

LUXEMBOURG CCUS & CDR ECOSYSTEM

SCOPE AND METHODOLOGY

This CCUS (Carbon Capture, Utilisation and Storage) & CDR (Carbon Direct Removal) ecosystem mapping, developed by Luxinnovation, is built upon a consolidated database encompassing public and private entities (organisations, companies, etc.) in Luxembourg. It aims to provide an initial comprehensive overview of the key actors shaping and positioning themselves along the CCUS & CDR value chain.

SCOPE OF THE CCUS & CDR ECOSYSTEM MAPPING

WHAT IS COVERED BY THE CCUS & CDR MAPPING?

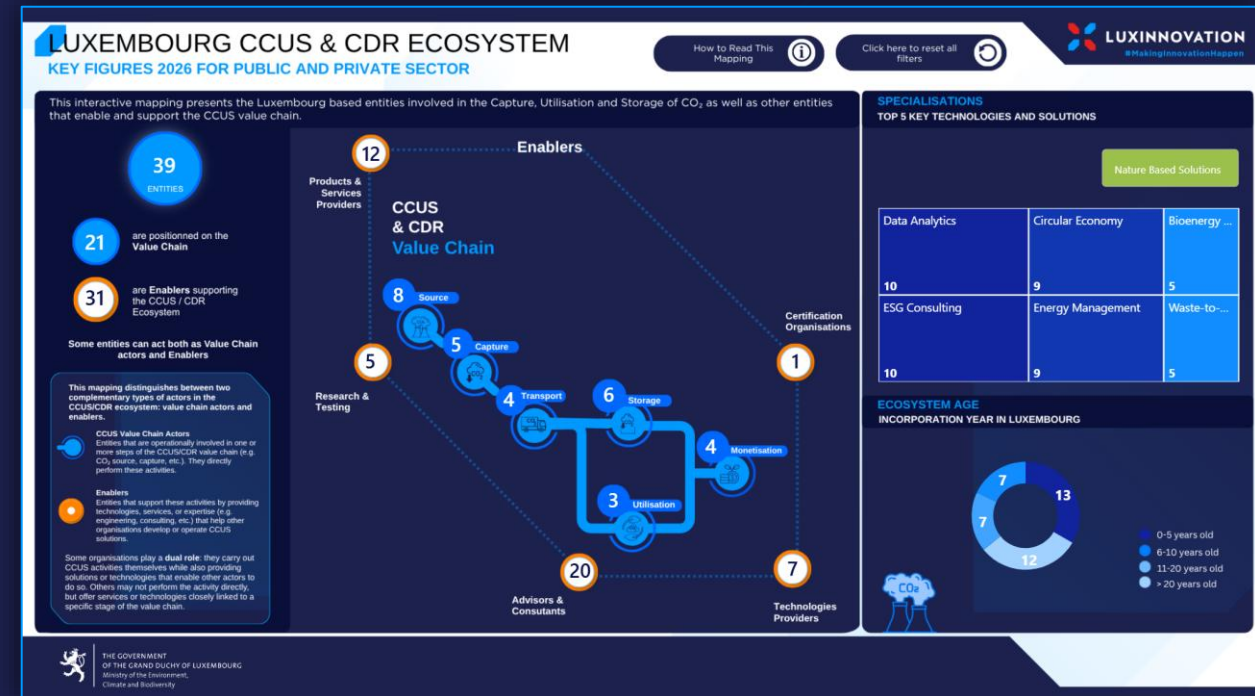
The scope of the mapping was defined to include all entities contributing directly to CCUS activities or providing enabling technologies, materials, or services that sustain the ecosystem.

The CCUS Value Chain :

The scope covers Luxembourg-based public and private entities contributing to one or several stages of the **CCUS value chain**, which is structured around six core steps :

- **Source** – Industrial sites producing concentrated and technically capturable CO₂ emissions, including cement, waste incineration, and bioenergy facilities
- **Capture** – Entities offering capture technologies (post-combustion, oxy-fuel, DAC, membranes, cryogenic), engineering firms designing capture systems
- **Transport** – CO₂ logistics actors including pipeline operators, cryogenic truck transporters, rail and shipping logistics firms, hazardous-material transport specialists, and logistics hubs enabling CO₂ flows.
- **Storage** – As Luxembourg has no geological storage potential, storage activities refer to permanent or semi-permanent storage solutions in materials (wood, biochar, concrete, mineralisation).
- **Utilisation** – Technological pathways converting CO₂ into products (e-fuels, polymers, chemicals), agrifood applications, or bio-based products.
- **Monetisation** – Actors enabling carbon pricing and financial mechanisms relevant to CCUS such as carbon credit platforms.

Entities may appear in more than one step of the value chain.



SCOPE OF THE CCUS & CDR ECOSYSTEM MAPPING

The CCUS Enablers :

Enablers constitute a central component of the CCUS ecosystem mapping. In contrast to industrial emitters or technology operators, enablers provide the capabilities, infrastructure, expertise, and institutional support that make CCUS deployment possible.

They supply technologies, digital tools, consulting services, engineering support, certification frameworks, research facilities, or regulatory environments that enable other actors to operate along the value chain.

- **Technology Providers** – Enablers supplying core technological components that make CCUS possible, including capture technologies, CO₂ handling equipment, advanced materials, sensors, membranes, and digital tools (data analytics, SaaS, MRV, cloud platforms). They enable the technical functioning of CCUS systems across the value chain.
- **Products & Service Providers** – Companies providing non-technological products, equipment or operational services that support CCUS implementation. This includes manufacturers of physical goods, distributors, service operators, logistics providers, and infrastructure operators (e.g., multimodal transport hubs).
- **Advisors & Consultants** – Actors offering strategic, regulatory, ESG or engineering guidance that helps organisations plan, design and implement low-carbon or CCUS-related activities. They support decision-making through assessments, studies, engineering design, compliance and sustainability expertise.
- **Certification Organisations** – Entities providing verification, validation, and certification services, including MRV for carbon projects, sustainability standard, and environmental performance.
- **Research & Testing** – Universities, research institutes and laboratories conducting fundamental and applied research, testing, prototyping, and pilot projects related to CCUS technologies, carbon cycles, environmental monitoring, materials, and biotechnologies.

Enablers may operate either as cross-value-chain contributors or be directly linked to one or more specific steps of the CCUS value chain.

When an enabler is associated with a particular step, it means that the organisation provides a concrete operational contribution; for example, monitoring capture performance or delivering certification services within carbon monetisation.

When no direct step is assigned, the entity acts as a transversal enabler, offering general support (e.g. consulting, digital tools) that benefits the CCUS ecosystem as a whole.

METHODOLOGY TO MAP THE CCUS & CDR ECOSYSTEM MAPPING

The Luxembourg CCUS & CDR mapping was built using a stepwise and data-driven methodology, ensuring consistency, and potential scalability over time.

Step 1: Scope definition

The scope of the mapping was defined with sector experts of the Ministry of Environment, aligning with Luxembourg's climate neutrality objectives and national CCUS action plans. It includes all Luxembourg-based companies and organisations that demonstrate a direct or indirect contribution to the ecosystem.

Step 2: Data source and value chain positioning approach

In order to identify potentially relevant entities to be mapped as part of the current CCUS & CDR ecosystem in Luxembourg, the following sources were used (aggregated):

- **Luxinnovation & Ministry of Environments knowledge about Luxembourg companies**
- **Associations and federations**
- **Corporate databases**
- **Company websites**

Each type of source was questioned to obtain results related to the scope of the mapping (i.e. entities that have a link with CCUS technologies). This enabled us to build a raw database of entities potentially relevant to the mapping.

Step 3: Design of a decision support tool

This final step was aimed at exploiting the database that had been set up to showcase the CCUS Ecosystem in Luxembourg. The following tools are provided:

- An **interactive dashboard** displaying the positioning of entities on the value chain and around it as enablers in Luxembourg in a synthetic and dynamic way.
- A **"Facts & Figures" report** providing an analysis of the data in order to better understand the ecosystem.

Your feedback

For any request regarding this mapping, please feel free to contact us at:

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