Careers that build sustainble cities: Copenhagen

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Wonderful, Wonderful Copenhagen!

Copenhagen has the top spot in the 2025 EIU's Liveability Index and yet its citizens have one of the highest tax rates in the world (1). How does the city achieve this?

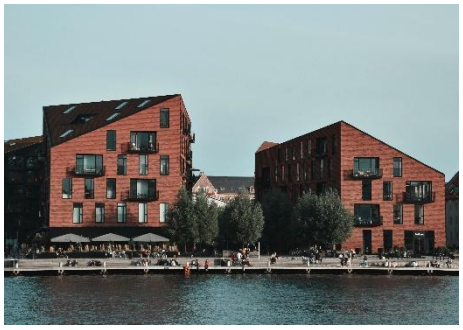

Image credit: Gianluigi Marin/Unsplash

This case study considers Liveability, Energy, Waste Management, Transport, Drainage and Open Spaces in examining how Copenhagen, despite being over 600 years old, is an example of a sustainable city.

Liveability

Liveability: the degree to which a place is suitable or good for living in (2). Categories that may be considered are: safety, connections, accessibility of excellent services to support all aspects of life, walkability, green spaces (3). Copenhagen is considered so liveable in large part due to long term integrated urban planning that ensures that its population have a great ease of access to high quality education, healthcare, public spaces. The city scored top marks in the "Stability" section meaning that its populace feels that they benefit from low crime rates and that there is a widespread public trust in institutions (4). This trust can only build up over time. Something that reoccurs when examining Copenhagen is the notion that this is not an overnight phenomenon and has taken at least half a century in planning and implementation; those seeking to emulate the success of the city in achieving liveability and a high degree of sustainability need to be aware that both are cumulative.

In being liveable, Copenhagen meets the three elements of sustainability; it is an economically prosperous city, its populace

The green boxes showcase geographical jobs in the **built environment sector**. They use geographical knowledge and skills that you learn in your geography lessons, and are accessible to you if you choose to study geography. For more info on geographers in the built environment sector, visit: https://memf.careers/

Careers for geographers in the built environment: **Urban Planner**

An urban planner designs and develops towns and cities to ensure that they meet the needs of the communities who live there as well as support economic growth and environmental sustainability. An urban planner has to balance demands for housing, transport, shops and services and green space. They help ensure that places are safe and attractive to live and work in.

Geographical knowledge & skills that urban planners use includes:

- ✓ Urbanisation, including push and pull factors to urban areas
- ✓ Knowledge of urban challenges and how these challenges can be managed
- ✓ Historical understanding of urban growth in the UK
- ✓ GIS and map knowledge
- ✓ Understanding of Census data

Salary:
£28,000 – £50,000+ per year

For more information, click the link:
What Does A Town Planner Do?

has a very good standard of living and quality of life and it not only has many open and green spaces but also has integrated environmental positive action into all of its political decision making.

Each of the following headings addresses how central planning has given opportunities for liveability and sustainability as well as exploring some of the challenges still faced by the city.

Energy and Waste Management

When we consider waste management in geography, we often struggle to make a positive case for any of the options in the circular economy; in the UK you would never hear someone suggesting a day at the local incineration plant! However, in converting 440 000 tonnes of waste annually into enough clean energy to heat 98% of the buildings in Copenhagen, whilst also being THE destination spot for skiing, snowboarding, hiking and climbing in the local area, the award winning CopenHill has achieved sustainability and has become an architectural landmark (6).

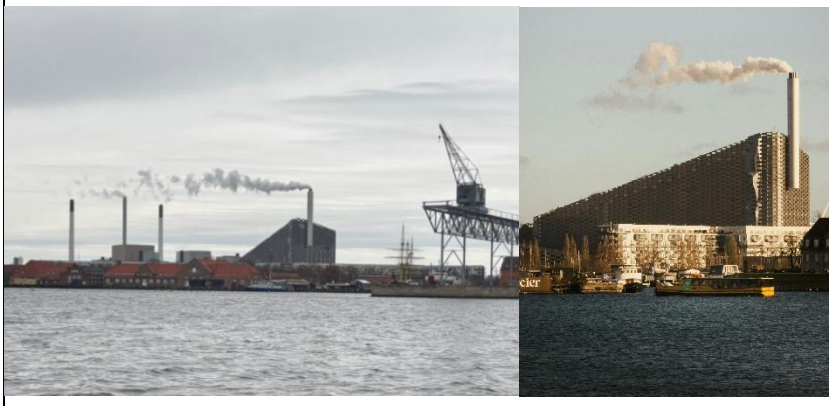

Photo credit: (Right) Deborah Watts, Built Environment Schools Trust; (Left) Carlos Tejada/Unsplash

From the water, CopenHill looks very much like what it is, a giant incinerator. However, a look at the plans for the structure shows the ingenuity of its design; the machinery has been positioned in height order to create the 9000m^2 ski slopes, the 85m high climbing wall and the 10000m^2 green roof that includes over 400 plant species (6). Carbon is captured within the plant and the Danish are even paid by the likes of the UK, Italy and France to take their waste which is then used in providing free heat energy to the city.

Sustainable impacts:

Social – CopenHill is owned by the city, communicates with nearby residents, provides jobs, open spaces and leisure opportunities; skiing, snow-boarding, walking, climbing, cafes.

Careers for geographers in the bult environment: **Facilities Manager**

A facilities manager oversees the operation, maintenance, and safety of buildings. They help ensure that buildings are fit for purpose and function well for a variety of users and purposes. This includes overseeing the organisation of building services like cleaning, security and maintenance. Facilities Managers are responsible for managing budgets and contractors.

Geographical skills & knowledge:

- ✓ Knowledge of how buildings can be more sustainable
- ✓ Knowledge of how resources can be used and managed sustainably, including sustainable management of waste, water and energy
- ✓ Data collection and data analysis skills

Salary:
£30,000 – £70,000 per year

For more information on this job role, click the link: Facilities Manager Job Description (Salary, Duties)

Just a few of the roles that will have been involved in creating Copenhill:

Land surveyors, Energy Consultants, Architects, Quantity Surveyors, Construction Managers, Building Control Surveyor, Facilities Management, Civil Engineer, Environmental Engineer, Legal departments and Mechanical Engineers

Economic – free heating for the city as well as generating income for the country and job creation (both direct and indirect jobs in the Built Environment)

Environmental – Carbon capture removes the CO_2 at source whilst NO_X is broken down into harmless nitrogen and water vapour. Increased biodiversity and reduction in landfill.

Across the world, the construction industry is wasteful, producing 40% of CO_2 emissions and 30% of all landfill. We have already seen how Copenhagen tackles the issue of household waste, but the city also uses innovative design and ideas to reduce waste; the Resource Rows are new homes from abandoned residences which have used approx. 30% less CO_2 than more conventional building methods (11). Another innovative design uses used shipping containers to create the CPH student village, thus creating easily assembled and also easily moveable housing (10).

Explore the companies involved in sustainable building here: Resource Rows - Lendager Mission — CPH Village

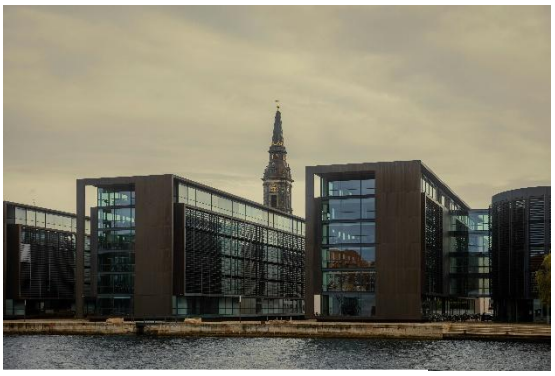

Image credit: Getty Images/Unsplash

Transport

In planning for an integrated transport network, speed and efficiency haven't been the only goals, in Copenhagen, the transport must also serve the environment (5).

The city uses a smart mobility network to monitor air pollution and ensure that the "Green Wave" is operating to maximum efficiency. There are more bicycles than automobiles in Copenhagen and the "Green Wave" has been developed to ensure that cyclists maintaining a 20 km/h travelling speed are green lit through their entire journey (7). The 400km of cycle lanes (compared to the 360km in London, a city x10 the size of Copenhagen) ensure that cyclists feel safe as well; a key element in promoting the bike as the primary transport means. By the end of 2025, all buses should be carbon-neutral, and all water-based transport should be electric. You can even kayak for free if you gather rubbish from the water as you go! (8)

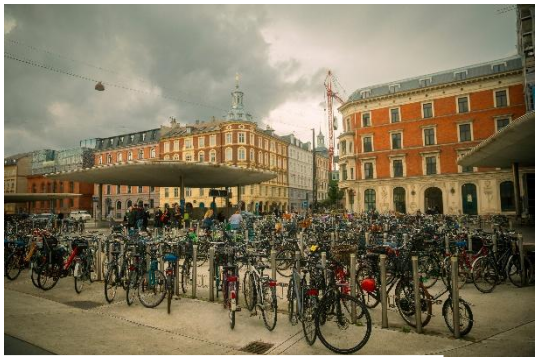

Image credit: Getty Images/Unsplash

In addition to the transport planning, the surroundings are maintained in a sustainable fashion: The verges are left untrimmed and grow wild to promote biodiversity, there are bat, bird and insect boxes in the trees.

Sustainable impacts:
Social - the health benefits of clean air and exercise are well documented but the communal feeling that cycling brings, and the sense of belonging are less well-documented, but these are key contributors to the city being considered so liveable.

Economic – cycling infrastructure enhances public health meaning there are less health costs, creating and maintaining the infrastructure creates many of the jobs listed to the right. Transport for London (9) found that high-quality cycling infrastructure unlocks new areas for building and can increase footfall on high streets.

Environmental – The reduction in emissions that a focus on cycling brings is a key element of Copenhagen hoping to become the world's first carbon-neutral city in 2025. The goal of at least 75% of all trips by bike or public transport is key in this (10). The wilding of the verges has increased biodiversity**.**

Careers for geographers in the built environment: **Transport Modeller**

A transport modeller uses data and computer modelling to design transport routes that are sustainable and help tackle issues like traffic and congestion. They analyse data to assess the impact of new roads, railways, or policies on the environment and make predictions about how the construction of new infrastructure like shopping centres will affect transport routes. The work that transport modellers do also helps to improve road safety.

Geographical skills & knowledge:

- ✓ Knowledge of how transport can be managed sustainability to help improve people's wellbeing and reduce the impact of transport on the environment
- ✓ GIS and data analysis

Salary:
£30,000 – £60,000 per year

For more information on this job role, click the link: Transport Modeller Career Options, Salary & Duties

Just a few of the roles that will have been involved in creating Copenhill:

Land surveyors, Energy Consultants, Architects, Quantity Surveyors, Construction Managers, Building Control Surveyor, Facilities Management, Civil Engineer, Environmental Engineer, Legal departments and Mechanical Engineers

Drainage and Green Spaces

Copenhagen developed its Climate Adaptation Plan (CAP) in 2012 in part in response to a 1000-year storm (known as a cloudburst storm) which left 50000 homes without heat for a week and caused 1 billion Euros of damage. A part of the CAP is The Cloudburst Plan to manage the increasing risks to this low-lying city in the face of rising sea-levels and changing climate patterns (12). Sustainable drainage solutions have been extensively utilised such as constructing wetlands and drainage corridors to absorb and retain run-off (13).

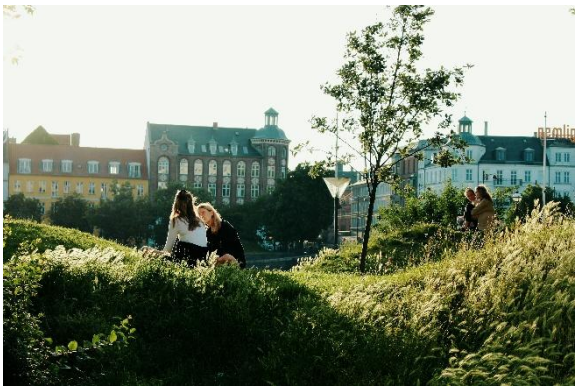

Image credit: Venus Major/Unsplash

The projects include both blue-green infrastructure as well as more traditional grey -engineering. Blue-green infrastructure is a nature-based approach and includes incorporating more green spaces to filter and retain stormwaters thus extending the lag-time to rivers (through interception and infiltration); open spaces are encouraged, green roofs and green building facades have proliferated, lakes have been enlarged and surrounded with wetlands to increase water storage capacity. Sustainability is achieved not only environmentally but also through increasing social spaces like skate parks and amphitheatres that double as collection basins (14) all of which is saving money in the face of future flood risks. The city has undergone a programme of replacing impermeable paves, car parks and public spaces with permeable materials; the economic investment is already saving money with it estimated that the green solutions have been $120mn cheaper than their grey alternatives (13). This is not to say that grey-engineering does not have its place; underground tunnels, basins and pipes all help with moving stormwaters to the sea. Storage of stormwater has also become vital as Norther Europe experiences droughts year on year meaning Copenhagen's sponge city both protects from floods and droughts.

Perhaps the best example of how all of this has been put together is the award-winning Karen Blixens Plads (Square) at the University of Copenhagen which manages to combine a public square, a nature reserve, a wetland with a bike park and many communal spaces whilst also acting as a storage for

Careers for geographers in the bult environment: **Drainage Engineer**

A drainage engineer designs and manages systems that control the movement of water and sewage flow safely and efficiently. The role involves a mix of desk-based work and site-based work. This includes using computer modelling software to plan drainage systems, and visiting construction sites to track progress of a building project.

Geographical knowledge & skills that drainage engineers use includes:

- ✓ Causes and impacts of river and coastal flooding
- ✓ Engineering and management techniques to mitigate flood risk
- ✓ Understanding of geology and how this affects flood risk
- ✓ GIS and mapping

Salary: £30,000 – £50,000+ per year

For more information on this job role, click the link: Drainage Engineer Job Description, Salary & Career Path

Some of the careers available in integrated transport planning:

Transport Modeller, Transport Manager, Land Surveyor, GIS Analyst, Urban Planner, Landscape Manager, Water Resources Planner

stormwater and a biodiverse habitat.

Many neighbourhoods promote organic growing and there are examples of communal volunteer-led gardens, rooftop gardens and mini-farms across the city which are then championed by the local restaurants (10).

Sustainable impacts:

Social – the creation of functional spaces that are appealing to all leads to a sense of belonging and community that ensure that citizens of the city are invested in making it work. Open spaces encourage healthy-lifestyles as well as the 2000-space bike-park being an integral part of the transport system.

Economic – the investment in the green spaces will reap rewards as climate change continues apace. Many jobs are created through this plan and the built environment sector has a major part to play

Environmental – the benefits of the green spaces are clear in terms of biodiversity and habitat renewal. The green roofs help with cleaning the air and bring down the effects of the Urban Heat Island. Drought and flood resistance are paramount in future-proofing the city.

Challenges
This all takes central planning and a willingness of the populace to take part. Copenhagen citizens are taxed at a very high rate however their responses to the Liveability Surveys suggest that they feel that the rewards are worth it.
Making this work in a city the size of London would be more difficult; London is ten times the size of Copenhagen. It is also a plan that has been many decades in coming to fruition; the political system in the UK can mean that longer-term planning is more difficult despite the benefits.

Careers for geographers in the bult environment: **Architectural Technician**

An architectural technician supports architectural projects such as the CPH Container Village. Their work includes a mix of desk-based and site-based work. This includes organising notes and project information and using design software like CAD to create technical drawings. They may also visit construction sites to ensure that projects are running smoothly.

Geographical skills & knowledge:

- ✓ Knowledge of sustainability, specifically knowledge on how buildings can be sustainable and meet the demands of a changing climate

Salary:
£27,000 – £50,000 per year

For more information on this job role, click the link: Architectural Technician Job Description & Courses

Just a few of the roles that will have been involved in developing the Climate Action Plan:
Land surveyors, Energy Consultants, Architects, Quantity Surveyors, Construction Managers, Building Control Surveyor, Facilities Management, Civil Engineer, Environmental Engineer, Drainage Engineers, Hydrographic Surveyors, Accountants, Landscape Engineers,

Student Activity – Think like a Geographer

Using the information above, put yourself in the shoes of each geographical job role to answer the questions. Think like …

1. **An Urban planner -** Urban planners have to consider the needs of a growing population in addition to minimising environmental impact. How has Copenhagen achieved this?

2. **A Drainage Engineer** – What challenges might the drainage engineers have overcome in order to achieve Sustainable Urban Drainage within the confines of a 600-year old city?

3. **A Facilities Manage**r – What will the facilities manager have to balance to meet the needs of the CopenHill incineration plant workers and the leisure users?

4. **A Transport Modeller** – A transport modeller has to consider the economic impacts of removing/reducing fuelled transport from the roads. How have they been successful in doing this in Copenhagen.

5. **An Architectural Technician** – The changing climate of Copenhagen will have brought challenges to the architectural technicians who brought the CPH Container Village to life. How have they made it a sustainable AND liveable settlement?

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