

Copenhagen



Source: mikeinlondon

Copenhagen’s approach to becoming a smart city is firmly grounded in the city’s main target of achieving carbon neutrality by 2025 and in so doing creating a greener, more sustainable, and more livable capital city, as well as supporting growth. Its smart city initiatives focus on environmental issues that are related to this commitment to carbon neutrality. Urban planning and carbon neutrality go hand in hand here.

Surprisingly, we awarded the city low scores for Information on Local Government Decision Making, Feedback from Citizens, and Data Management. Copenhagen also scored lower than the five other cities in our

study for Access to Schools, Welcoming of Minorities, Traffic Congestion, and Air Pollution. However, it is possible that the extent of the city’s achievements in these areas has led the municipality to reduce its efforts to directly communicate them.

The smart city concept in Copenhagen is also geared toward making the city more attractive at the European and international levels. Copenhagen’s aim to achieve carbon neutrality within such a short time frame is exceptional among the international community of large cities and capitals.

Copenhagen has an airport and a major seaport. It collaborates with the city

of Malmö (Sweden) to manage Baltic Sea shipping and goods traffic. One of the advantages that the city enjoys is its ownership of its sources of energy production. However, the city’s objective of becoming carbon neutral raises a couple of questions about social inclusion and citizen participation there, among other matters.

Copenhagen’s Green Growth program, which aims to stimulate sustainable economic development, is unique. It represents a vital tool for the city to achieve its goals and shape its development. Copenhagen ought to be respected worldwide as the **Green Growth City**.

Copenhagen

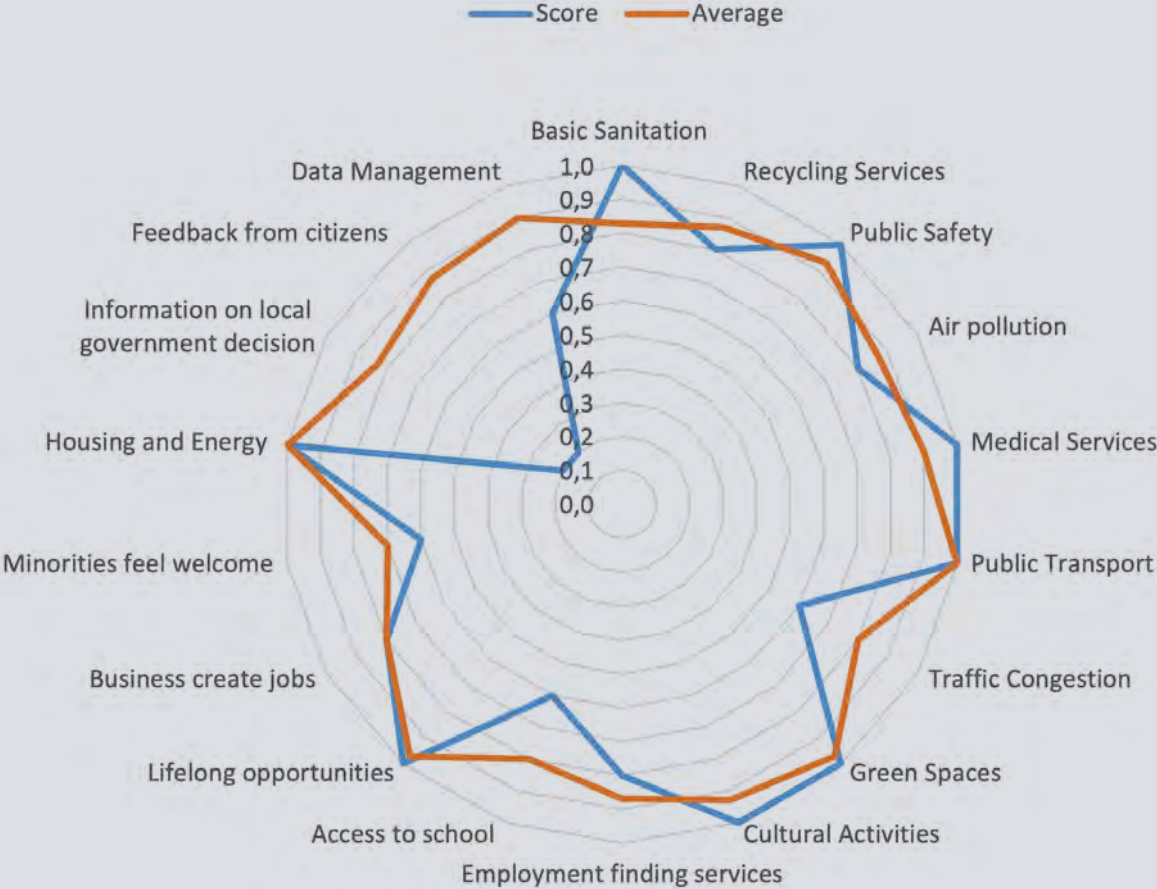


Chart type designed to plot 18 factors translated into values over multiple quantitative variables. Blue line is about the city and Orange line is the average value for the six selected cities. It should be used with care.

Executive summary

With about six hundred thousand inhabitants in its city area and almost two million in its greater metropolitan area, Copenhagen is the largest city in Denmark.

There is no question that Copenhagen is a trailblazer in smart and sustainable city developments. To find evidence of this, one need look no further than the honors that the city was awarded in 2014. The European Union named the city its European Green Capital; Monocle proclaimed Copenhagen the Most Livable City in the World; at the Smart City Expo World Congress in Barcelona, Copenhagen took home the World Smart Cities Award in the Best Project category for the Copenhagen Connecting project. Among the contenders to be the most advanced city in the world in terms of smart city technologies, Copenhagen wins hands down.

Copenhagen's smart city approach is strongly anchored in the three main objectives of achieving carbon neutrality by 2025; creating a greener, more sustainable, and more livable capital city; and supporting economic growth. Copenhagen has launched myriad projects to achieve its targets. One major example here is the Strategic Climate Action Plan, which encompasses many diversified initiatives and sets the target of achieving a 20 percent CO₂ reduction by 2015.

Denmark does not face the land shortage issues that, for instance, Singapore does (see Chapter 5). The country has a common view on traffic reduction as a source for increasing sustainability and enhancing citizens' quality of life. Moreover, Copenhagen faces challenges similar to those of Singapore, as the metropolis's population is rapidly increasing.

Copenhagen's aim to become carbon neutral by 2025 has spurred the development of a new intelligent traffic systems framework for the very near future. The framework builds on Copenhagen's Climate Plan 2025, and one of its goals is to ensure that 75 percent of all trips within the city should be taken by bike, public transport, or on foot.

Among the objectives mentioned above, climate action and traffic systems receive the biggest share of funds. They are fields where there is the greatest potential for innovation and where solutions can be delivered in the short-term future.

Biking. Denmark's tax system is certainly not neutral. In the Danish auto import business, the term "steel price" is

used to refer to the price that the dealer actually pays for the vehicle when it is imported (that is, the invoice price of the vehicle from the manufacturer). Added to this price are import customs (10 percent for vehicles manufactured outside the EU) and VAT (25 percent). The high taxes on cars in Denmark were implemented by the Danish government a long time ago. They have decisively influenced citizens' commuting behavior, and they have especially strengthened Copenhagen's biking culture.

To fulfill the objectives that it has set concerning soft mobility, Copenhagen has already tested many projects and solutions. Many of them are the result of a public-private collaboration between fourteen companies and two universities. These solutions involve prioritizing buses and cyclists on roads and using data-gathering devices and smart lighting at junctions as well as other technologies that could complement the intelligent traffic solutions that are being implemented in Singapore.

A good example of mobility-related innovation is Copenhagen Intelligent Traffic Solutions (CITS). This platform consists of a network of Wi-Fi access points that can geolocate Wi-Fi-enabled devices on the streets without compromising privacy. The data gathered through the system enables officials to monitor traffic in real time, and it is stimulating the design of transport-related tools and apps. CITS can be considered indicative of the Danish tendency toward tripartite collaboration between universities, businesses, and government. More broadly, Copenhagen has recently become a successful hub in the high-tech startup environment.

Denmark is well known as a "bike nation." Over one million journeys are taken by bike in Copenhagen every day. Continuous efforts are being made to provide better conditions for cyclists—for example, maintaining road surfaces, creating dedicated cycle paths, providing bike parking, and integrating bicycles into multimodal solutions.

In 2014, the Danish capital installed twenty-two thousand smart streetlights in its streets (half of its lighting needs at this time). Their main smart feature involves varying the luminosity that they produce. The lampposts detect the arrival of a cyclist and react by increasing the intensity of the light, before decreasing it as the cyclist moves away. So far, the scheme has produced a 76 percent saving in the bill for public lighting.

Copenhagen Solutions Lab, founded in late 2014, gave birth to the Smart City Street Lab, which encourages citizen involvement as well as business development within its remit of testing out smart and sustainable city solutions in the area around City Hall. It showcases the newest technologies and accelerates partnerships with both the private sector and academia.

Carbon Neutrality. In 1984, the five mayors of the municipalities that comprise Greater Copenhagen (Copenhagen, Frederiksberg, Gentofte, Gladsaxe, and Tårnby) decided to set up a common district heating system, under which companies supplying energy could choose freely among the various generation plants owing to the integrated structure of the system. Two criteria drove the choice of generation plant: i) the cheapest to take into operation; ii) the most suitable to cope with government-prescribed environmental directives. The City of Copenhagen's ambition is to be the world's first carbon-neutral capital by 2025. The current climate plan (CPH 2025) commits the City Council to allocating 2.7 billion Danish kroner (363 million euros) for the lifespan of CPH 2025 (from 2012 to 2025). The roadmap for CPH 2025 includes sixty-five specific projects. It makes the climate plan tangible to stakeholders, citizens, and observers more generally.

We understand that the municipality has mainly focused its smart and sustainable city initiatives on environmental issues related to its commitment for Copenhagen to be an entirely carbon-neutral city by 2025. Under this vision, urban planning and carbon neutrality are bound up together. The expected benefit of making the city carbon neutral will be at least one billion Danish kroner per year from savings in the city's use of heating, air conditioning, and electricity. Adherence to the goal of carbon neutrality is evident in the urban development currently taking place in Copenhagen. With the deployment of intelligent solutions in the city, Copenhagen is quickly becoming a leader in smart city technology, enriching citizen experiences and improving operational efficiencies.

Combining Solutions. With each new initiative, Copenhagen is enabling a more intelligent use of the city's existing resources and improving the way in which it delivers services to its growing population and to visitors to the city. This is making the city more attractive to new business investments and entrepreneurs.

Through digital transformation, Copenhagen's technology solutions and partner ecosystems will deliver digital innovation opportunities for the city itself to create new revenue streams, improve access to public services, enhance community experiences, and create new operating models that drive increased efficiency.

In Denmark, implementation of green, urban, and smart solutions offers strong business cases with short payback times and high returns on investment. Copenhagen is at the vanguard of smart cities, having initially adopted a high-ROI (return on investment) technology, smart streetlights, to make travel safer for drivers and cyclists. Nearly half of commutes in Copenhagen are by bicycle, making lighting a critical element of the city's efforts to guarantee the well-being of all its citizens.

Copenhagen's smart lighting system enables remote lighting management and control. One of the city's current projects is to deploy road condition sensors to determine when it is necessary to sand or salt roads because of winter conditions. Planners are acutely aware that sanding and salting increase the carbon footprint, and they are dedicated to minimizing or eliminating these measures if they are not required.

For Copenhagen, another priority with regard to its smart and sustainable city strategy is the publishing and provision of accessible and open data for all players. Through its open-data platform, the municipality has published more than a hundred diversified datasets, including, for example, real-time visualizations of traffic flow and maps indicating the location of parking spots and public washrooms.

There are plans to release large quantities of data and information about energy use in the city's buildings and the relationship of that data to demographic data. Moreover, the potential of big data is being explored, with the Japanese technology company Hitachi having established a platform (named City Data Exchange) in the spring of 2015. Hitachi has chosen Copenhagen for its first big data laboratory in mainland Europe. Hitachi is cooperating with the City of Copenhagen, the Capital Region of Denmark (Hovedstaden), and CLEAN.¹ The latter organization is a Danish cleantech cluster that is tackling complex challenges related to the green transition. The City Data Exchange aims to bring together private data and public data to create better public solutions and new business opportunities for companies.

(1) <https://www.sustaineurope.com/clean-denmark-s-paramount-clean-cluster-21072017.html> [Accessed on 10 June 2021].

Below we summarize the key findings related to each of the nine themes that are examined in this chapter.

Basic sanitation: Copenhagen's mayor² for technical and environmental affairs believes that the public drinking water supply is cleaner than bottled water, a claim that very few other cities in the world would make (Dana Raidt, 2015).

Recycling services: Denmark aims to be recycling 70 percent of all its waste by 2025, and it produces a comparable per-person rate of municipal waste to that of other EU countries (Circular Copenhagen - Resource and Waste Management Plan 2024, 2019).

As for Copenhagen specifically, within its waste management goals, the city has placed emphasis on tackling waste generated by the many tourists who are drawn to the city every year. Therefore, solutions aim to influence both residents' and tourists' behavior.

Mobility: Copenhagen City Council has formulated a set of twenty-five green mobility initiatives. These have required an initial investment estimated at between 0.8 and 1.2 billion Danish kroner (110 to 160 million euros) (Action Plan for Green Mobility, 2013). In 2010, 544,000 tons of CO₂ were emitted by the transport sector in Copenhagen, amounting to 22 percent of the city's total CO₂ emissions. Road traffic was responsible for 70 percent of transport emissions (Action Plan for Green Mobility, 2013). The city has set the target of 75 percent of all journeys in the town being taken on foot, by bike, or by public transport. For this reason, the Green Mobility Package is included within the Urban Development Plan (UDP); it ensures that all infrastructure will be optimized and enhanced, and it should facilitate the greening of transportation.

Activities: Back in 2014, Copenhagen won the European Green Capital Award. And, as we have mentioned, it holds the ambition of becoming the first carbon-neutral city in Europe by 2025. A goal has been set to deliver a quality satisfaction level of 95 percent among users of parks, cemeteries, waterfronts, and green and natural areas by 2025.

Green spaces: In 2011, a cloudburst caused around one billion US dollars (710 to 720 million euros) of damage in the city ([Cloudburst Master Planning Initiatives](#), Administered by Mayor for Technical and Environmental Affairs, Morten

Kabell, 2016). This catastrophe showed the need for collaborative efforts to be established to prevent flooding from having such ruinous effects.

Employment-finding services: Denmark characterizes its labor model as one of "flexicurity" (Denmark.dk website, 2020). The model both allows employers to easily hire and fire employees to adapt to marketplace conditions and gives employees a secure safety net.


Lifelong opportunities: According to the OECD, Denmark is among the best places to live in terms of the work-life balance that it offers (Denmark.dk Website, 2020)

Housing and energy: Copenhagen is a firm supporter of the 2015 Paris Agreement, and it is aiming to reduce its carbon footprint by two million tons. Housing and energy represent a critical area that needs to be leveraged if the city is to succeed in that aim. The city is therefore seeking to reform its current building stock so that it makes smarter use of energy. Retrofitting is the approach that the city is applying (Copenhagen Climate Plan, Carbon Neutral by 2025, 2009), with a view to decreasing the electricity usage of all buildings by up to 10 percent and reducing their heat consumption by 20 percent by 2025.

Governance: The political responsibility of the City of Copenhagen is collegial and organized around a tight team of about ten people. Each of the elected officials assumes full responsibility for a pole, with a high level of decision-making autonomy and without systematically going through the council. Decentralization is therefore strong. "We haven't had any political decisions so far on a smart city strategy... not a big one. It's politically decided that yes we should work with smart city and this direction, but it's not like it's a vision for Copenhagen that the politicians have decided" (Extract from Arvin Ghasemi MS thesis (2015), interviewing Spiegelberg Stelzer (2015)).

Danish basic data program: The Danish Basic Data Program creates a shared government registry for data distribution. The registry is called the Common Public-Sector Data Distributor. This program aims to introduce the once-only principle, under which, for example, public authorities cannot ask citizens for the same data provided earlier. Instead, each of the three bodies has to obtain information from the system itself. Governmental institutions, businesses, and citizens are the three main beneficiaries of this shared data program.

[2] <https://ramboll.com/media/rqr/former-mayor-for-technical-and-environmental-affairs-morten-kabell-to-join-ramboll> (Accessed on 10 June 2021).



Estimates indicate that savings yielded by this program reached around thirty-five million euros by 2020 owing to the decrease in administrative costs that it has brought about (Open Data Impact, Juliet McMurren et al., 2017). In addition, the private sector expected a return of sixty-seven million euros owing to the program's promotion of digital services, facilitation of administrative processes, and reduction of costs (Open Data Impact, Juliet McMurren et al., 2017). Lastly, citizens might obtain benefits from integrated public services.

We have organized our analysis of the main decisions and projects that the City of Copenhagen has adopted according to the principal topics and themes summarized above.