

## Sustainable Urban Planning - Copenhagen and the Path to Climate Resilience



Banner Image: "Circle Bridge In Copenhagen" Jacob Schween

[https://unsplash.com/photos/a-bridge-over-a-body-of-water-next-to-tall-buildings-8aiW\\_BwguYU](https://unsplash.com/photos/a-bridge-over-a-body-of-water-next-to-tall-buildings-8aiW_BwguYU)

The term "sustainable urban planning" can be defined as **"a holistic approach to developing and managing cities that prioritises long-term environmental, social, and economic sustainability."**<sup>1</sup>

The concept is holistic in the sense that it attempts to model cities for the future, considering a multitude of different targets. These targets include resilience against extreme weather events, reducing pollution, protection of wildlife/green spaces, and improving quality of life for residents. It is an ethos, rather than a singular solution for a singular problem. Every city is unique, facing different challenges and requiring a tailored approach.

Sustainable planning involves integrating various aspects of urban design to create an ecosystem, including, but not limited to: green infrastructure, clean energy, water, waste management, public transport, and housing. As global temperatures continue to rise, extreme weather events like floods and wildfires are becoming increasingly common and deadly. More people are choosing to live in cities than ever - as of 2025, nearly half of the world's population lives in urban areas, which account for more than

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<sup>1</sup> Oktay, Derya. "Sustainable urbanism and identity: A holistic perspective for future cities." *Perspectives in Architecture and Urbanism*, Vol 1, Issue 2, 2024.

70% of global CO<sub>2</sub> emissions.<sup>2</sup> Uncontrolled urban expansion has many negative effects, like higher infrastructure and housing costs, worsened resource efficiency, and longer commute times. It causes cities to encroach on green spaces, leading to the loss of ecological value that is provided by fields, forests, floodplains, and open spaces for wildlife. It also increases vulnerability to extreme heat through the formation of urban heat islands,<sup>3</sup> as well as floods, droughts, and severe storms, leading to preventable deaths and destruction. At a political level, sustainable urban planning looks to developments in engineering and technology for ways to keep cities and residents safe from the effects of climate change. It attempts to do this while also lowering carbon emissions, preventing further heating and reducing the likelihood of extreme weather events or other climate repercussions.

The renewal of Seoul's Cheonggyecheon district, completed in 2005, stands as one of the earliest examples of sustainable urban planning. The project involved the removal of an ageing elevated highway, which had been built over a stream that had crossed the city for centuries beforehand. The stream was manually restored and turned into a 5.8km linear park. Pedestrian paths were added, creating an open space for residents to walk, cycle, and enjoy the city. It was an expensive and risky project (the entire process cost the equivalent of £220m), but one with a plethora of benefits for the city. Cheonggyecheon is now 3.6 °C cooler than nearby streets in Seoul.<sup>4</sup> The open space creates wind paths, which have caused a drop in air pollution. Wildlife has returned to the area, including many species of fish, birds and amphibians, increasing biodiversity by 639%.<sup>5</sup> Flood management properties are built into the stream's design, so that extreme rainfall in monsoon season can be absorbed and moved out of the city. Cheonggyecheon has become a tourist attraction, bringing revenue to the area and providing jobs for locals. The success of this project led to the removal of sixteen other elevated highways in South Korea and is thought to be the inspiration for several green infrastructure projects across the world, like New York's High Line and the City Moat in Utrecht.

In cities like Brisbane, where extreme heat is a public health issue, urban planners have come up with many creative solutions to reduce dependence on car travel. In summer, the heat and humidity make it difficult to move around the city without the air conditioning provided by automobiles, leading to increased fuel consumption (air conditioning units in cars can reduce the fuel economy by more than 25%) and carbon dioxide emissions, which make the streets even hotter for pedestrians. The best option for cities is to encourage commuters to walk or cycle, and make it as easy and safe as possible for them to do so. Brisbane's comprehensive plan provides shaded walkways and integrates cooling systems into design, like misting machines in public spaces/restaurant gardens. This has reduced reliance on cars and curbed further heat increases from vehicular emissions, waste heat and road friction.<sup>6</sup>

Copenhagen, Denmark's capital city, is viewed by many as a leading example of sustainable urban planning, showcasing how cities can flourish while emphasising environmental stewardship, liveability, and forward-thinking innovation. In 2012, the city government introduced the CPH 2025 plan, outlining its

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<sup>2</sup> "Sustainable Urban Development." OECD, <https://www.oecd.org/en/topics/sustainable-urban-development.html>. Accessed 15 April 2025.

<sup>3</sup> Druckenmiller, Hannah. "Urban Heat Islands 101" *Resources for the future*. <https://www.rff.org/publications/explainers/urban-heat-islands-101/> 4th March 2023.

<sup>4</sup> Rashid, Raphael. "Everybody Thought it Would cause Gridlock: The Highway That Seoul Turned Into Stream." *The Guardian*. 17th January 2025.

<sup>5</sup> Johnson, Lesley. "Greener horizons: The Cheonggyecheon stream restoration project." *Planet Forward* 3rd March 2017.

<sup>6</sup> Barker, Billy. "Learning from Australia: San Antonio's path to a cooler, more walkable future." *San Antonio Express News*. 9th February 2025.

ambition to become the world's first carbon-neutral capital. Their comprehensive strategy would use corporate investments and partnerships to add sustainable districts to the city, reduce reliance on fossil fuels, and limit car traffic creating a cleaner, safer environment with a better quality of life.

One of the most successful of the initiatives has been the renovation of the city's waterfront and North Harbour district. Until the 1990s, Copenhagen's wastewater was discharged directly into the harbour, leaving it contaminated and unsafe for bathing. By 1999, \$440 million had been invested in redesigning the system, adding overflow drains and reservoir systems so that even heavy rains would not cause sewage to be released into the harbour.<sup>7</sup> The water was declared safe, and in 2002, canal swimming areas were opened, as well as platforms, showers, and saunas offering the opportunity for outdoor exercise and social activities to residents. In the summer, open water swimming competitions are held, with thousands of participants enjoying the clean, safe harbour. The whole area has been invigorated, attracting investment and the building of new, quality housing. The North Harbour, or Nordhavn, has been redeveloped, prioritising a low carbon footprint, and has received the prestigious gold certification from DGNB for its green building and sustainability standards.<sup>8</sup>

A key priority of the CPH plan is reducing reliance on car travel and encouraging residents to make as many journeys by bike as possible. From 2010 to 2014, the City of Copenhagen allocated a total of €80 million to the implementation of its bicycle strategy,<sup>9</sup> increasing and widening existing cycle paths to keep cyclists separate from motor traffic. Integration with other forms of public transport was another priority, as well as funding public campaigns to promote cycling as a healthy, ethical, and cost-effective way to travel. This endeavour was largely successful; the number of kilometres cycled in Copenhagen has increased by approximately 30% since 1998, and cycling is now the most popular method of commuting in the city, keeping residents fit and the air clearer. Expanding on this vision, Copenhagen's planners aim to eliminate the need for car travel by developing "five-minute cities," where all essential amenities are within a five-minute walk, encouraging residents to choose walking as their primary mode of transportation. The Nordhavn district, which was an industrial landscape in 2008, is one of the few areas in the world that qualifies as a five-minute neighbourhood and is now home to around 6000 residents. Lars Riemann, a representative of the consultancy firm that worked on the redevelopment, described how instead of beginning the plans with roadmap and working out how cars could pass through the district, they asked, 'What does a walkable city look like? What do the streets look like? What do people like to experience as they are walking?' Emissions in Copenhagen have been reduced by 75% since the CPH pledge, but Nordhavn is the only district that has managed to become fully carbon neutral.

As in many parts of the world, due to climate change, rates of rainfall in Copenhagen are becoming increasingly difficult to predict. 2023 saw the most rain of any year in Denmark since records began, and these levels are set to increase by up to 30% in the next century.<sup>10</sup> To prepare for this, the city has begun transforming Enghaveparken, one of its largest parks, into a 2,000 cubic metre underground water retention basin, designed to absorb flood waters and keep nearby infrastructure safe from destruction.<sup>11</sup> Since residents will be losing one of their largest open spaces, new parks are being developed throughout

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<sup>7</sup> Admin "Water, Water, Everywhere - And It's All Nice and Clean" *The Copenhagen Post*. 10th July 2012.

<sup>8</sup> Srivastava, Sujata. "The Sustainable City: Learning from Copenhagen's Plan for Zero Carbon." *SPUR*, 31st August 2022.

<sup>9</sup> "The City of Copenhagen's Bicycle Strategy" *Urban Sustainability Exchange*.

<https://use.metropolis.org/case-studies/cycling-in-copenhagen>. Accessed 15th April 2025.

<sup>10</sup> AFP Staff Writers "Denmark Sees Record Precipitation for 2023" *Space Daily*. 20th December 2023.

<sup>11</sup> Mooney, Attracta.. "Extreme Rainfall Puts Cities on Alert" *Financial Times*. March 1st 2025.

the city to ensure that flood protection efforts do not come at the cost of urban liveability. These projects are a few examples from hundreds that have been commissioned by the city of Copenhagen as part of their CPH plan, in the hope of building a city that will provide a lasting and pleasant home for its citizens.

As with all climate pledges and projects, there are failures and examples of corporate greenwashing. Greenwashing is when a company **falsely promotes or exaggerates its environmental efforts** to appear more sustainable than it actually is. Most eco projects are expensive and require private investment/contractors, who typically favour profitability over keeping emissions low. Sustainability often requires compromises and trade-offs; global warming is a complex problem and there are no quick fixes or simple solutions. The production of materials required for eco-projects can be extremely pollutive, and claims of “carbon neutrality” tend to be based on these emissions being offset by mass tree planting. The CopenHill waste-to-energy plant, which was completed in 2019, is one of Copenhagen's flagship sustainability projects and an example of the private sector agenda taking over and abandoning climate priorities. The plant burns waste to make heat and electricity for 150,000 households, reducing the need for recycling, but creating CO<sub>2</sub> emissions as part of the incineration process. There is also not enough waste in Denmark to keep the plant running, and more needs to be shipped from other countries, creating further unnecessary pollution. The plant, which features a climbing wall, hiking trails and ski slope as part of its structure, is the main reason Copenhagen will fail in meeting its goal of becoming carbon neutral by 2025.<sup>12</sup>

There are other trade-offs too. The most popular locations for new “eco-cities” are generally offshore or in deserts, the former leading to the destruction of valuable marine environments which are essential for absorbing carbon dioxide from the atmosphere.<sup>13</sup> Inequality is also a major factor in sustainable urban planning. Most of these projects can only be commissioned in wealthy areas, with the possibility of living in a sustainable neighbourhood only available to the select few who can afford it. Whilst making use of inner-city space for housing saves on commuting emissions and car journeys, it can neighbourhoods crowded and reduce the availability of green spaces and parks.

## **Conclusion**

Copenhagen is among many cities that have introduced sustainable urban planning initiatives, but its goal of becoming the first carbon-neutral city represents the most comprehensive effort to tackle climate change at a fundamental level. The city has not been able to eradicate carbon emissions by this year, as it set out to do in 2012, but crucially, they are trying to do things properly by consulting sustainability activists and devoting appropriate funds. If the city government continues to pursue further creative solutions, reduce car travel and develop infrastructure to protect residents against extreme weather events, there is a strong chance they might reach net-zero in the next 5 years. Other cities must follow suit if they wish to protect their citizens from the epidemic of flooding, wildfires and extreme heatwaves approaching. The only option is a holistic approach to planning, placing sustainability as the number one criteria in every single planning decision and avoiding mistakes like the CopenHill waste-to-energy plant by prioritising the opinions of scientists and activists over corporations. When implemented effectively, sustainable planning projects can be both environmentally beneficial and economically advantageous for

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<sup>12</sup> Williams, Jeremy. “Copenhill: a revolutionary clean energy plant?” *The Earthbound Report*, 17th August 2022.

<sup>13</sup> NUgent, Ciara. “So-Called ‘Green’ Cities Promise a Climate-Friendly Utopia. The Reality Is a Lot Messier.” *Time* 10th May 2023.

local communities, as seen in the case of Cheonggyecheon. The rest of the world must take inspiration from these successes, and every city must face its unique challenges and adapt if they wish to survive.