

# Bio-CCS as a policy measure to achieve climate goals – the pioneering support scheme in Sweden

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**Abstract.** By 2045, Sweden is to have zero net emissions of greenhouse gases into the atmosphere. After 2045, Sweden should achieve negative emissions. To accomplish this, the use of bioenergy with carbon capture and storage (bio-CCS) will be important.

Sweden should aim to capture and store two million tonnes of biogenic carbon dioxide per year by 2030. However, the feasible potential for bio-CCS in Sweden amounts to at least 10 million tonnes of biogenic carbon dioxide per year in a 2045 perspective. To support the development and deployment of CCS the Swedish energy Agency has been given two governmental assignments.

1. The first task/assignment, given in December 2020, was to establish a national centre for CCS. This task entails planning, coordination and promotion of CCS throughout the country. The Swedish Energy Agency will carry out its work in dialogue with both national and international stakeholders: industries, academia, governmental authorities and the Government Offices of Sweden. The present tasks for the centre are to implement a support system for bio-CCS and ensure that it is line with international conventions, such as the UN Convention on Biological Diversity and its moratorium on geo-engineering, and the London Convention and the London Protocol. The centre is also working with questions related to the accounting and reporting of negative carbon dioxide emissions in relation to national and international climate goals as well as following the emergence of a carbon market – voluntary and/or regulated – for negative emissions.

2. The second assignment was to roll-out the support system earlier proposed by the agency. The Swedish Energy Agency has concluded that a reverse action as the most cost-effective support system as well as to be compatible with EU state aid rules. The support system for bio-CCS has a budget framework of 3.6 billion €. A reverse auction means that, for example, a pulp and paper industry or a combined heat and power plant can submit a bid on how much carbon dioxide they can capture and store, and at what cost. The one who can deliver bio-CCS according to the stipulated requirements at the lowest cost, wins the auction. The Swedish Energy Agency hope to launch the first round of auction in 2023 and have the first storage of Swedish captured carbon dioxide taking place in 2026.

Other countries can use Sweden's knowledge and experiences when implementing bio-CCS. Exchanging knowledge, experiences and ideas with other countries are important to achieve large-scale deployment of bio-CCS in the Nordic-Baltic region and net-zero emissions in 2045.

**Keywords:** Bio-CCS, Sweden, negative emissions.