City Case Studies

Copenhagen - The Strategizer

This case study is part of a series. The development of the case study was led by Carbon Gap, a partner in the City CDR Initiative, and received direct input from the Climate Section in the Climate, Environment, and Technical Administration of the City of Copenhagen.

City: Copenhagen, Denmark
Country Governance: Decentralized unitary parliamentary constitutional monarchy

Capital City: Yes
Climate Zone: Temperate

Location: Coastal
Population: 659,352 (2024)

Carbon Footprint:
1 tCO2e per capita annually Scopes 1 and 2 (2024)

City Climate Targets:
Climate positive by 2035

National Climate Targets:
70% reduction by 2030, climate neutrality by 2045 (National Climate Act) and aiming for 110% reductions by 2050, compared to 1990

Memberships:
C40 Cities, Carbon Neutral Cities Alliance, NetZeroCities EU

Capacity to Act:
The city of Copenhagen is amongst the most climate progressive cities in the world. Its ability to adopt ambitious climate goals is backed up by strong political commitment, comprehensive citizen involvement, a robust set of legal competences and a city climate budget. The municipality holds substantial land ownership in the city and frequently acts as a major developer in urban regeneration. It can impose levies on key sectors to secure funding for climate action and has generated billions of Danish Crowns to invest in public infrastructure by transferring land to a publicly-owned, privately-run corporation, for development. Copenhagen has sizable regulatory powers, strong institutional capacity and access to national and international collaboration platforms to advance policies, implement programs and exchange with peer cities.

POLICY LANDSCAPE ANALYSIS

As part of an update of its KBH 2025 Climate Plan, the city of Copenhagen's new Climate Strategy 2035 came into effect in January 2026. Copenhagen is targeting a state of climate positivity within the city's boundaries by 2035. To achieve these objectives, the city is focusing its efforts on completely decarbonizing its energy and transport systems, heavily reducing construction-related carbon footprints with zero-emission construction sites and low carbon materials, and limiting its consumption-based emissions from approximately 10 tCO2e in 2019 to around 5 tCO2e in 2035.

In addition to maximizing the reduction of its territorial emissions, the city is pursuing significant amounts of carbon removal to balance its residual emissions from hard-to-abate sectors and remove more CO2 than it emits by 2035 to counter its consumption-based emissions. The cornerstone of its negative emissions planning is to capture and store biogenic CO2 from (organic) waste (waste-to-energy (WtE) CCS) or biomass incineration (BECCS). However, the strategy still lacks clarity on expected scale of residual emissions, the volume of removals needed, and the delivery mechanisms. This is notable as Copenhagen initially envisaged relying on a WtE CCS project led by the publicly owned Amager Resource Centre (ARC) for its carbon removal needs, but had to take a step back due to funding ineligibility and regulatory uncertainty. This left a 434,000-tonne CO_2 gap in reaching climate neutrality and prompted a strategic pivot away from its original 2025 climate neutrality goal.

BECCS remains an important part of its Climate Strategy 2035, with expected support for projects at ARC and HOFOR's biomass-fired plants, both emitting significant amounts of biogenic CO_2. The City Council allocated DKK 450 million to advance CCS within the city, complementing national level support. At the national level, the Danish Energy Agency issues CCS tenders and other funding opportunities for CCS. Meanwhile, the multi-stakeholder INNO-CCUS partnership, funded by Innovation Fund Denmark, supports over 30 research projects to advance scalable, cost-effective CCS and CDR solutions. This broader innovation ecosystem is essential to supporting Copenhagen's local ambitions. Copenhagen's role in the EU Climate Neutral Cities Mission reinforces its focus on cross-sector infrastructure and system integration, though responsibility for CO_2 transport and storage remains diffuse and enabling policy frameworks are still evolving. Local stakeholders are exploring other CDR methods. It serves as the central hub for the nation's Rockstart Biochar Network and is investigating ways to convert urban organic waste into biochar for use in climate-neutral concrete production and promoting the use of bio-based building materials.

GOVERNANCE LANDSCAPE ANALYSIS

Copenhagen's climate governance is led by the Climate, Environment and Technical Administration, under the strategic direction of the City Council and its Climate, Technical and Environmental Committee. The Climate Section within the Department for Climate and City Development oversees key planning documents, including the Climate Strategy 2035, while a dedicated unit under the Department for Mobility, Climate Action and City Structures oversees the Climate Adaptation Plan. Responsibility for implementing the city's BECCS efforts lies with municipal utilities. ARC runs the CopenHill WtE plant and is developing the CopenCapture WtE CCS project. HOFOR, the city's majority-owned energy and water utility, is preparing a BECCS project at its Amagerværket biomass plant. These initiatives enjoy strong political backing, including a City Council allocation of DKK 50 million in December 2023 for CCS planning at HOFOR, with mayoral support. Copenhagen also participates in the Carbon Capture Cluster Copenhagen (C4), a regional partnership coordinating CO_2 capture, transport, and storage.

Despite strong coordination and public ownership of key assets, Copenhagen lacks a dedicated unit or cross-departmental mechanism for managing CDR city-wide. It also remains unclear where responsibilities for planning and coordinating the implementation of carbon removal solutions beyond WtE CCS and BECCS would lie. The city has yet to undertake an evaluation of potential carbon removal project approval bottlenecks which could inform governance and policy innovation and strategic funding efforts. Nonetheless, Copenhagen's high-level political commitment, institutional capacity, and active role in global city networks position it well to strengthen CDR governance over time.

GAPS AND OPPORTUNITIES

- Copenhagen lacks a city-level strategy and implementation roadmap for CDR to meet its 2030 and 2035 climate targets.
- CDR efforts are heavily reliant on large-scale, capital-intensive WtE CCS and BECCS projects, while stable local financing mechanisms to support pilot and demonstration projects in other CDR methods are absent.
- Biogenic emissions from other plants, such as the sewage sludge incineration plant operated by wastewater utility BIOFOS, are not integrated into a broader BECCS strategy.
- The absence of a centralised CDR implementation framework risks fragmentation and missed opportunities for the systemic integration of CDR and carbon sinks in the urban environment.
- Wastewater-related removals, such as pyrolysis of sewage sludge into biochar or wastewater alkalinity enhancement , represent a promising but largely untapped CDR vector within city services.
- Mass-timber and bio-based construction in Copenhagen present significant carbon sequestration potential, with the capacity to turn buildings into carbon sinks rather than carbon emitters.

CORE RECOMMENDATIONS

1. **Calculate the expected residual emissions to reach climate positivity by 2035 as a yardstick for the minimum amount of required CDR and demand signal to developers.**
2. **Assess the carbon removal potential within the city boundary to guide research funding and pilot project development across a diversified portfolio of carbon removal methods and deployment pathways.**
3. **Develop a municipal CDR roadmap as a follow up to the Climate Strategy 2035 that integrates both large-scale and decentralised approaches across short, medium and long-term time horizons.**
4. **Prioritize embedding CDR in existing urban systems and infrastructure, including wastewater management, waste-to-energy systems, and urban greening.**
5. **Integrate carbon sinks in stormwater infrastructure, combining this with its "sponge city" green design, looking specifically at nature-based solutions, biochar and carbon-negative concrete.**
6. **Leverage CDR for embodied carbon reduction and use this as a strategic growth sector by supporting mass-timber, bio-based construction, and integration of biochar and carbonated materials in aggregates.**
7. **Develop clear and robust accounting frameworks for tracking and financing CDR activities, potentially in collaboration with other cities in Scandinavia.**
8. **Strengthen collaboration with national innovation platforms such as INNO-CCUS, Energy Cluster Denmark, and State of Green.**

EXISTING CDR PROJECTS AND STAKEHOLDERS

- **ARC (Amager Resource Center)** – Public waste-to-energy utility.
- **HOFOR (Greater Copenhagen Utility)** – City's energy and water utility (majority city-owned).
- **Ørsted** – State-majority-owned energy company and C4 cluster partner.
- **BIOFOS** – Regional wastewater utility (owned by 15 municipalities).
- **Rockstart Biochar Network** – a newly launched network for the biochar ecosystem
- **Again.bio** - a synthetic biology startup that turns industrial CO2 emissions into valuable, carbon-negative chemicals using engineered microbes.
- **Rock Flour Company** – Danish startup supplying Greenlandic rock flour for enhanced rock weathering.
- **Klimate** – Copenhagen-based climate tech firm facilitating voluntary carbon removal purchases.
- **Ramboll** - A globally leading engineering, architecture and consultancy firm headquartered in Copenhagen.
- **Danish Energy Agency (Energistyrelsen)** – National agency running CCS funding programs and tenders.
- Copenhagen has a vibrant climate tech investor ecosystem. Key climate tech investors focused on CDR and CCS include The Footprint Firm, Copenhagen Infrastructure Partners (CIP), and the Export and Investment Fund of Denmark (EIFO). Other active players in the Danish market include Rockstart and KOMPAS VC.