CITY CDR INITIATIVE
Building Carbon Sink Cities

City Case Studies:

Stockholm - 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 City of Stockholm Executive Office.

City: Stockholm, Sweden
Country Governance: Unitary
Capital City: Yes
Climate Zone: Continental
Location: Coastal
Population: 995,574 (2024)

Carbon Footprint:
1.2 tonnes CO_2 per capita annually (2024)

City Climate Targets:
Climate positive by 2030 and fossil-fuel-free by 2040

National Climate Targets:
Net-zero by 2045 (Swedish Climate Policy Framework)

Memberships:
C40 Cities, Covenant of Mayors, Carbon Neutral Cities Alliance, Viable Cities

Capacity to Act:
The city of Stockholm has the ability to make urban planning decisions, develop policies, and implement programs to address urban challenges and pursue climate goals. This is based on a combination of significant regulatory powers and institutional capacity, fiscal means, land ownership, societal buy-in, and national support frameworks.

POLICY LANDSCAPE ANALYSIS

The City of Stockholm has firmly integrated carbon dioxide removal (CDR) into its climate strategy, aiming to achieve climate neutrality by 2030. Stockholm reaffirmed its commitment to this goal under the national Viable Cities initiative and the European Mission on Climate-Neutral and Smart Cities 2030. Stockholm's Climate Action Plan 2030 explicitly requires that territorial negative emissions surpass territorial residual emissions by 2030, highlighting the crucial role of CDR in meeting this goal.

The city primarily relies on Stockholm Exergi's bioenergy with carbon capture and storage (BECCS) project at its existing heat and power biomass plant, which is expected to deliver 800,000 tonnes of negative emissions annually from 2028. Additional CDR efforts planned for after 2030 include enhanced carbon sequestration through improved forest and land management, production and storage of biochar, and carbon capture and storage (CCS) at waste-to-energy plants handling mixed fossil and biogenic waste.

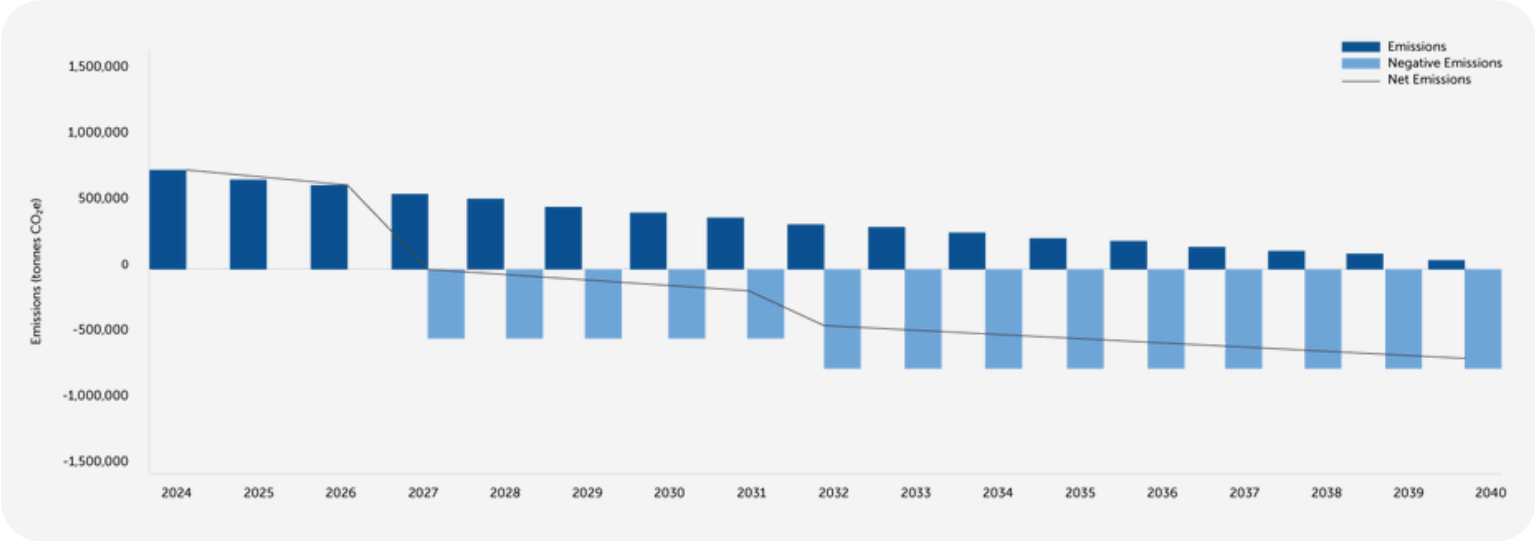

Figure 1: Stockholm's emissions budget 2024-2040 based on milestone 2.1 *A Stockholm that is climate-positive by 2030 and fossil-free by 2040 [based on territorial emissions].*

Stockholm also prioritizes circular economy solutions, such as biogas production from sewage sludge and food waste, and seeks to lower emissions from wastewater treatment processes. The city's Environment Programme 2030 reinforces these objectives, emphasising viable ecosystems, biodiversity enhancement, blue-green infrastructure, improved water quality, and innovative wastewater management.

Additionally, the city's Budget 2025 emphasizes strategic climate investments, funding through the "Climate Billion" initiative, and explicitly highlights the importance of securing external funding sources at national and EU levels.

GOVERNANCE LANDSCAPE ANALYSIS

Stockholm's City Executive Board oversees the implementation of the climate action plan, with Stockholms Stadhus AB and the Environment and Health Committee specifically guiding the development of a climate-positive energy system. Operational responsibility for CCS/CDR actions is clearly designated across utilities and infrastructure that is partially or fully owned by the city:

- Stockholm Exergi AB operates the primary BECCS facility and is 50% owned by the city.
- Stockholms Hamn AB, alongside Stockholm Exergi and Stockholms Stadhus AB, coordinates CO_2 transport and intermediate storage and is owned by the city.
- Stockholm Vatten och Avfall AB assesses CCUS/CDR opportunities related to waste incineration and biochar production, in collaboration with several city committees and enterprises, and is owned by the city.

The structure demonstrates that the governance of industrial CDR pathways is split across several organisations over which the city has significant control. This organised decentralisation encourages the uptake of CDR in different urban systems and infrastructure. At the same time, there is not one body in charge of CDR as a cross-sectoral topic, which undermines holistic decision-making and planning of all carbon removal pathways in the urban and peri-urban environment.

GAPS AND OPPORTUNITIES

- Despite strong institutional support, Stockholm relies heavily on a single large-scale BECCS project owned by Stockholm Exergi for its residual emissions. This introduces potential delivery and financial risks.

- Integrating CDR into urban planning, development processes, and sustainable procurement (particularly in sectors like regenerative agriculture and supply chain management) can unlock opportunities. Addressing challenging emissions, such as from wastewater treatment, is underexplored. Developing carbon-negative materials such as concrete within the construction sector also presents considerable potential.

- There is a lack of clear methodologies for accounting and verifying CDR. This is particularly pertinent considering anticipated financing models involving multiple private stakeholders beyond the city's geographical boundaries, including for Stockholm Exergi's BECCS project.

CORE RECOMMENDATIONS

1. **Map the carbon removal potential and urban planning needs for project deployment in the urban and peri-urban environment, including embedding CDR in urban systems, infrastructure, and public utilities.**

2. **Develop a CDR strategy to integrate CDR holistically in the city's Climate Action Plan and embed carbon removal objectives horizontally across public policy domains where synergies can be realised.**

3. **Explore CDR opportunities within construction and demolition waste mineralisation. The city of Stockholm could partner with large Swedish construction companies such as Skanska and Sweco.**

4. **Integrate CDR explicitly into sustainable procurement guidelines and bidding frameworks, such as for food, services and construction works.**

5. **Accelerate innovation in wastewater treatment technologies to tackle challenging emissions, working with other cities to exchange best practices and involving wastewater treatment companies.**

6. **Develop and advocate for clear and robust accounting and reporting frameworks for tracking and financing CDR activities and associated GHG inventory changes**

EXISTING CDR PROJECTS AND STAKEHOLDERS

- Stockholm Exergi - BECCS Stockholm project.
- ReCarber - BECCS company founded in Stockholm.
- Paebbl - Dutch-Scandinavian carbon mineralisation company headquartered in Stockholm.
- Planboo - digital Monitoring, Reporting and Verification technology provider.
- Net Zero Company - Blockchain-based carbon removal credit developer.
- Stockholm Environment Institute - Non-profit research institute co-developing C-Sink, an EU-funded project to develop MRV pre-standards and policy strategies.
- Stockholm Wood City - Urban development project using timber as building material.
- Roselundsparken Biochar project - Led by Novocarbo and Carbonfuture.
- Stockholm Biochar project - Funded by Bloomberg Philanthropies, including lessons learnt. This pilot project was decommissioned in 2023, to investigate a large-scale biochar production facility.
- KLIMPO - Stakeholder forum for climate positive and carbon sinks.
- Stockholm is home to climate tech investors and accelerators supporting early-stage CDR ventures, such as Luminar Ventures, Spintop Ventures, and Course Corrected.