the need to ensure that individual buildings do not overheat.

The London Plan requires all major development (defined as 10+ residential units, a residential site area ≥ 0.5 ha, or non-residential uses with 1,000sqm+ floor space or site area ≥ 1 ha) to minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure. All major development should incorporate urban greening as an integral part of its layout and design, including trees, green roofs and green walls - and must provide an established minimum of such greening. The 35 local planning authorities within London are empowered to introduce locally tailored urban greening minimums and apply these to developments which fall below the “major development” threshold.

With regards to internal overheating in individual buildings, the plan requires major development proposals to demonstrate how they will reduce the potential for overheating, whilst also reducing reliance on air conditioning systems. It established a “cooling hierarchy” (pictured), which is a framework that prioritises different methods for keeping buildings cool, ranked by their environmental impact and energy efficiency. Developers must evidence via an Energy Strategy that they have followed this hierarchy and planning permission shall not be granted without this evidence.



Figure 6.
Cooling hierarchy
(adapted from GLA
London Plan)
Source: RIBA Journal

London, UK.
Source: Unsplash, by Benjamin Davies



Singapore.
Source: Unsplash, by Mike Enerio

Pursuing comprehensive land management for water security Singapore

The challenge

For decades, the island-nation of Singapore struggled to secure an adequate supply of water. It ranks fifth among the top 33 countries likely to face extremely high water stress by 2040 ([WRI, Water Stress by Country](#)). The National Water Agency predicts that population growth and economic development could almost double Singapore's total water demand by 2060. The challenges lie in a shortage of freshwater sources (such as groundwater and aquifers) and, as a result of increasing urbanisation, the lack of sufficient space to capture and store rainwater. In 1965, Singapore had three reservoirs and a catchment area covering only 11% of the land.

The solution

Singapore began to approach water as an environmental asset essential for improving urban livability. Under the country's 1972 Water Master Plan, officials designed a policy that called for the construction of catchment areas and reservoirs to collect rainwater in order to boost local water supply. Today, Singapore's approach to ensuring continued water supply is termed the "Four National Taps" and comprises: the collection and storage of rainwater in reservoirs; imported water; recycled water and desalinated water.

By 2011, through careful land use interventions and management, Singapore had increased its water catchment area from 11% to 66% of total land area. Through a network of rivers, canals and drains, rain that falls on two-thirds of Singapore's land area is now channelled into 17 reservoirs before it is treated for drinking water. The Public Utilities Board (PUB) states that local catchment water, ie. water collected and stored in reservoirs, provides about 20% of the country's total water needs.

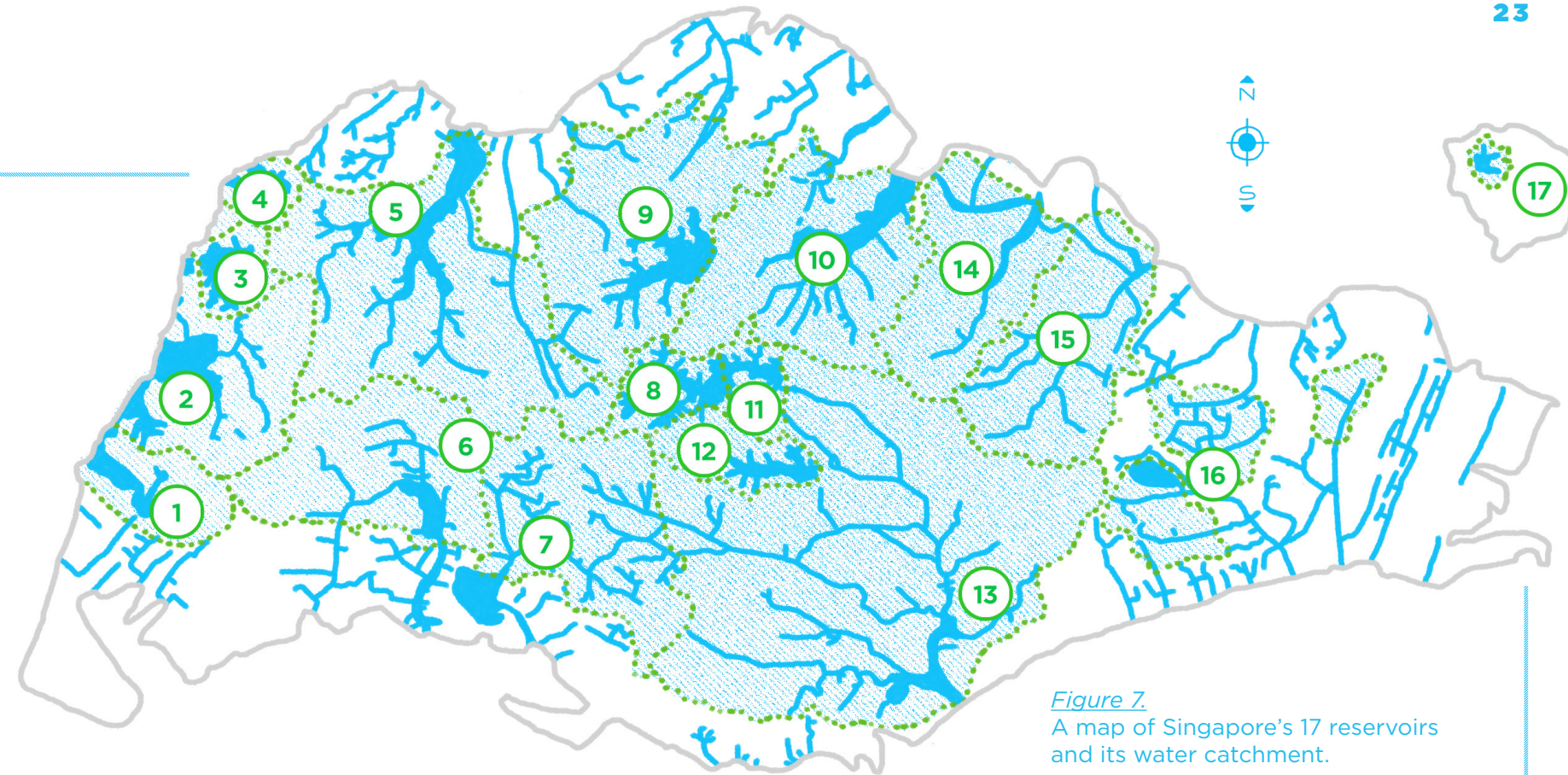


Figure 7.
A map of Singapore's 17 reservoirs and its water catchment.
Source: Public Utilities Board

Water catchment

Singapore's 2019 Master Plan designates the Central Catchment Area, home to four major reservoirs, as protected. Major and industrial development, as well as intensive agricultural uses, are prohibited in protected catchment areas to try and maintain their natural states and functions as far as possible. Development is allowed in unprotected catchments, although the type of developments is limited to residential developments and non-pollutive industries.

Additionally, through their Active, Beautiful, Clean Waters (ABC Waters) design guidelines and ABC Waters Certification, Singapore encourages public agencies and private developers to incorporate water-sensitive design features. This includes natural/artificial water features that improve water quality by clean pollutants from stormwater runoff. The treated water can be collected and used for non-potable purposes. Developers are encouraged to incorporate localised rainwater harvesting and on-site re-use of harvested water in their developments. Mainstreaming the ABC Waters concepts throughout catchment areas through planning and design obligations is central to improving urban runoff quality for re-use, as well as providing wider benefits like enhanced livability and improved biodiversity.



Lower Peirce Reservoir, Singapore.
Source: Canva Pro, Clinton Kay



Urban Planning *for* Nature

The importance of nature in cities cannot be overstated. Urban green and blue spaces, such as parks, natural reserves, lakes and rivers, provide numerous benefits to city dwellers. Benefits include flood prevention, heat reduction, water purification, air quality regulation, carbon sequestration, and improved physical and mental health. Protecting and expanding nature within urban environments helps to preserve the vital ecosystems that provide these benefits whilst supporting wildlife.

Cities prioritising space for nature are already benefiting. After planting more than 880,000 trees and 2.5 million plants to create 36 green corridors, the city of Medellín, Colombia experienced an average drop in temperatures of 2°C and city officials expect a further decrease of 4-5°C within three decades. Over the course of the next century, the new vegetation comprising just one of the 36 corridors will absorb the equivalent amount of carbon dioxide as taking 500 cars off the road¹⁹. The City also employed and trained locals from disadvantaged backgrounds to plant and maintain these corridors. The case for safeguarding

urban nature as a means to not only tackle the twin climate and ecological crises, but also to provide good, green jobs, is clear.

Urban planning plays a vital role in the delivery and protection of nature in cities. Responsible urban planning ensures not only that existing natural areas are preserved and enhanced, but also that new public and private developments contribute to urban nature. Understanding the existing distribution and accessibility of natural spaces is key to addressing spatial inequalities in provision.

Planning policy actions include:

- **Urban Growth Boundaries and/or Green Belts:** establishing limits on how far the built-up area can extend into surrounding greenfield areas and/or designating areas around a city where development is restricted to preserve natural landscapes and prevent urban sprawl.
- **Planning Networks of Green and Blue Infrastructure (GBI):** mapping areas of existing GBI and planning for their improvement and expansion through the strategic provision of additional GBI, seeking to maximise ecological connectivity.
- **Environmentally Protected Areas:** designating natural areas as protected and thereby limiting or prohibiting development, construction and other land-altering activities to prevent degradation.
- **Development Setbacks and Buffers:** requiring new (re)developments to include buffer zones around natural features like rivers, forests, and wetlands to protect them from encroachment.
- **Mandating Sustainable Urban Drainage Systems (SUDS):** requiring new (re)developments to incorporate green or grey SUDS, such as rain gardens, green roofs, and permeable pavements, to manage stormwater and reduce flooding risk while contributing to urban vegetation.
- **Green Building Standards:** incentivising or mandating new (re)developments to incorporate a minimum amount of nature, such as public green spaces, green roofs or living walls. Higher minimums can be introduced in areas relatively deficient in nature.



Bogotá, Colombia.
Source: Unsplash, by Random Institute

**Prioritising nature
as the backbone of
urban development**
Bogotá

The challenge

Bogotá is the capital district of Colombia. Between 1960 and 2023, Bogotá tripled its urban footprint, occupying 22,000 new hectares and reducing naturally pervasive wetlands to only 900 hectares. Today, the city covers an area of roughly 163,000 hectares, including a mix of densely populated urban areas and vast rural landscapes. This formal distinction between “urban” and “rural” is blurred by the rapid growth of the city over recent decades, in particular by the establishment of informal settlements (barrios informales) in the surrounding mountains to the south of the urban boundary. The City Council sought a way to better accommodate urban growth in order to restore degraded natural landscapes and safeguard the benefits they provide to all residents.

The solution

Bogotá’s most recent Land Use Plan [Plan de Ordenamiento Territorial], ‘Bogotá Reverdece 2022-2035’ (which translates literally as ‘Bogotá becomes green again’), is the overarching spatial plan for urban and rural land regulation in Bogotá. The plan establishes a hierarchy of structural elements that guide spatial planning in the district. Green and blue infrastructure (defined as the Principal Ecological Structure or PES) is at the top of this hierarchy. The Land Use Plan consolidates and expands by 30% the areas designated as PES throughout the metropolitan area, including at the rural-urban edge and across the urban area. Any development in the city must take into account the protection and restoration of these areas.

The Land Use Plan implements five specific instruments to support well-functioning ecosystems: urban forests, a manual for vegetation coverage, a public space manual, areas for climate resilience interventions and ecosystem connectors.

- The Land Use Plan identifies 21 strategic areas for planting urban forests, which should be dense and made up of diverse tree species.

- The new manuals for vegetation coverage and public space represent a departure from the previous approach of transforming public spaces using asphalt and other impermeable material. These manuals require the incorporation of green and permeable spaces. The vegetation coverage manual includes guidelines and protocols for the restoration of priority green and blue infrastructure (the PES), with the objective of ensuring that all city projects, both public and private, contribute to the enhancement of nature.
- The Land Use Plan identifies areas for climate resilience, where development must include interventions, such as localised nature-based solutions, to mitigate risk.

- The Land Use Plan designates five, principally urban, ecosystem corridors that will be enhanced to provide better connectivity for wildlife, including through small-scale interventions like pocket parks and greening roadside verges.

Throughout the Land Use Plan, interventions to enhance natural ecosystems are positioned as necessary and cost-effective to address many of the greatest challenges facing the city and its metropolitan area, including those arising from the climate crisis - namely, extreme heat, drought, and flooding.

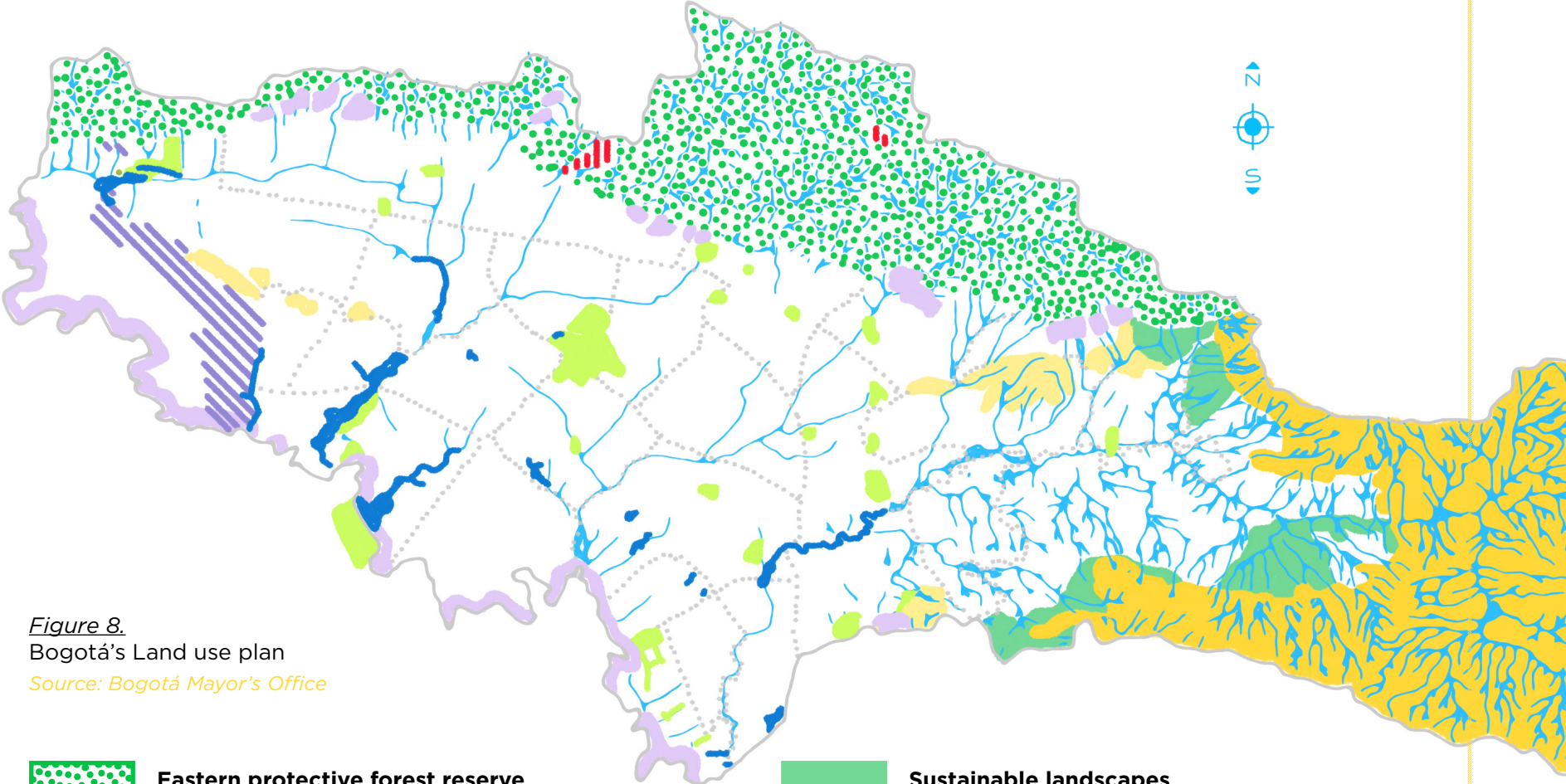
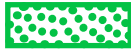









Figure 8.
Bogotá’s Land use plan
Source: Bogotá Mayor’s Office

- | | | | |
|---|---|---|----------------------------------|
|  | Eastern protective forest reserve |  | Sustainable landscapes |
|  | Mountain ecological district park |  | District wetland reserves |
|  | Protective forest reserve producer |  | Hydric system |
|  | Regional forest reserve producer T. van der Hammen |  | Border parks |
|  | Climate resilience and risk protection areas |  | Contemplative parks |

Requiring private development to contribute nature São Paulo

In its 2014 Master Plan, the City of São Paulo, Brazil adopted a new and innovative zoning tool: the Environmental Quota (EQ). This makes it mandatory for anyone seeking a licence to build or renovate buildings on plots larger than 500m² to consider the environmental aspects of doing so. With this tool, new developments on private lots must meet minimum vegetation lot coverage and soil drainage requirements. As a result, private development contributes to public goods, including stormwater management and climate and air quality regulation.

The EQ is an index that aggregates several indicators to evaluate the “environmental performance” of a plot. The project’s EQ number must be equal to or greater than the EQ minimum, which is determined according to which EQ zone the lot is located in and the lot’s size. Fiscal incentives are also in place to encourage developers to exceed these requirements. Those that exceed receive a discount on the cost of a permit to build to a higher density than established by the zoning rules.

Requiring private development to contribute nature Oslo

In 2019, the Municipal Planning and Building Agency in Oslo, Norway introduced a planning tool to increase green and blue infrastructure throughout the city. The tool, known as the “Blue-Green Factor” (BGF) is a performance-based indicator which aims to ensure a minimum provision of vegetation coverage and surface water management across all residential development projects. The minimum provision is determined by the zone that a development project falls in within the city. Different green/blue interventions, such as rain gardens, permeable surfaces and vertical gardens, have scores between 0 - 1.0 associated with them. Scores differ across “inner city” and “outer city” zones. Developers have flexibility in how they meet the minimum score requirements through their choice of different green/blue features. The BGF has succeeded in promoting nature-based solutions across residential projects and, in 2023, it was extended to non-residential uses, including public space redevelopment.



Oslo, Norway.
Source: Unsplash, by frdm



Urban Planning *for* Resilient Informal Settlements

Informal settlements are a global urban phenomenon. They exist in cities around the world, taking various forms and typologies, and known by a variety of names (shantytowns, slums, favelas, barrios informales, bidonvilles, squatter settlements). Informal settlements are residential areas where housing has been constructed without formal planning and typically without legal recognition from authorities. They are defined as areas where 1) inhabitants have no security of tenure vis-à-vis the land or dwellings they inhabit, 2) neighbourhoods usually lack, or are cut off from, basic services and city infrastructure and 3) the housing may not comply with current planning and building regulations. They are often situated in geographically and environmentally hazardous areas, including those most vulnerable to climate impacts. Slums are the most deprived and excluded form of informal settlements²⁰.

As of 2020, nearly 1.1 billion people lived in informal settlements, with an additional 2 billion expected to live in similar conditions within the next 30 years²¹. Some 85% of informal settlement inhabitants are concentrated in three regions: Central and Southern Asia (359 million), Eastern and South-Eastern Asia (306 million) and sub-Saharan Africa (230 million)²². While urban informality is most prevalent in Global South countries, informal housing has increasingly emerged as a response to economic crises and housing shortages in Global North countries.

A number of interrelated factors result in informal settlements: a lack of affordable housing; rapid urbanisation; weak governance (particularly in urban planning); econo-

mic vulnerability and inequality; marginalisation and lack of social protection; and displacement caused by conflict, natural disasters and climate change²³.

The residents of informal settlements generate fewer GHG emissions than middle and high income urban residents²⁴. Despite this, they are disproportionately vulnerable to the impacts of the climate crisis. Informal settlements are frequently located in sites that are particularly susceptible to climate hazards, such as flooding and landslides²⁵. These at-risk areas (riverbanks, low-lying coastlines and steep slopes) are often the only areas accessible to poorer residents, being closer to sources of employment and having a lower risk of eviction as the land is less attractive for developers. Their vulnerability is compounded by unsafe housing, susceptible to overheating and collapse during extreme weather events.

Additionally, the informal nature of these settlements means that they are often overlooked in formal urban planning processes, leading to a lack of investment in infrastructure and services that reduce risk (such as water, sanitation and waste), as well as in infrastructure that supports improvements in economic conditions (such as public transport). Integration of informal settlements into formal plans and processes is complex and has its limits without other policy reforms; regardless, meaningful intermediary steps can and must be taken to increase the liveability and resilience of such areas in the absence of formal integration.



Informal housing in Manila, Philippines.
Source: Unsplash, by Alvin Cabaltera



Including informal settlements and their resident communities in urban planning processes provides significant opportunities to decrease climate vulnerability while contributing to the broader goals of sustainable development.

Urban planning actions include:

- **Effective Community and Multi-Stakeholder Engagement:** establishing mechanisms to meaningfully involve informal neighbourhood communities in all planning and decision-making processes. Participatory approaches help to ensure that interventions meet residents' needs and leverage local knowledge of the area.
- **Formal Integration of Informal Settlements in Urban Plans:** formally integrating informal settlements into city Urban Plans. Historically excluded from such plans, formal integration recognises these areas as legitimate parts of the city. Initiatives set out in a city's Urban Plan often determine where investment is focussed. Inclusion of informal areas and their residents therefore allows for resource mobilisation and for integrated medium and long-term planning to bring about improvements in quality of life, e.g. through provision of basic services and upgraded infrastructure. Legal recognition in Urban Plans is a

step towards addressing the complex issue of land tenure security - an issue that cannot be done justice within this concise guide, but that is well documented by others^{26, 27}.

- **In-Situ Upgrading of Informal Settlements:** wherever possible, existing informal settlements should be upgraded in-situ and in close collaboration with the local community. An understanding of the spatial dimension of climate risks should inform any decision about whether to upgrade in-situ or pursue relocation. Upgrading means planning for the provision of and access to risk-reducing infrastructure and services, such as stormwater drainage, sanitation, waste and healthcare, to reduce human risk and environmental degradation. This will rely on prudent financial resource management by the city authority and its ability to leverage private investment and/or grants.
- **Relocation of Residents to Lower-Risk Areas:** As a measure of last resort and where informal settlements are demonstrated to occupy areas at very high-risk from climate hazards, relocate residents to less risky locations. To minimise disruption to social networks, education and livelihoods, relocation destinations should be as close as possible to the original area. Relocation initiatives should be community-led and opportunities should be taken to provide safe and affordable housing while increasing land tenure security for relocated residents.
- **Increasing Provision of Quality Affordable Housing:** safeguarding well-located or well-connected sites for the provision of affordable housing. Harness the private sector by adopting policies that require private development to provide a minimum proportion of multi-typology dwellings reserved for low-income residents as a means to tackle one of the root causes of informal housing, i.e. a lack of affordable housing options. Such a policy can be applicable city-wide, with stricter requirements applied to any redevelopment projects in informal neighbourhoods themselves.

Additionally, many of the strategies contained within the [planning for flooding, extreme heat and drought](#) and [planning for nature](#) chapters are relevant to improving the climate-responsiveness of informal settlements.



Undertaking community-led urban plans in Mukuru Nairobi

The challenge

The area of Mukuru in the city of Nairobi, Kenya is a collection of informal ‘slum’ neighbourhoods spanning 650 acres and home to over 500,000 people. As an unplanned area, Mukuru was characterised by inadequate infrastructure, lack of basic services, and vulnerability to environmental hazards. Frequent flooding, poor sanitation, and overcrowding made the residents particularly susceptible to health risks and economic instability. The growing impact of climate change intensified these issues, making it imperative to develop an inclusive plan to improve the community’s resilience and living standards.

The solution

In 2017, Nairobi City County (NCC) government declared Mukuru a Special Planning Area (SPA), initiating a two-year process for the participatory development of an Integrated Development Plan. SPAs are used by planners to designate zones where formal, statutory standards are suspended, usually when there is a need for substantial re-development - for example, to revitalise an inner-city area or for comprehensive waterfront development. Mukuru is the first informal settlement in Africa to be declared an SPA, marking an innovation in tools used for upgrading

informal settlements. The SPA provided a sound legal basis for the planning process and eventual implementation of the plan. NCC’s approach to the Mukuru SPA deliberately sought to involve actors beyond the County’s Planning Department, including the community and non-government organisations.

Over 5,000 Mukuru residents, NCC and 40+ organisations from civil society, academia and the private sector came together to produce the Integrated Development Plan. The involvement of private sector expertise - as opposed to simply financial donations - was a distinct difference to prior slum upgrading projects in Kenya. Stakeholders were organised into eight consortia, with each being led by a corresponding department from NCC. Alignment between the consortia and NCC departments was a deliberate means of ensuring that all actions identified fall within the responsibilities of NCC departments and their budgets.

Each of the eight consortia contributed to the development plan by: collecting and analysing data, consulting the community and seeking feedback on draft proposals, and developing solutions that integrated community knowledge and aspirations with financial, legal and spatial realities. To give every household a chance to be heard, grassroots organisations divided Mukuru into 13 segments, within which there were “cells” of 10 households and “clusters” of about 100 households, which formed the basis for engagement through in-situ community planning forums.

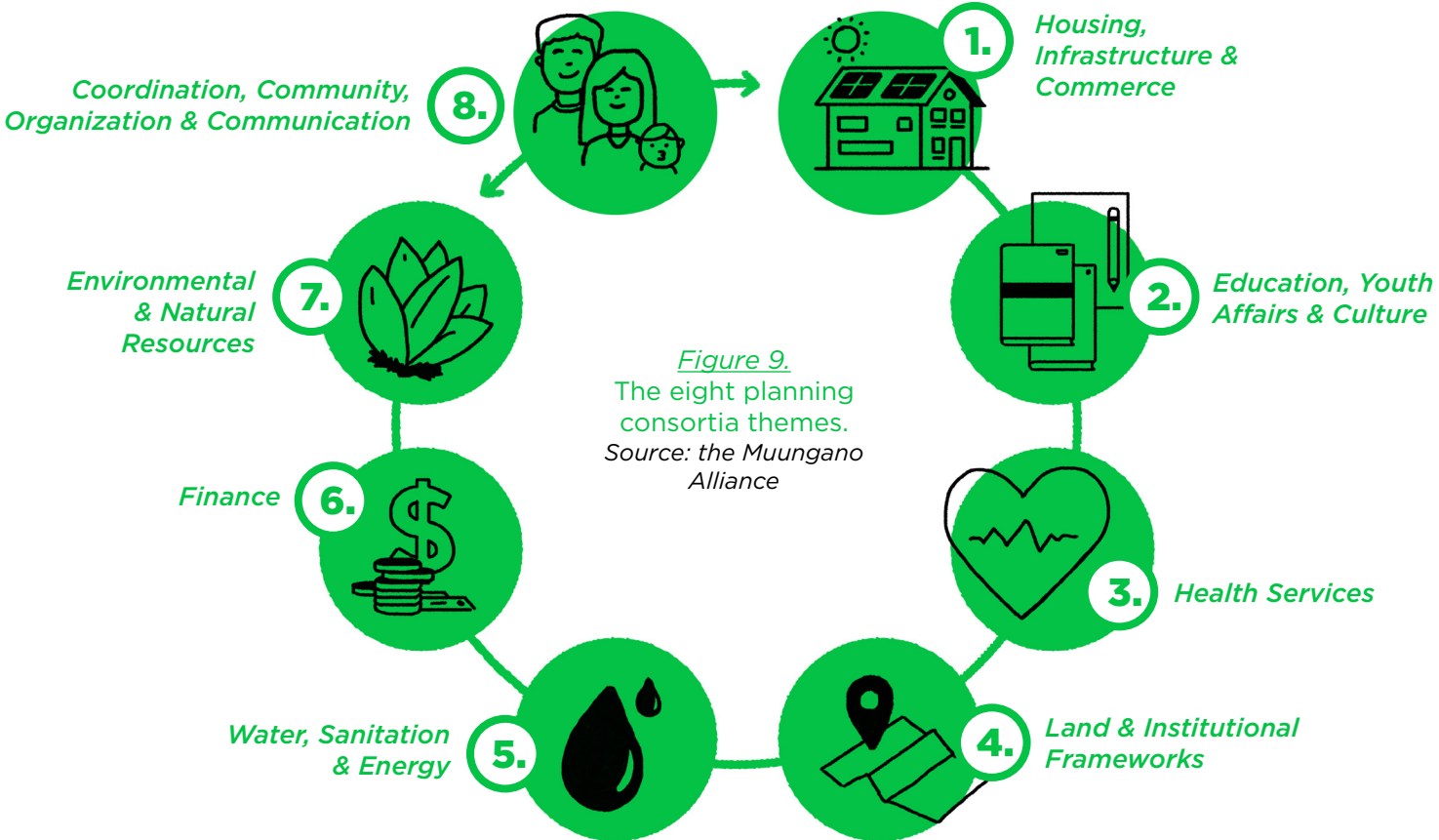


Figure 9.
The eight planning consortia themes.
Source: the Muungano Alliance

Since the plan’s finalisation in March 2020, certain implementation measures have begun, including paving key roads, installation of stormwater drains and managed retreat from the riverside-edge of the riparian zone. The planning process is regarded as exemplary in how it went about ensuring that the community was at the forefront of the planning and decision-making process. The success of the Mukuru SPA has seen the declaration of two other informal slum neighbourhoods in Nairobi as SPAs.

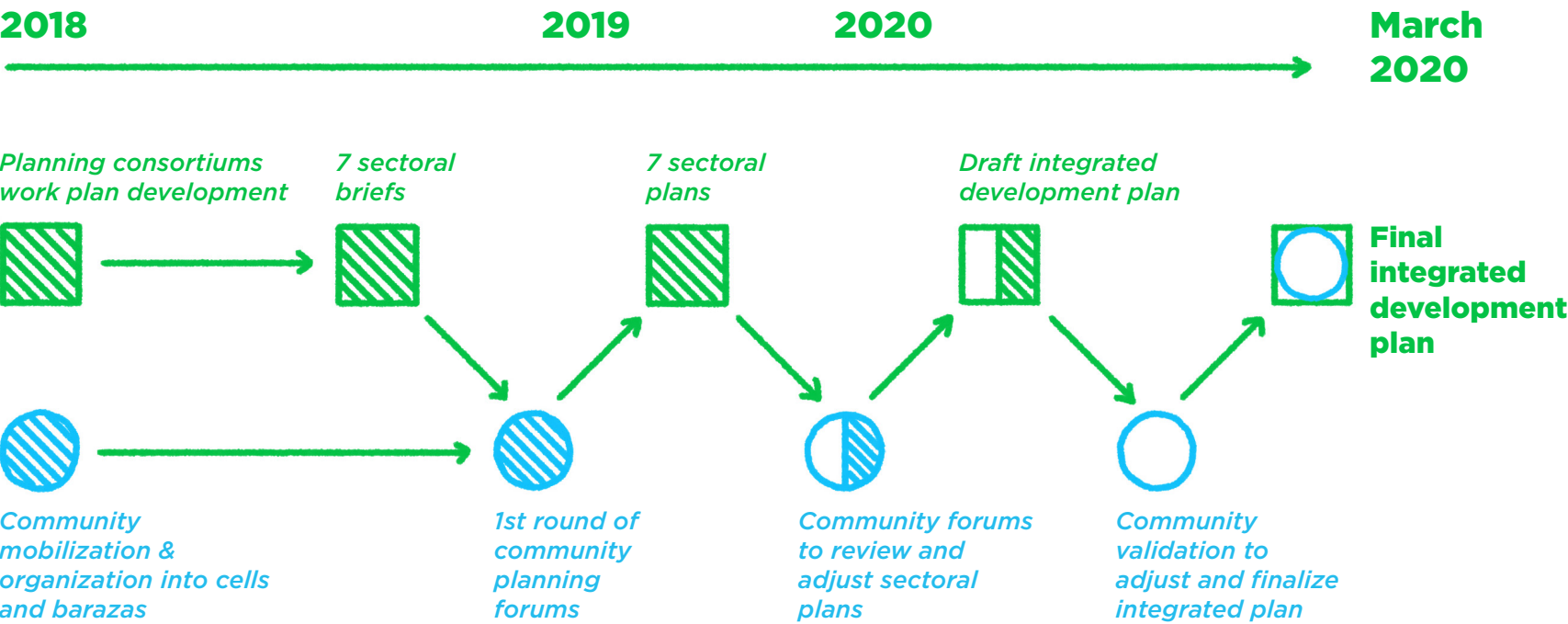


Figure 10.
The planning process.
Source: the Muungano Alliance



Favela of Paraisópolis, São Paulo.
Source: Wikimedia Commons, by Roberto Rocco

Securing quality affordable housing for residents of informal neighbourhoods Mumbai and São Paulo

The City of **São Paulo**, Brazil uses Special Zones of Social Interest (ZEIS) as a strategic tool for increasing affordable housing provision. The most recent iteration of the ZEIS, set out in the [2014 Master Plan](#), has five zones covering 10% of the municipal area:

- ZEIS 1: Areas with informal settlements or favelas that require upgrading or regularisation.
- ZEIS 2: Areas characterised by unbuilt or underused land or lots, suitable for development.
- ZEIS 3: Underutilised or vacant land or buildings suitable for new social housing developments.
- ZEIS 4: Watershed areas characterised by unbuilt plots which are suitable for urbanisation, with specific socio-environmental restrictions. ZEIS 4 are considered suitable destination sites for residents relocated from areas of high environmental risk.
- ZEIS 5: Properties or group of properties, especially vacant or underused, located in areas where there are services, facilities and infrastructure.

The Slum Rehabilitation Authority (SRA) is a planning authority in **Mumbai**, India responsible for implementing the city's slum rehabilitation scheme. Under this scheme, which is integrated within the city's development control regulations, developers who take on the redevelopment of slum areas must provide free housing to eligible slum dwellers on a portion of the redeveloped land. In exchange, developers are allowed to build to higher densities and sell additional units at market rates. For a redevelopment scheme to proceed, it generally requires the consent of at least 70% of the slum's residents. This aims to ensure that the community agrees to the redevelopment plan, including the proposed housing design and other amenities.

The principal purpose of all ZEIS is to provide decent housing for people on low incomes. Social Interest Housing (HIS) is a category of housing specifically designed for low-income families and is broken down into HIS-1, for families earning up to three times the minimum wage, for HIS-2, for families earning between three to six minimum wages. Popular Market Housing (HMP) is intended for lower-middle-income families, earning between six to ten minimum wages.

Any public or private sector (re)development on land with an area greater than 1000m² in ZEIS (or 500m² in ZEIS 3) must provide a minimum proportion of floor space for homes catering to different income ranges, as set out in the table below.

Without demonstrating the provision above, development will not receive an approval licence. In exchange, developers will receive a full refund on the fee payable for the right to build social housing and a discount on the fee payable for building HMP. To encourage the provision of more low

income housing across the city, the Master Plan introduced a so-called "solidarity quota" for developments within designated growth corridors. This requires all large-scale developments (20,000m²+) to donate 10% of their built area to Social Interest Housing or the equivalent monetary value to the city's Urban Development Fund.

In ZEIS 1 - areas of informal settlements - Management Councils made up of representatives from the community, the City of São Paulo and civil society groups should be set up to co-design, approve and manage the implementation of urbanisation plans. Urbanisation plans are detailed plans aimed at promoting the **physical upgrading** and **regularisation** of settlements. Regularisation is the process of legalising or formalising informal settlements, granting residents the right to occupy the land. Physical upgrading entails the provision of basic services, drainage systems, green infrastructure and social facilities. Urbanisation plans also establish planning guidelines for the subdivision and use of land parcels.

Percentage of total built area by residential and non-residential uses in ZEIS

Type of ZEIS	HIS-1	HIS-2	HMP	R and NR Uses
ZEIS 1 - 4	Minimum 60%	Allowed	Maximum 20%	
ZEIS 5	Minimum 40%		Allowed	Maximum 40%

Table 1. Percentage of total built area by residential and non-residential uses in ZEIS.



Slum in Dharavi, Mumbai
Source: Unsplash, by vinay manda.



Urban Planning *for* Compact Cities

Compact cities are ones in which land is used efficiently. They are characterised by medium density and mixed land uses and they enable residents to travel by walking, cycling or public transport. Compact cities stand in contrast to sprawling ones, which expand out onto previously undeveloped, greenfield lands. In sprawling cities, low densities and segregated land uses force reliance on private cars.

Many cities will need to expand their spatial footprint to accommodate rapid urban population growth. This expansion should be carefully planned. On the other hand, many relatively mature cities - particularly in land-rich countries - continue to sprawl needlessly. Indeed, the average population density of cities is falling in every region of the world²⁸.

Urban sprawl exacerbates the climate crisis by promoting inefficient land use, increasing greenhouse gas (GHG) emissions and degrading natural land. Sprawl leads to greater reliance on cars, resulting in higher emissions from transportation. As the urban footprint expands, it results in the loss or degradation of natural habitats and green spaces, which are crucial for managing water runoff, mitigating urban heat islands and carbon sequestration.

The Intergovernmental Panel on Climate Change states that “integrated spatial planning to achieve compact and resource-efficient urban growth through co-location of residences and jobs, mixed land use, and transit-oriented development could reduce GHG emissions between 23-26% by 2050 compared to the business-as-usual scenario”²⁹. Evidently, introducing planning policies to promote the compact city model, alongside building out public services and transport infrastructure to peri-urban areas, could play a significant role in helping cities to achieve their GHG emissions reduction commitments.

Planning policy actions include:

- **Urban Growth Boundaries and/or Green Belts:** establishing limits on how far urban development can extend into surrounding greenfield areas and/or designating areas around a city where development is restricted to preserve natural landscapes and prevent urban sprawl.
- **Reversing Single-Family Zoning and Promoting “Missing Middle” Housing:** to allow for the construction of medium-density housing types, like duplexes, triplexes and townhouses in traditionally single-family residential zones. Higher density residential zones reduce the need for urban sprawl and greenfield loss, enable energy efficiency through shared heating, cooling and utilities, and contribute to reducing reliance on cars.
- **Higher Densities in the Right Places:** mandating or incentivising higher densities in suitable locations, such as those with good access to public transport. Density bonuses can be awarded to encourage developers to provide affordable housing, green spaces or other public benefits in their projects.
- **Incentivising Urban Infill:** prioritising the development of vacant or underutilised parcels of land within existing urban areas before expanding into greenfield land. To do so, planners need to proactively plan for necessary infrastructure upgrades, such as for utilities and schools, to ensure adequate provision as densities increase.

Some planning strategies for compact cities overlap closely with those for **mode-shift and TOD** and **polycentric cities and proximity**.



Barcelona, Spain
Source: Unsplash by Kaspars Upmanis



Promoting for compact urban form
Amman

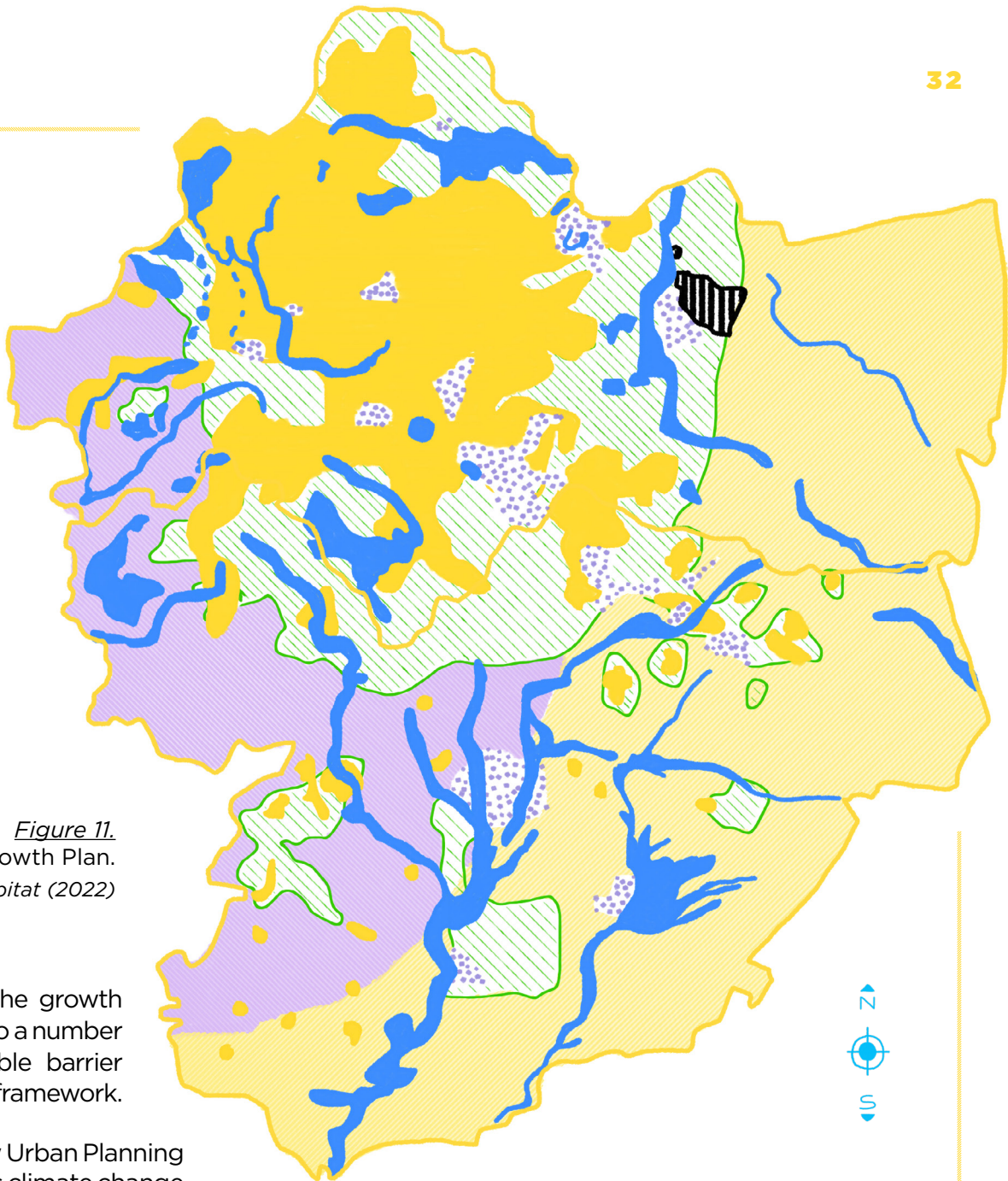
Amman, Jordan.
Source: Anton Ivanov Photo

The solution

In 2006, the Greater Amman Municipality (GAM) embarked on a comprehensive spatial planning exercise, culminating in the Greater Amman Master Plan 2025. The plan established a growth strategy intended to guide integrated land use, transport and infrastructure planning and deliver a compact urban form. The plan sought to limit sprawl, protect greenfield land, and transition away from car-dependency, in order to make best use of existing services, promote low-carbon transportation and address housing affordability issues.

Two significant foundations of the plan were the designation of “primary, limited and no growth areas” and intensification along growth corridors. Primary growth areas include existing built-up areas, as well as identified settlement expansion areas (located close to the urban core) to absorb future population growth. Limited and no growth areas include natural and cultural heritage sites, such as watersheds, wadis and farmlands. Intensification along growth corridors entails zoning rule changes to encourage higher densities, mixed-uses and urban infill along development corridors, as well as investment in a new Bus Rapid Transit (BRT) system. The BRT system would connect high density urban areas along the growth corridors.

Figure 11.
Amman Metropolitan Growth Plan.
Source: UN-Habitat (2022)



- Built up areas**
- Expansion areas**
- Natural heritage systems**
- Rangelands**
- Croplands**
- Expansion employment**
- Quarry and extraction areas**

The challenge

Greater Amman, Jordan has experienced very significant urban growth over the last four decades. Rapid population growth and unprecedented refugee influx led the urban built-up area and urban population to grow by 71% and 114% respectively between 1990 and 2015³⁰. Much of this urbanisation has been characterised by sprawl in the form of built-up area extension and “leapfrogging” (development occurring at a distance from the existing built-up area). As a result, Greater Amman’s urban footprint is now double that of Barcelona, a city with a similar population³¹. The urban population is expected to continue growing, from some 4 million people in 2022 to 4.8 million by 2030³².

This type of growth does not occur without side-effects, such as a higher carbon footprint, strain on municipal finance and service delivery, traffic congestion, degradation of agricultural land and growing socio-spatial inequalities between Greater Amman’s western areas, its central old town and its eastern informal settlements, which developed around the three refugee camps of Jabal Hussein, Wahdat and Marka.

However, it is estimated that only 20% of the growth strategy has been implemented³³. This is due to a number of implementation barriers, with one notable barrier being an outdated urban planning legislative framework.

In response, GAM is currently preparing a new Urban Planning Regulation. This modern legislation prioritises climate change and seeks to guide all planning processes and decisions in line with the Sustainable Development Goals.

At the same time, GAM is currently preparing a new growth strategy to replace that in the 2025 Master Plan. Urban growth scenarios - i.e. scenarios which represent projections of possible future conditions in Greater Amman based on different planning policies - are being used as a key piece of evidence. A notable innovation is that the urban growth scenarios calculate not just the impact on the city’s urban footprint, but also impact on greenhouse gas emissions and exposure to hazards (landslides, river flooding and surface water flooding). The scenarios demonstrate the multiple benefits Amman faces to gain through pursuing land use policies for a compact and resource-efficient urban form³⁴.

Limiting urban sprawl and encouraging infill Portland

The challenge

Urban sprawl accelerated dramatically in the United States following World War II, as the nation experienced rapid economic growth, suburbanisation and increased private car ownership. The post-war period saw a surge in population migration from inner cities to suburban areas, enabled by factors like the construction of highways. In the 1970s, the City of Portland deliberated over how best to manage growth to avoid becoming like the sprawling cities emerging in neighbouring states and to protect its natural assets.

The solution

IMetro - a regional planning body for the Portland metropolitan area in Oregon - was established in 1978. It was created out of the desire for effective regional coordination and to address issues of regional growth management, land use planning and transportation across the metropolitan area's three counties. The following year, Metro introduced the nation's first Urban Growth Boundary (UGB) to limit sprawl, protect farmland and encourage urban density. The policy has evolved over time to allow for population growth and flexibility. Today, urban development is prohibited outside the UGB. "Urban reserves" are identified as areas outside the current UGB where future expansion may occur, deemed suitable based on infrastructure capacity and compatibility with surrounding land uses. "Rural reserves", on the other hand, are areas outside the UGB that are designated for the long-term protection of agricultural, forest and natural lands. This system is working: although the UGB has been expanded more than 30 times in as many years, its land area has expanded by 14%, while its population has increased by 61%.

More recently, the City of Portland has taken progressive steps to reverse inefficient zoning practices that exclusively catered to detached, single-family homes. In 2021, it became one of the first major U.S. cities to eliminate single-family zoning citywide through an overhaul of its so-called Residential Infill Project. Zoning code changes allowed the construction of "missing middle" housing types to make more efficient use of the areas between single-family homes and large apartment buildings, without significantly altering neighbourhood character. The City of Portland intends for this policy to increase housing density, improve affordability through tackling the housing shortage and promote social equity by diversifying housing options across the city. Equally, by encouraging compact, walkable neighbourhoods that support public transport use and reduce car dependency, this policy is intended to help reduce the environmental footprint associated with new construction.

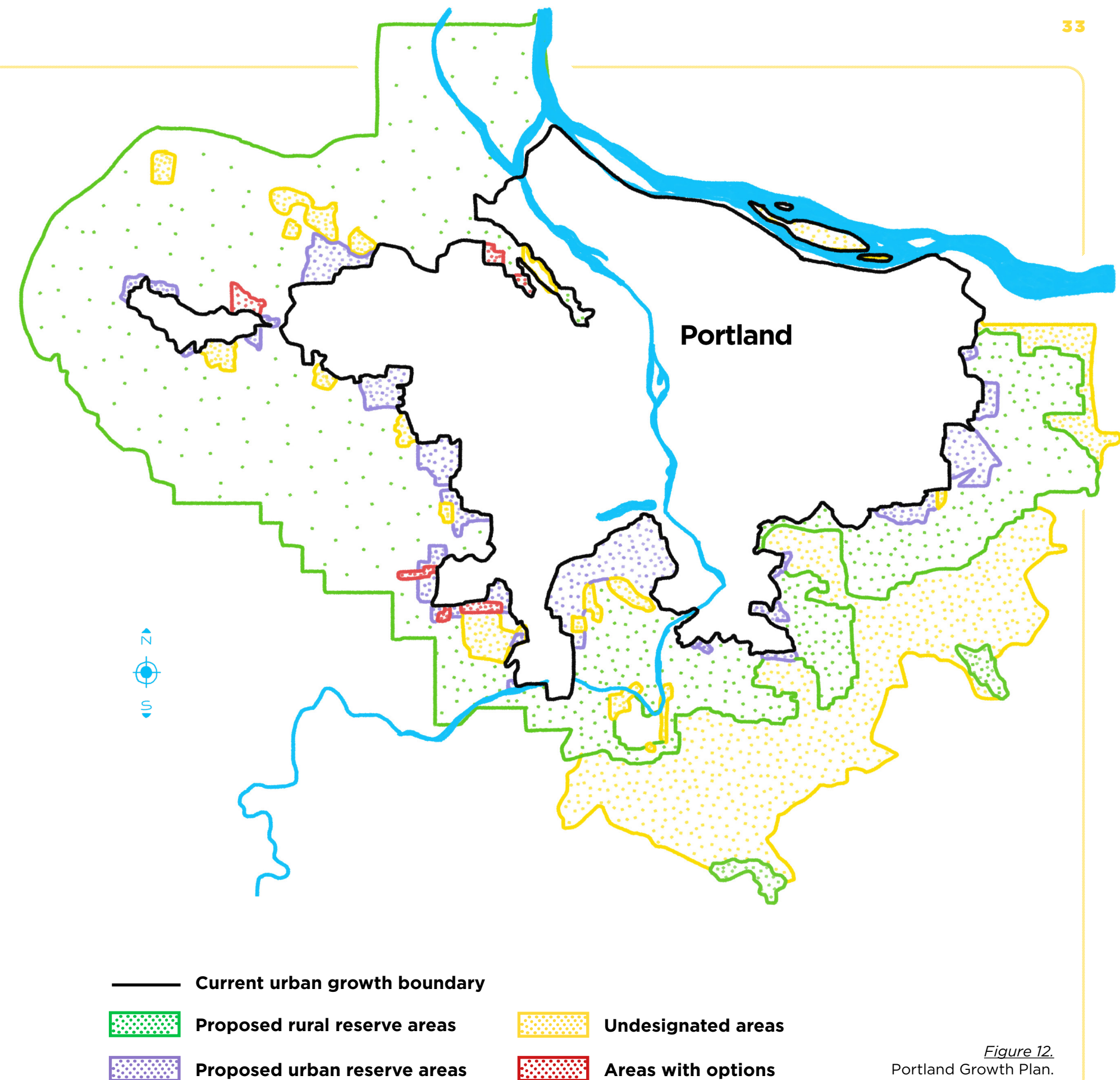
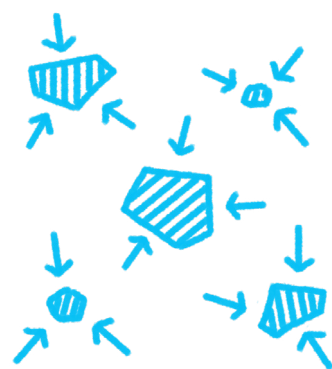


Figure 12.
Portland Growth Plan.
Source: Metro



Urban Planning *for* Polycentric Cities and Proximity

The idea behind cities of proximity, also known as **polycentric** or **15-minute cities**, is to **counteract monocentric urban form** and segregated land use **which increase travel demand and distance, as well as reliance on private cars**. Supportive planning strategies promote a more balanced urban system, with amenities, services and jobs distributed across neighbourhoods, rather than being concentrated in a central core.

A polycentric city is made up of multiple centres and 'complete neighbourhoods' in which core services and amenities are present and everyone is able to meet most of their daily needs within a short walk or bicycle ride. This approach contributes both to reducing GHG emissions and promoting spatial equity through increased access, leading to positive effects for liveability, productivity and efficiency.

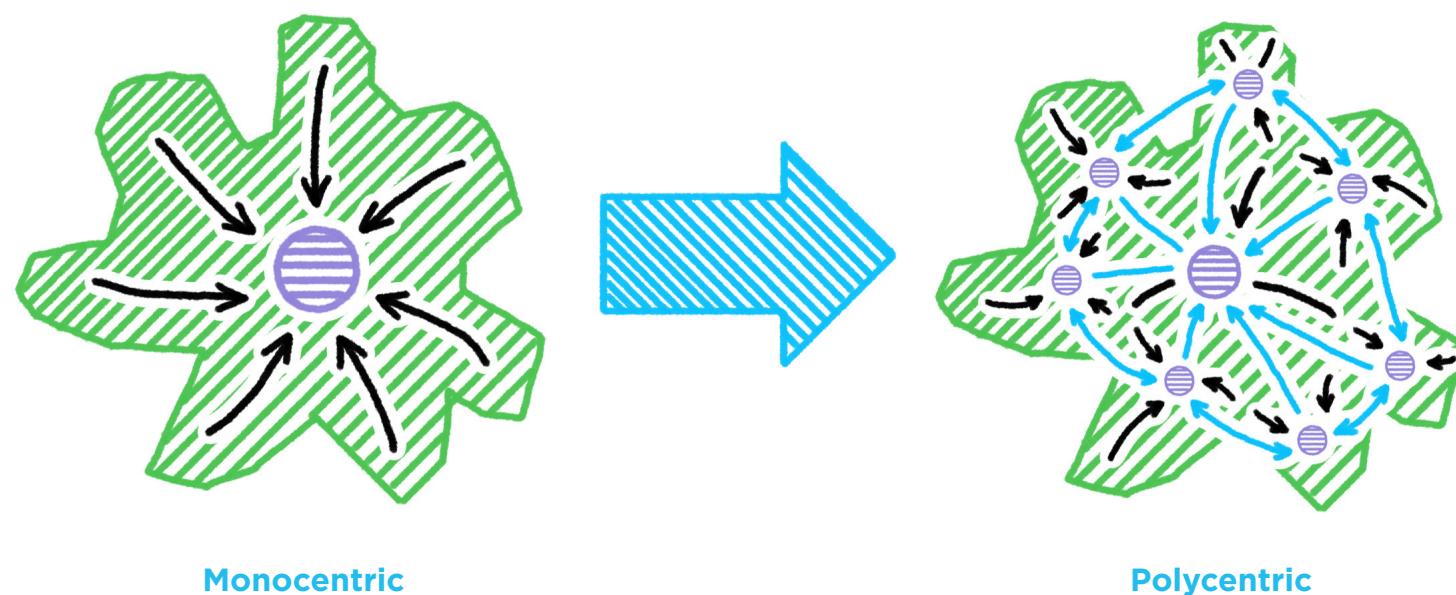


Figure 13.
Monocentric and
polycentric city models

A polycentric city weaves together strands of **climate action** and **people-centric urban development**. It also put **equity** and **inclusion** at the heart of its approach. Many cities do include "complete neighbourhoods", but they tend to be concentrated in centrally located or wealthier areas. Proximity interventions emphasise equal access to key services, amenities and green space for people across the different areas of cities.

This urban planning approach stands in stark contrast to **'modernist urbanism' approaches which spread across the world in the 20th century**. Instead, it takes inspiration from the **seminal work of the American-Canadian urbanist, Jane Jacobs**.

Strategies aligned with the city of proximity are already being implemented by a wide variety of cities with very different urban forms - from sprawling, low-density, high-income cities like Vancouver and Melbourne to semi-dense, middle-income cities like Bogotá, to dense European cities such as Barcelona and Milan.

Planning policy actions include:

- **Polycentric Spatial Strategy:** adopting a growth or regeneration model that focuses on multiple centres of activity within a city rather than focussing all development and services in a single, central area.
- **Counteract Single-use Zoning:** promoting mixed-use zoning that permits a complementary mix of residential, commercial, and/or industrial uses in a single district tend to reduce the need for long journeys to carry out daily needs while promoting vibrant neighbourhoods that are walkable and bikeable.
- **Designate Sites for Local Service Hubs:** designating specific areas within neighbourhoods for the development of local service hubs within predominantly residential neighbourhoods. Flexible zoning should allow for a range of services and amenities, which could include libraries, sports facilities or other community uses.

- **Integrate Public Services in Mixed-Use Zoning:** Requiring a certain proportion of floorspace to be dedicated to public service or amenity uses, such as community centres, childcare centres, cultural venues or local health clinics.
- **Incentivise Small-Scale Commercial Development:** providing incentives for small-scale, local businesses to set up in predominantly residential areas. Incentives include relaxing zoning code restrictions, offering property tax abatements and implementing streamlined permitting processes that expedite approval.
- **Ground-Floor Activation:** requiring active uses³⁵ on ground floors up to a specific depth from the street frontage, allowing increased ground floor heights and simplifying the permitting process for local businesses to promote neighbourhoods with a diverse offering.
- **Reactivate Abandoned Buildings:** requiring owners of abandoned buildings to submit a redevelopment/reactivation plan for the building within a specified time period or risk forfeiture to new owners committed to redevelopment, in order to counter urban decay and revitalise neighbourhoods.
- **Design Standards for Public Space:** introducing design standards for public spaces and streets that will enhance the quality of the public realm, accommodate all users safely - including pedestrians, cyclists, wheelchair users and public transport riders - and integrate nature.

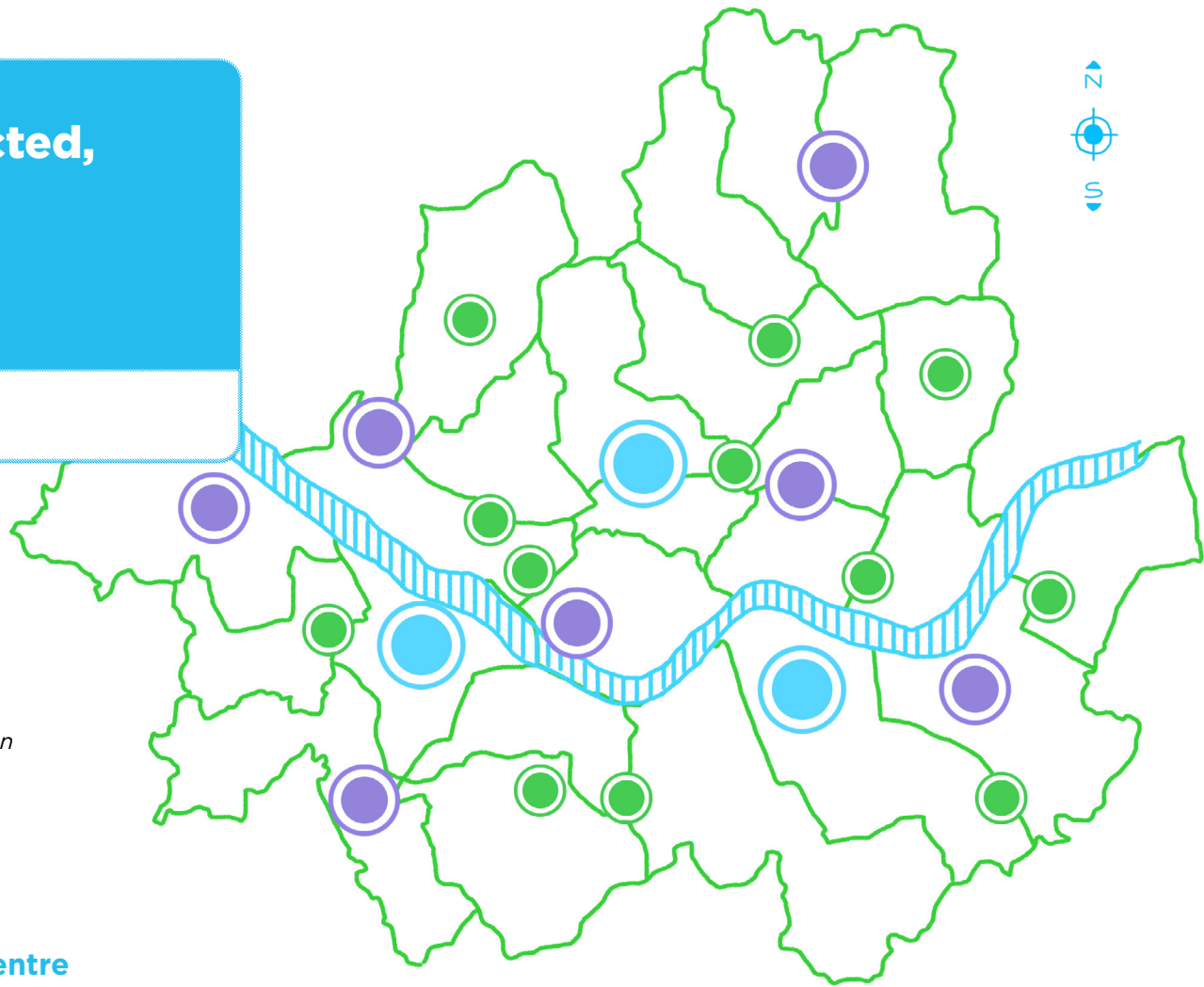
Given their overlapping objectives, some planning strategies for mode-shift and TOD overlap closely with those for **compact cities** and **polycentric cities and proximity**.

Find a wide range of examples of city policies, programmes and initiatives that are in line with city of proximity objectives by visiting [C40's 15-minute city initiatives explorer](#).

Planning for connected, polycentric hubs Seoul

Figure 14.
Seoul's system of main, regional and local centres.

Source: 2040 Seoul Master Plan



The solution

The [2040 Seoul Master Plan](#), adopted in 2023, is the highest level statutory spatial plan for the city of Seoul. It sets the direction for the future of Seoul over a 20-year period and all sub-plans for land use and development must conform with it.

The Master Plan adopts a spatial strategy that seeks to achieve more balanced growth across the city. The 2040 Plan maintains the strategy of its predecessor, the 2030 Seoul Plan, which turned away from a monocentric model to establish three “urban centres”, seven “metropolitan centres” and twelve “local centres”. The functionality and identity of these centres will be strengthened, in accordance with their unique characteristics, as will the public transport connectivity between them.

At the same time, Seoul is looking to further blur the usual dividing lines between home, leisure and work. The city has been divided into 116 “living area neighbourhoods” covering the entire city. Each living area is inhabited by about 100,000 people. Local living area plans will be drawn up by local authorities to guide spatial management in each area, as a means to transpose the city Master Plan to the neighbourhood scale. The objective behind this planning strategy is to balance development and improve quality of life across all areas, going from “one Seoul to over 100 micro Seouls”.

The Master Plan establishes the policy direction to reorganise the 116 living areas to be self-sufficient units with local amenities and infrastructure. They should be designed to be people-centred, walkable and to ensure that a variety of daily needs and activities (such as housing, work, leisure, commerce and culture) can be met within a 30-minute walk.

To achieve this, the Master Plan breaks with the previous zoning-led planning system, which it describes as too rigid to allow the city to respond to its rapidly changing context. The new system, labelled as “Seoul Beyond Zoning”, will allow flexible uses and maximise land efficiency. Regulations on uses, densities and building forms are being eased to underpin multi-functional, mixed-use areas where people can live, work and play. With these zoning changes, it is intended that predominantly residential areas become diversified to support a lifestyle centred around walking and public transport use. Emphasis is still put on complementing the existing characteristics of neighbourhoods. Non-regulatory measures, such as administrative support, tax breaks and financial support will accompany zoning changes to encourage local businesses.

Seoul, South Korea.
Source: Unsplash, Ann Danilina



The challenge

Between the 1960s and the 1990s, Seoul’s development, economic activities and services were highly concentrated in one centre: the central business district. Since the 2000s, efforts have been made to rebalance socio-spatial inequalities and reduce traffic congestion by decentralising development. Moreover, having made a commitment to achieve carbon neutrality by 2050, the City is looking for ways to reduce the carbon footprint of its buildings and transport, which currently account for 90% of greenhouse gas emissions.

Neighbourhood-scale planning for a city of proximity Milan

The challenge

The City of Milan adopted a new Urban Plan (Piano di Governo del Territorio or PGT) in 2020. This document sets a vision for the city’s future and regulates urban development to achieve this vision. Significant global and local socio-economic and environmental challenges since 2020, including the severity of the climate crisis, growing socio-spatial inequalities exacerbated by the Covid-19 pandemic and a shortage of affordable housing, prompted the City to update the plan once again. The City plans to adopt the new PGT in late 2024/early 2025.

The solution

The “proximity city” is expected to be one of four guiding principles for Milan’s new city-wide PGT, alongside the “sustainable city”, “equitable city” and “beautiful city”. Each new development project within the city would need to demonstrate its contribution to the “four cities” of Milan, with higher densities possibly awarded to schemes that show an outstanding contribution.

The PGT would be underpinned by nine more detailed area plans at the municipality level (one area plan for each of the city’s nine municipalities). The introduction of this intermediate scale of planning would be new to the forthcoming PGT. Together, the nine area plans would compose a “neighbourhood atlas”. These would not be statutory plans but rather guidelines that will orient urban regeneration. The neighbourhood atlas will also determine where financial contributions from developers should be spent, for example on improving specific public spaces or delivering improvements in services.

To create evidence-based municipality area plans, the City is undertaking a 15-minute city analysis for each of its 88 Local Identity Units (smaller, neighbourhood-scale administrative areas). Through this analysis, the City will gather a clear understanding of the availability of and existing access to services (including education, health, culture and leisure services), nature, quality public spaces, an active mobility network and public transportation. It will also gain an evidence base on vacant/underutilised lots that can be utilised for urban regeneration. Equipped with this information, the City aims to provide a detailed, neighbourhood-level understanding and planning framework, bridging the gap between the overall city plan, locally responsive regulations and flagship public space/private site transformations.

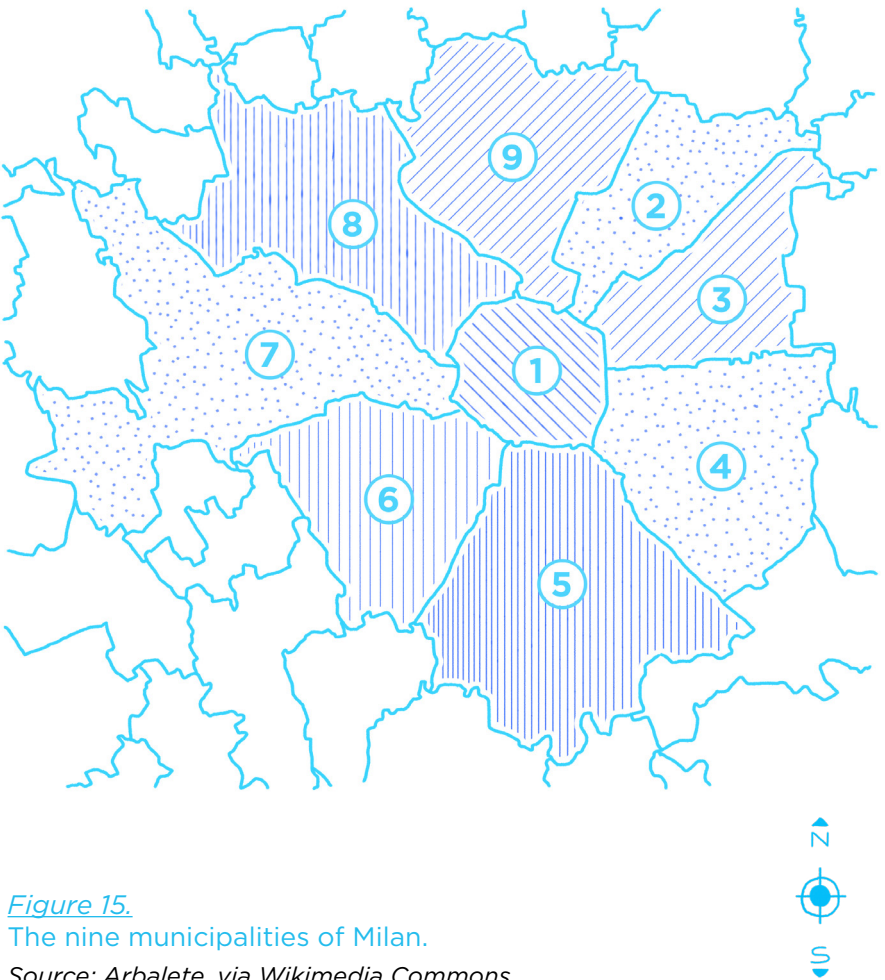
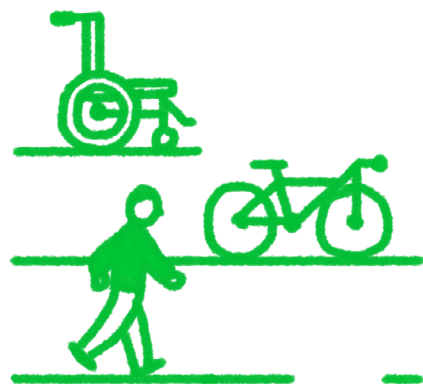


Figure 15.
The nine municipalities of Milan.
Source: Arbalet, via Wikimedia Commons



Brera District, Milan, Italy.
Source: Canva Pro, Silvia Zecchin

Urban Planning *for* Mode-Shift & Transit-Oriented Development

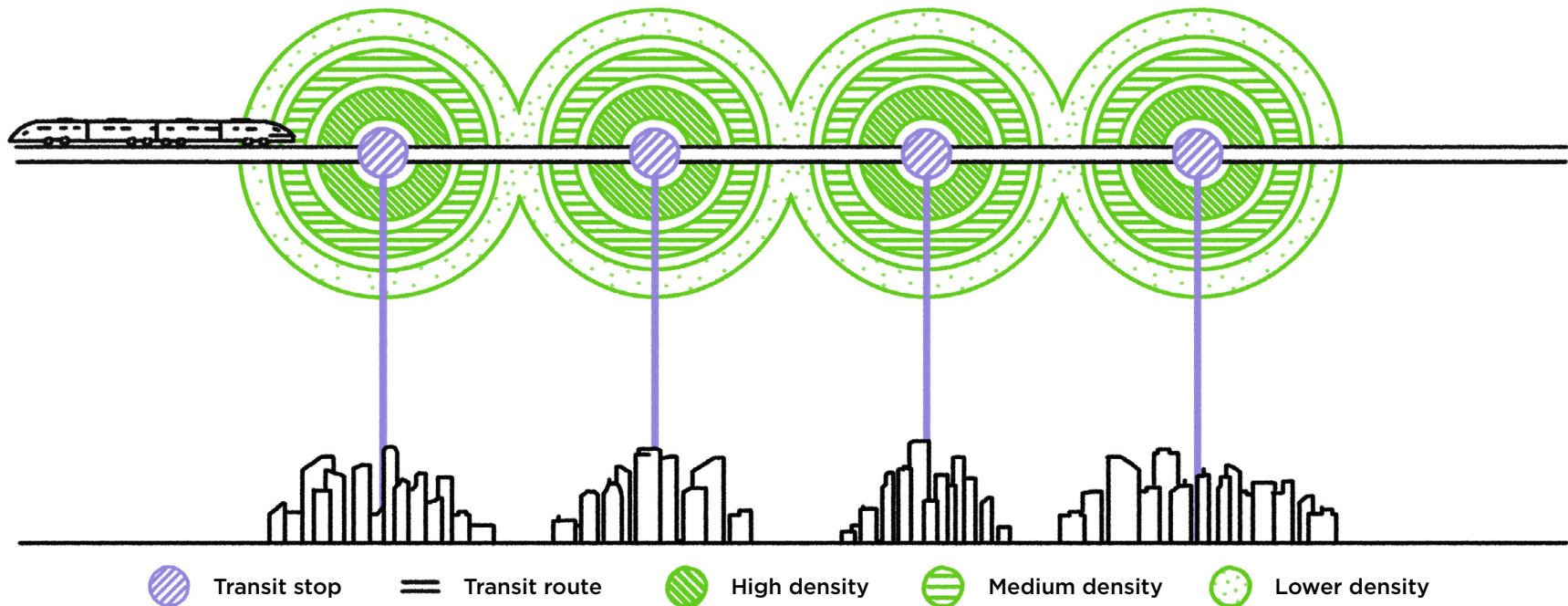


With road vehicles responsible for almost one-fifth of global greenhouse gas emissions, facilitating the shift away from fossil-fuel powered cars is a priority, and urban planning plays an integral role in this. Reducing car dependency in favour of public transport, walking and cycling will not only reduce cities' GHG emissions, but also contribute to broader sustainable development objectives like reduced air pollution, less congestion, increased access to job opportunities and greater convenience for urban inhabitants.

Transit-oriented development (TOD) is a key urban planning strategy for mode-shift. TOD refers to integrating land use and transport planning in order to develop neighbourhoods and communities based around public transport hubs and corridors. The areas immediately surrounding transit stations (often referred to as the “core” or “station area”) have the highest density of development to maximise access, with density gradually decreasing as one moves further from the station, as illustrated in Figure 15. TOD supports **mode-shift** by creating high-density, mixed-use neighbourhoods around these hubs and corridors to facilitate a lifestyle where residents can easily access work, services, and leisure activities without relying on cars.

Figure 16.
Typical TOD model.

Source: Wessels, Pardo, Bocarejo (2012)³⁶



Planning policy actions include:

- **TOD Spatial Strategy:** centering the cities' development model around public transport and active travel to consolidate growth or renewal in well-connected areas, reducing the need for car travel.
- **Defining Sustainable Transport Networks:** defining in the urban plan future public transport and active travel networks based on projected population growth, land use patterns and economic activity. This should take an integrated approach, aligning sustainable transport networks with density to maximise usage and creating a cohesive network through planning for multi-modal connectivity (buses, trains, bicycles, etc). The plan should outline phased implementation, allocate specific budget and set out mechanisms to secure financial contributions from developers. For cities that produce a Mobility Master Plan, ensure this plan and the urban plan reinforce one another.
- **Mixed-Use Zoning:** incentivising or requiring the co-location of residential, commercial, and recreational spaces to encourage walking and cycling, especially for sites within walking distance of transport stations, to reduce the need for car travel and make more efficient use of land.
- **Density Bonuses:** offering increased building density allowances for developments near transport hubs, thereby promoting higher population densities in well-connected areas and more efficient land use.
- **Land Value Capture and Public Transport Investment:** introducing land value capture mechanisms to leverage the increase in property values near transport stations to fund improvements to the public transport network.
- **Pedestrian and Cycling Infrastructure:** requiring new (re)developments to connect to existing or contribute financially towards the expansion of bicycle lanes and pedestrian-friendly streetscapes to encourage walking and cycling.
- **Car Parking Restrictions:** reducing minimum parking requirements for new (re)developments, implementing maximum parking limits, and promoting shared parking solutions to discourage car ownership and use.

For a detailed guide on planning and implementing TOD, visit this [resource](#) published by the World Bank.

The complementary relationship between **polycentricity**, **TOD** and **compactness**:

There is considerable complementarity between planning strategies for polycentricity and proximity, mode-shift and TOD, and compact cities.

While polycentric city and TOD models have different approaches - the former based on proximity and walkability, the latter focussed on designing cities around the use of public transport - both planning strategies pursue the same primary objective: counteracting car-oriented planning and reducing transport-related emissions.

Both models require compact and mixed-use cities. Without flexible zoning that allows for mixed uses and without minimum densities, local services and amenities are not viable - making it impossible to achieve the “complete and walkable” neighbourhoods that compose a polycentric city. In the TOD approach, compactness, concentrated densities and mixed uses are key to maximising the number of homes and workplaces that are accessible by public transport.

Instead of emphasising the differences between them and choosing one strategy in isolation, **cities can pursue these two complementary planning models to achieve more sustainable, equitable and vibrant places.**



Transit-oriented development Delhi

The challenge

Throughout the 20th Century, the Indian city of Delhi's growth was largely driven by its road networks, with major roads and radial roads serving as the primary arteries of the city. As the city's population rapidly increased, from about 1.7 million in 1951 to 13.8 million by 2001, severe congestion and environmental concerns led to the demand for better mobility options.

The solution

Delhi introduced its Mass Rapid Transit System (the Delhi Metro) in 2002. Since then, it has expanded significantly to become the backbone of the city's public transport network. The Master Plan for Delhi 2021 (adopted in 2007) marked a significant shift in urban development, adopting transit-oriented development as the principal growth model in place of road expansion. The focus became creating high-density, mixed-use developments within the 500m 'Influence Zone' of MRTS corridors. The plan permitted higher floor area ratios and established a compulsory mix of uses for all plots, regardless of plot size (minimum 30% residential, 10% commercial and 10% public amenities) within Influence Zones.

The [Draft Master Plan for Delhi 2041](#) (currently awaiting final approval from central government) expands upon the TOD principles established in the earlier plan. The forthcoming plan emphasises not just density in transit Influence Zones, but also the integration of other modes of transport, such as buses and non-motorised transport. The plan puts greater focus on enhancing the public realm within Influence Zones, including through green infrastructure, to create vibrant, safe and resilient public spaces. Finally, the draft plan affords greater importance to affordable housing, encouraging schemes within Influence Zones to include non-ownership housing types like rental and student housing.



Delhi metro.
Source: Pexels, by Shivam Pandey

Equitable Transit-Oriented Development Austin

The challenge

In 2020, the City of Austin (USA), together with the Capital Metro (Austin's transit authority), initiated a comprehensive, multi-year transport expansion plan. It aims to transform public transport in the city through the development of new rail lines, rapid bus routes, park-and-ride facilities and improvements to existing infrastructure, in order to underpin sustainable growth. However, the City sought to move away from the traditional Transit-Oriented Development (TOD) model. This model had been shown to exacerbate gentrification and displace existing communities - often comprising low-income and racial minority groups - within areas targeted for TOD. The City wanted to pursue TOD, but to do so in an equitable way that maintained the existing characteristics and communities of targeted neighbourhoods.

The solution

The City Council adopted an Equitable TOD ("ETOD") [Policy Plan](#) in 2023. This is a citywide guide and policy toolkit that is intended to align planning, programming and investment with the goal of ensuring that future development around transport systems supports residents of all incomes and backgrounds. The Policy Toolkit contains a menu of 46 "tools" that the City and its partners will focus on to achieve equitable transport outcomes. Some of these are urban planning tools, while others are economic (tax incentives grants and subsidies) or social (community engagement and apprenticeship programmes).

Car-lite development Mexico City and Jakarta

Mexico City, Mexico

Prior to updating its planning regulations in 2017, car parking was the single fastest growing land use in the city - driven by the fact that all other land uses were obliged to be accompanied by parking. In 2017, the City announced changes to its development code, switching minimum parking requirements to maximums. For housing, the limit is 3 parking spaces per unit, no matter its size, and for offices bigger than 100 square metres, the limit is 1 parking space for every 30 square metres. In central areas and areas near good public transport, a fee is charged on developers for every parking space built between 50% and 100% of the new maximums. This provides an incentive to build less parking than the allowed maximum, while also creating a revenue stream to fund public transport expansions.

Jakarta, Indonesia

Jakarta's Detailed Spatial Plan (2022) provides specific regulations and guidelines for land use and development within various zones of the city, in accordance with the higher-order Jakarta Spatial Plan. It includes detailed provisions related to parking requirements and restrictions. In areas well-served by public transportation - such as those near Mass Rapid Transit and Bus Rapid Transit stations - the Detailed Spatial Plan allows for the reduction or elimination of minimum parking requirements for new development. In the central business district and other high-density areas, parking maximums have replaced minimums. Developers are encouraged instead to focus on providing amenities and infrastructure that support the uptake of public transport and active travel.



Urban Planning *for* Sustainable Buildings



Making buildings more sustainable is an essential step towards tackling the climate crisis and one which many cities can use their planning powers to support. The carbon dioxide (CO₂) emissions from buildings operations and construction reached new highs in 2022, making up 37% of total global CO₂ emissions³⁷. This is despite improvements in energy efficiency - also known as a reduction in energy intensity - which have been outpaced by growing global demand for energy. The main source of emissions from buildings is the energy they consume for operational needs like heating, cooling and lighting, but emissions associated with construction and materials are also significant.

As cities grow in size, so too do the emissions associated with constructing and operating new buildings. About 60% of the buildings that will exist by 2050 have yet to be built³⁸. The total emissions from buildings in rapidly industrialising countries will exceed emission levels from buildings in developed countries in the near future³⁹.

Likewise, as temperature extremes become the new norm, energy demand for cooling has become the fastest growing end-use in buildings, with energy demand for air conditioning expected to triple in the 30 year run-up

to 2050. This equates to ten new air conditioning units being sold every second until 2050⁴⁰. This huge growth in demand has the potential to drive up greenhouse gas emissions - further exacerbating the very problem it is designed to alleviate - at the same time as contributing to increased heat in cities by pumping hot air out of the building and into the streets.

Through their urban planning powers, cities can implement policies that support sustainable buildings through requiring energy-efficient designs and retrofits, the (re) use of low-carbon materials, the use of renewable energy and more. In some cities, these powers will rest with a separate Building Control Department. **Planning policy actions include:**

- **Green Building Standards:** incentivising or mandating buildings to achieve green building standards above the minimums established in national building codes (including internationally established standards like LEED and BREEAM). Green standards require sustainable building practices in building design, materials and internal systems to improve energy efficiency, conserve resources and promote thermal comfort.



- **Net-Zero Carbon Targets and Offsetting:** establishing goals and timelines for achieving net-zero carbon emissions from buildings, with allowances and mechanisms for carbon offsetting as a last resort option. Carbon reduction targets may encompass operational and/or embodied emissions.
- **Retrofitting Existing Buildings:** requiring or incentivising the modification of existing buildings to improve their environmental performance. This type of policy can be tied to applications for rezoning, redevelopment or refurbishment.
- **Renewable Energy:** requiring new (re)developments to incorporate renewable energy systems, such as solar panels, wind turbines, or geothermal heating and cooling systems.
- **Whole Life-Cycle Carbon Assessments:** requiring developers to conduct whole life-cycle assessment of carbon emissions for proposed developments, including embodied carbon emissions associated with construction materials, transportation, construction processes, maintenance and end-of-life disposal

or recycling. Accompanying this requirement with benchmarks or targets for allowable embodied carbon emissions per square metre of built space, encouraging developers to choose materials and construction methods with lower carbon footprints (such as choosing locally sourced materials).

- **Materials Circularity:** incentivising or mandating the repurposing of existing buildings over demolition, the use of recycled materials in construction and salvaging reusable building materials during deconstruction, thereby lowering demand for primary resources and diverting materials from landfill.
- **Design Guidelines:** publishing guidelines for the design and construction of low-carbon, resilient and affordable buildings, as well as the retrofit of existing buildings. The guidelines would elaborate on spatial and architectural design interventions like site layout, building orientation, insulation and low-carbon and weather-durable materials. In Global South countries, tailored guidance is considered more suitable for informal housing typologies, recognising acute affordability issues and incremental construction practices.

Green buildings policy Shanghai

The challenge

Over the last four decades, Shanghai, China has experienced a boom in construction. The built-up area of Shanghai has more than tripled since the late 1980s, expanding from approximately 780km² to over 2,400km² by 2015. Shanghai is planning for further growth, announcing in 2021 its intentions to invest in the development of five “new towns” in the city’s suburbs. Past construction has put immense pressure on natural resources, spurring the city government to seek ways to lower the environmental and carbon footprint of future buildings.

The solution

Since 2006, China’s Green Buildings Evaluation Standards have been established and gradually strengthened. Under the national regime, there are four levels

of certification for green buildings (in ascending order of quality requirements): Basic Grade, 1-Star Grade, 2-Star Grade and 3-Star Grade. Buildings are evaluated against six categories: land savings and outdoor environment; energy savings; water savings; materials savings; indoor environmental quality; and operations and management. Building owners are required to specify the building’s carbon emission intensity (the ratio of carbon dioxide equivalent emissions to building floor area) and interventions to reduce this intensity in order to obtain 1-Star rating or above.

By 2025, all new buildings in China must meet Basic Standard, but municipal authorities are allowed to set higher local requirements. This is exactly what Shanghai has done. The Shanghai Master Plan 2017-2035 states that all new buildings will reach the latest specified green building standards, embedding flexibility in expectation of increasingly stringent requirements. Particularly notable is the requirement introduced by Shanghai’s most recent sub-national Five Year Plan (2021), which requires new buildings in the five “new towns” to achieve the highest, 3-Star Grade.

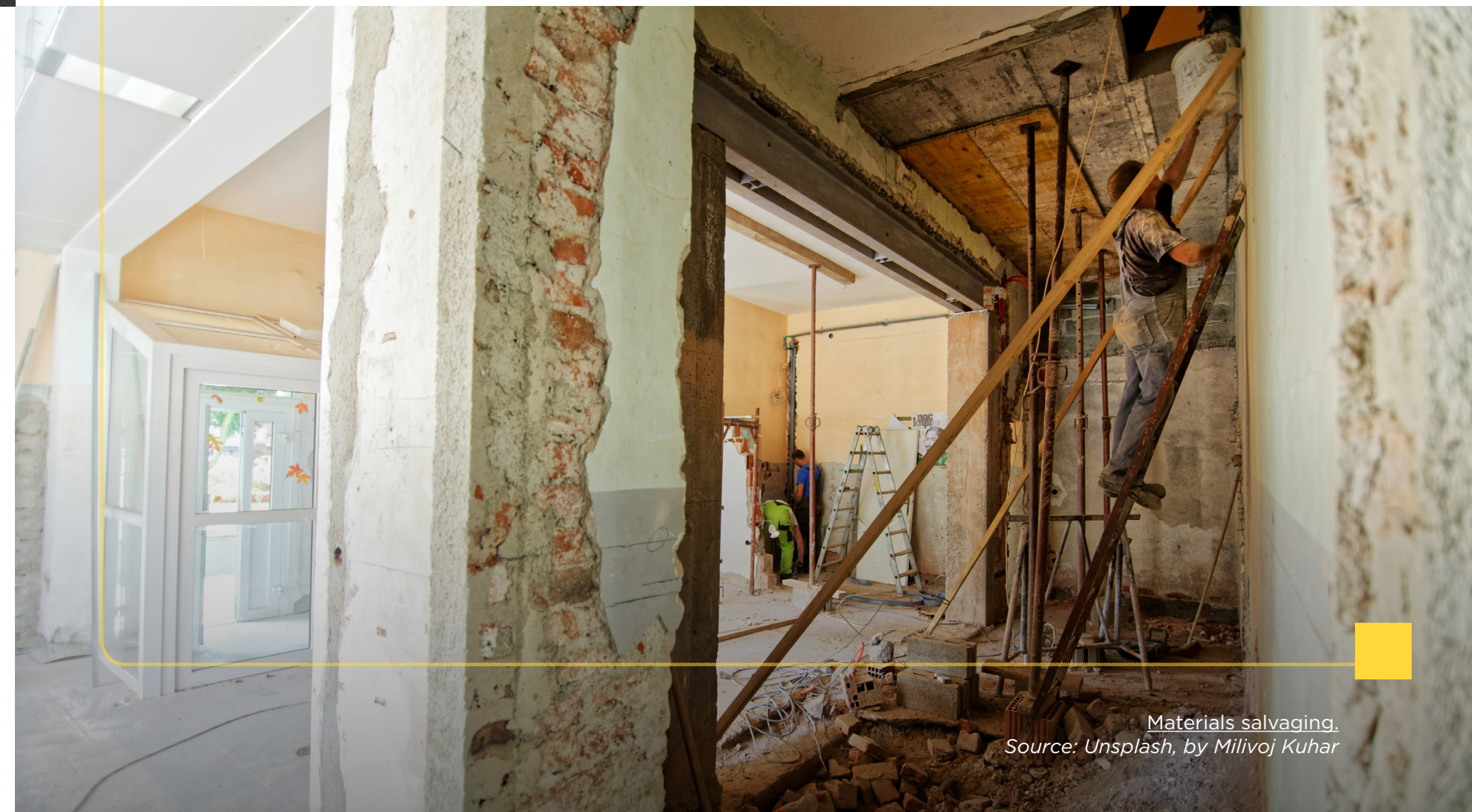
Promoting materials circularity Medellín and London

The cities of Medellín, Colombia and London, UK both use their urban plans (Medellín Land Use Plan [POT] and London Plan, respectively) to encourage materials circularity. Materials circularity is about designing and constructing buildings in a way that allows materials to be reused, recycled or repurposed rather than being thrown away after use.

Medellín is using policies and incentives to try and keep materials in use for as long as possible, reducing waste and the need for new raw materials. Medellín’s Sustainable Construction Manual is a key technical

document which advises developers on how to respond to the policy ambition in the city’s POT of increasing sustainable construction practices. The manual provides guidance on how to recycle waste from demolition and construction, and how to switch to sustainable building materials that are responsible for fewer emissions in their production and transportation. It also contains guidance on achieving greater energy-efficiency. Developers that adopt the manual in their projects are eligible for a tax deduction of 2-10% depending on their fulfilment of sustainability criteria.

The **London** Plan encourages all schemes to consider materials circularity principles at the start of the design process. All schemes referable to the Mayor for approval (which typically includes all projects of more than 150 residential units or over 30 metres in height) must aim to be zero-waste and provide a Circular Economy Statement demonstrating the steps taken to reach near/zero-waste. London Boroughs are encouraged to use their Local (Urban) Plans to set lower thresholds at which Circular Economy Statements become mandatory (e.g. for major development of 10+ dwellings or non-residential development above 1,000m²).






Materials salvaging.
Source: Unsplash, by Milivoj Kuhar

Key Takeaways

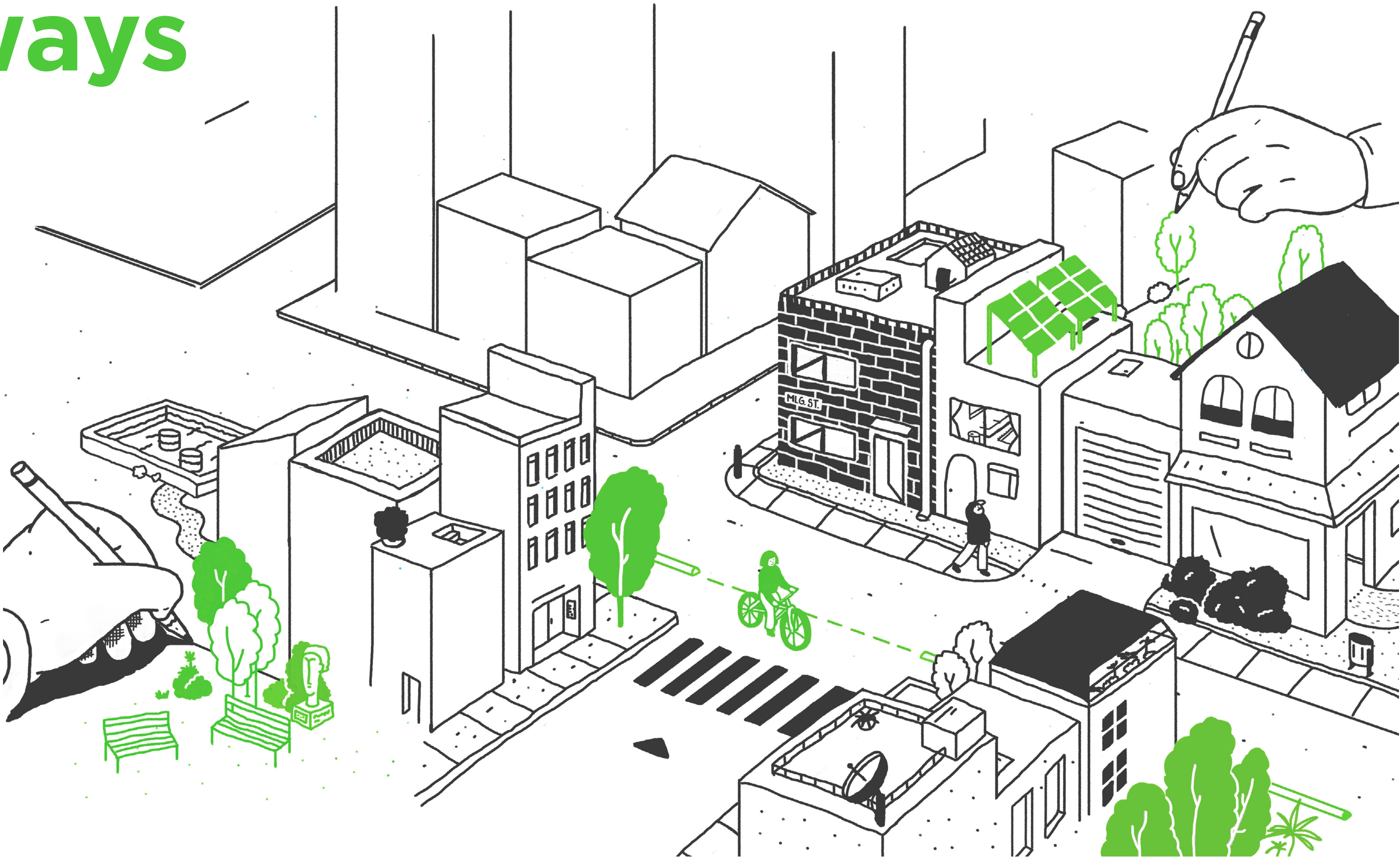
Urban planning is a central city function which offers unparalleled opportunities to mainstream climate priorities to deliver emissions reductions and increased resilience, while contributing to broader sustainable development goals.

This guide has highlighted seven key planning policy areas which urban planners should focus on in order to drive GHG emissions reductions and reduce vulnerability to hazards:

-  Urban Planning for Tackling Flooding, Extreme Heat and Drought
-  Urban Planning for Nature
-  Urban Planning for Resilient Informal Settlements
-  Urban Planning for Compact Cities
-  Urban Planning for Mode-Shift & Transit-Oriented Development
-  Urban Planning for Polycentric Cities and Proximity
-  Urban Planning for Sustainable Buildings

Whether undertaking a wholesale update to a city's urban plan, or simply revising one or a handful of policies, **every opportunity should be taken to pursue the principles advocated for across these policy areas.** Doing so will make a significant contribution to the complementary objectives of responding to the climate crisis and creating **greener, healthier and more equitable cities.**

Hopefully this guide has provided direction and inspiration for its readers. What is needed now is bold and decisive action.



Further Resources

Keep an eye out for more publications from C40 on this topic in 2025! In the meantime, take a look at the following resources:

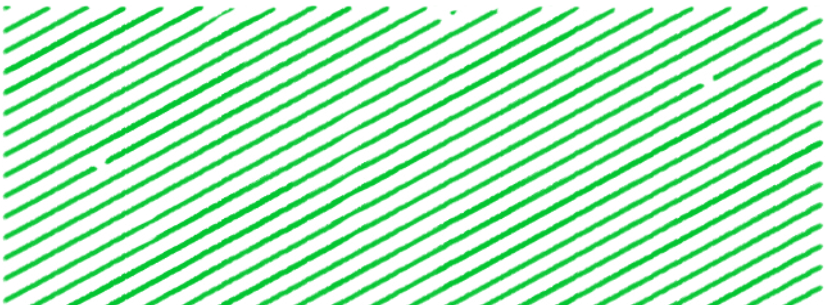
C40's [Integrating Climate Adaptation: A toolkit for urban planners and adaptation practitioners](#) (available in English, Spanish, Portuguese and French)

Visit C40's [Knowledge Hub](#) for an extensive catalogue of “how to” guides, articles and case studies that elaborate on the contents of this guide.

UrbanShift's free and self-paced online course [“Accommodating Urban Growth”](#). Aimed at Global South cities, the course covers how to deal with the complexities of managing urban growth in a climate-responsive way. (available in English, French, Spanish, Portuguese, Indonesian Bahasa and Mandarin Chinese)

UrbanShift's free and self-paced online course [“Integrated Urban Planning”](#). Aimed at Global South cities, the course covers the process for integrated urban planning through tools, case studies and examples around the world, from vision to stakeholder engagement, to funding and implementation.

The UN's [New Urban Agenda](#), which is an action-oriented roadmap for creating well-planned and well-managed urban environments over a 20-year period from its adoption in 2016.



Amman.
Source: Getty Images, by Emad Aljumah



Acknowledgements

This guidance was created by C40’s Urban Planning and Design team. It was made possible thanks to C40’s partnerships with Community Jameel and UrbanShift.



In partnership with:



C40 is a network of nearly 100 mayors of the world’s leading cities working to deliver the urgent action needed right now to confront the climate crisis and create a future where everyone, everywhere, can thrive. Mayors of C40 cities are committed to using a science-based and people-focused approach to help the world limit global heating to 1.5°C and build healthy, equitable and resilient communities. **C40’s Urban Planning and Design team** supports cities in developing, implementing and sharing urban planning strategies and regulations that set a framework for sustainable and equitable urban growth. Find out more about our network and programmes [here](#).

Community Jameel advances science and learning for communities to thrive. An independent, global organisation, Community Jameel was launched in 2003 to continue the tradition of philanthropy and community service established by the Jameel family of Saudi Arabia in 1945. Community Jameel supports scientists, humanitarians, technologists and creatives to understand and address pressing human challenges in areas such as climate change, health and education. Learn more [here](#).

UrbanShift supports cities around the world to adopt integrated approaches to urban development, building an equitable, zero-carbon future where both people and planet can thrive. Funded by the Global Environment Facility and led by the UN Environment Programme, UrbanShift is implemented in partnership with the World Resources Institute, C40 Cities, ICLEI – Local Governments for Sustainability, the UN Development Programme, the World Bank and the Asian Development Bank. Learn more [here](#).

Authors

Lead author: **Emma Goddard** (C40 Cities)
Helene Chartier (C40 Cities) and
Matheus Ortega (C40 Cities)

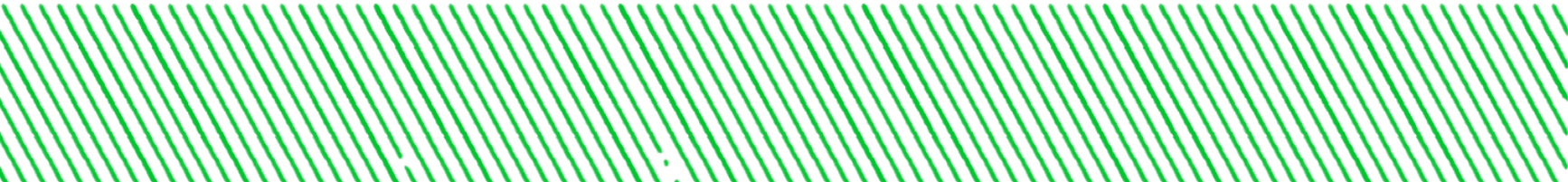
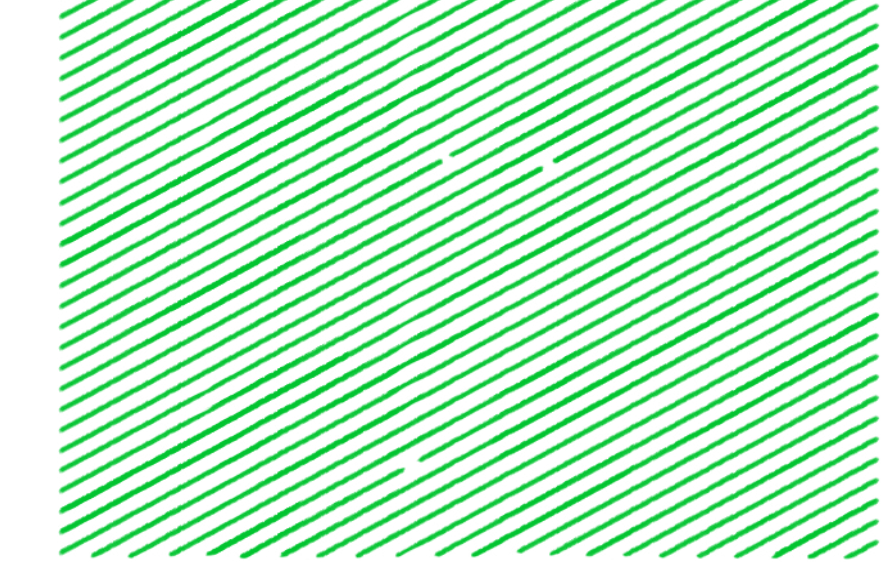
Contact C40 via upd@c40.org

This guidance was enriched thanks to the following reviewers:

- Alice Kaumba (C40 Cities)
- Jessica Kavonic (C40 Cities)
- Andrea Fernández (C40 Cities)
- Michael O’Neill (C40 Cities)
- Cassie Sutherland (C40 Cities)
- Aagya Purohit (C40 Cities)
- Euan Crispin (C40 Cities)
- Cléa Daridan (Community Jameel)
- Karim Elgendy (Buro Happold)

Art direction & Design

Editorial design,
cover, illustrations
and figures by
Epigrama Studios



Endnotes

¹ IPCC (2022) **Cities, Settlements and Key Infrastructure**. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

² UN Environment Programme (2024) **Global Status Report for Buildings and Construction**: Beyond foundations: Mainstreaming sustainable solutions to cut emissions from the buildings sector.

³ World Bank (2020) **Building Sustainable Cities and Communities**.

⁴ CDP (2022) **Protecting People and the Planet**.

^{5,6} UCCRN, C40, Acclimatise and GCOM (2018) **The Future We Don't Want**.

⁷ C40 and Mayors Migration Council (2021) **Global Mayors Action Agenda on Climate and Migration**.

⁸ IPCC (2022) **Urban systems and other settlements**. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

⁹ Pomponi, F., Saint, R., Arehart, J.H. et al. (2021) **Decoupling density from tallness in analysing the life cycle greenhouse gas emissions of cities**. npj Urban Sustain 1, 33 .

¹⁰ Foster, V., Briceno-Garmendia, C. (2010) **Africa's Infrastructure: A Time for Transformation**. World Bank, Washington, DC.

¹¹ Seto and Dhakal, 2014. Chapter 12: **Human Settlements, Infrastructure, and Spatial Planning**.

¹² World Health Organization. (2021). **WHO global air quality guidelines**: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide.

¹³ Global Commission on the Economy and Climate (2014) **Better Growth, Better Climate**.

¹⁴ United Nations Environment Programme and International Union for Conservation of Nature (2021). **Nature-based solutions for climate change mitigation**. Nairobi and Gland.

¹⁵ Li, G., Fang, C., Li, Y. et al. (2022) **Global impacts of future urban expansion on terrestrial vertebrate diversity**. Nat Commun 13, 1628).

¹⁶ Rentschler, Jun; Marconcini, Mattia; Su, Rui; Strano, Emanuele; Hallegatte, Stephane; Riom, Capucine; Avner, Paolo. 2022. **Rapid Urban Growth in Flood Zones**: Global Evidence since 1985. Policy Research Working Paper;10014. © World Bank.

¹⁷ Moncau, G. (2024) **Death toll due to flooding in Rio Grande do Sul rises to 161, and first leptospirosis fatal victim confirmed**. Available at: <https://www.brasildefato.com.br/2024/05/21/death-toll-due-to-flooding-in-rio-grande-do-sul-rises-to-161-and-first-leptospirosis-fatal-victim-confirmed> [Accessed 25 July 2024]

¹⁸ IPCC (2022) **Cities, Settlements and Key Infrastructure**. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

¹⁹ **C40 Cities and Nordic Sustainability** (2019) Cities100.

²⁰ United Nations (2015) HABITAT III Issue Papers 22 – **Informal Settlements**.

²¹ Frediani, A.A. Cociña, C. and Roche, J.M. (2023) **Improving Housing in Informal Settlements**: Assessing the Impacts in Human Development.

²² UN Habitat (2023) SDG 11: **Sustainable Cities Fact Sheet**.

²³ United Nations (2015) HABITAT III Issue Papers 22 – **Informal Settlements**.

²⁴ UN Habitat (2018) **Pro-Poor Climate Action in Informal Settlements**.

²⁵ UN Habitat (2023) **Nature-based Solutions to Build Climate Resilience in Informal Areas**.

²⁶ Cities Alliance (2021) **Securing Tenure in African Cities**.

²⁷ UN Habitat (2014) **Land Tenure Security in Selected Countries**: Synthesis Report. Securing land and property rights for all.

²⁸ Global Commission for the Economy and Climate (2018) **Unlocking the Inclusive Growth Story of the 21st Century**.

²⁹ IPCC (2022) **Urban systems and other settlements**. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

³⁰ Kaw, Jon Kher, Hogeun Park, and Ban Edilbi (2024) **Future Amman Positioned at a Juncture: Three Strategies Toward Climate-Smart Spatial Transformation**. Washington, DC: World Bank.

³¹ ESA (European Space Agency). 2015. **World Settlement Footprint**. <https://urban-tep.eu/#!> (via Ababsa, Myriam, and Ahmad Z. Abu Hussein (2020) “Metropolitan Amman: Comprehensive Climate Plans.” In Volume II of Greater Than Parts: A Metropolitan Opportunity, edited by Shagun Mehrotra, Lincoln L. Lewis, Mariana Orloff, and Beth Olberding. Washington, DC: The World Bank)

^{32,33} UN-Habitat. 2022. **Amman Spatial Profile Jordan**.

³⁴ Kaw, Jon Kher, Hogeun Park, and Ban Edilbi (2024) **Future Amman Positioned at a Juncture: Three Strategies Toward Climate-Smart Spatial Transformation**. Washington, DC: World Bank.

³⁵ **Active uses** refers to uses and structures that activate public spaces, including but not limited to retail stores, restaurants, markets, galleries, community centres, and associated outdoor seating, shelter structures, public art and placemaking infrastructure.

³⁶ Wessels, Pardo and Bocarejo (2012) Bogotá 21 – **Towards a World-Class, TransitOriented Metropolis**

^{37,38} United Nations Environment Programme (2024). **Global Status Report for Buildings and Construction**: Beyond foundations: Mainstreaming sustainable solutions to cut emissions from the buildings sector.

³⁹ UN Habitat (2014) **Planning for Climate Change**: A strategic, values-based approach for urban planners Copyright

⁴⁰ International Energy Agency (2018) **The Future of Cooling Opportunities for energy efficient air conditioning**.