

The Role of Carbon Management in a Climate-Neutral North Rhine-Westphalia

How North Rhine-Westphalia will use carbon management to create a climate-neutral industry

Summary

The Government of North Rhine-Westphalia has studied and identified the [need to develop a carbon management industry](#) in order to meet [its legally-binding target of climate-neutrality by 2045](#). According to [a study by the Wuppertal Institute for Climate, Environment and Energy](#) key industries in North Rhine-Westphalia will require carbon management and CO₂ transport infrastructure to become climate-neutral in 2045.

Even when taking all technically feasible measures to reduce CO₂ generation in North Rhine-Westphalia, point sources in the industrial sector will still emit **7 Mt of CO₂ in 2045**. Involving the use of biomass with carbon capture and storage (BECCS) – as is envisaged under all leading scenarios for a climate-neutral Germany in 2045 – increases the total CO₂ output to **35 Mt of CO₂ per year in 2045**. An analysis on the need for carbon management in a climate-neutral Germany in 2045 is available [here](#).

30 of the 50 identified point sources of CO₂ in North Rhine-Westphalia could be connected for carbon capture and storage which would mitigate **97% of emissions from the industrial sector**.

North Rhine-Westphalia



Quantities of CO₂ stored in a climate-neutral Germany in 2045:

Study	DAC and BECCS 2045	CCS from Point Sources 2045
Ariadne	41-74 Mt. CO ₂	9-11 Mt. CO ₂
Agora	57 Mt. CO ₂	16 Mt. CO ₂
Dena	29 Mt. CO ₂	24 Mt. CO ₂
BDI	59 Mt. CO ₂	11-20 Mt. CO ₂

Climate and Economic Profile of North Rhine-Westphalia



North Rhine-Westphalia's economy is the [largest among Germany's 16 Federal States](#), home to **18 of the 50 largest companies** in Germany.



[Almost a third of the workforce](#) are directly employed in the industrial sector in industries such as: Steelmaking, Cement, Chemicals, Glass and Lime.



53 of the 800 largest industrial production facilities in Europe are located in North Rhine-Westphalia.



North Rhine-Westphalia is by far the [most CO₂-intensive Federal State in Germany](#), producing approximately **one-quarter of Germany's entire CO₂ emissions** per year.

Carbon Management Clusters in North Rhine-Westphalia

Two key areas were identified as carbon management clusters in North Rhine-Westphalia: The Rhine Cluster and Westphalia Cluster.

The Rhine Cluster

- The Rhine Cluster is made up predominately of chemical refineries, as well as the presence of steel and lime industries.

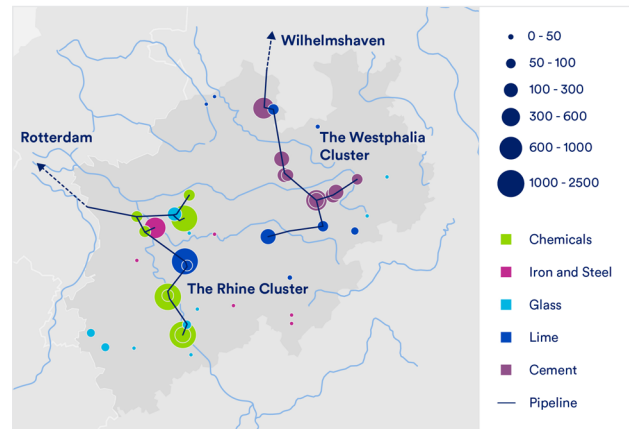
The Westphalia Cluster

- The Westphalia Cluster comprises of cement and lime industrial facilities.
- The development of a CO₂ pipeline network for the Westphalia Cluster is highly-recommended.

A critical component of the Carbon Management Strategy of North Rhine-Westphalia is the availability of CO₂ storage sites. The study examined storage options in the Netherlands ([Porthos](#)) and Norway ([Northern Lights](#)).

The **availability of CO₂ storage sites** in Germany or its surrounding areas would enable industries in North Rhine-Westphalia to reduce CO₂ emissions more easily.

CO₂ Quantities in kt/yr



Source: SCI4climate.NRW 2021: CO₂-Entstehung der Industrie in einem klimaneutralen NRW, Impuls für eine Infrastrukturgestaltung, Wuppertal

“No carbon capture and storage without CO₂ infrastructure. No climate-neutral industry without carbon capture and storage.”

Ministry for Economic Affairs, Digitisation, Innovation and Energy of North Rhine-Westphalia

The Carbon Management Strategy of North Rhine-Westphalia

To address the need to develop a carbon management industry, the Government of North Rhine-Westphalia has developed a [Carbon Management Strategy](#). Four key stages are involved in the Strategy which include:

- 1 Reduction of Carbon Intensity in Industry**
Development of carbon-free technologies, a hydrogen economy and renewable energy generation
- 2 Sustainable Carbon Usage**
Emphasise and monitor the sustainable use of biogenic sources while creating value pathways through the Emissions Trading system, Carbon Border Adjustment Mechanism and Carbon Contracts for Difference
- 3 CO₂ Management**
Planning development of CO₂ transportation infrastructure for national and international cooperation, while providing a more harmonious legal framework for CO₂ storage
- 4 Social Discourse**
Provide public awareness and education on carbon management while promoting low-carbon products with a Sustainable Carbon Label