November 14th, 2023
Brussels, Belgium

Funded by the European Union

PUBLIC PERCEPTION AND BUSINESS MODELS JOINT EVENT

Organised by the Carbon Capture, Utilisation and Storage (CCUS) & Alternative Fuels Horizon 2020/ Horizon Europe CLUSTER projects

Supported by CINEA - European Climate, Infrastructure and Environment Executive Agency

Joint event for CCUS & Alternative fuels CINEA cluster projects organised by:
Martina Fantini fantini@eucore.eu (CLEANKER, CALBY2030 & HERCCULES);
Jose M. Serra jsalfaro@itq.upv.es (eCOCO2); Laura Almar lauallia@itq.upv.es (eCOCO2);
Ana M. García C amgarcia@itq.upv.es (eCOCO2)

November 14th, 2023
Brussels, Belgium

Advanced Carbon Capture for Steel Industries Integrated in CCUS Clusters

Long-term CCUS Business Models

Hannah Galbraith-Olive

Funded by the European Union

www.c4u-project.eu

The contents of this presentation are the sole responsibility of ERM and do not necessarily reflect the opinion of the European Union.

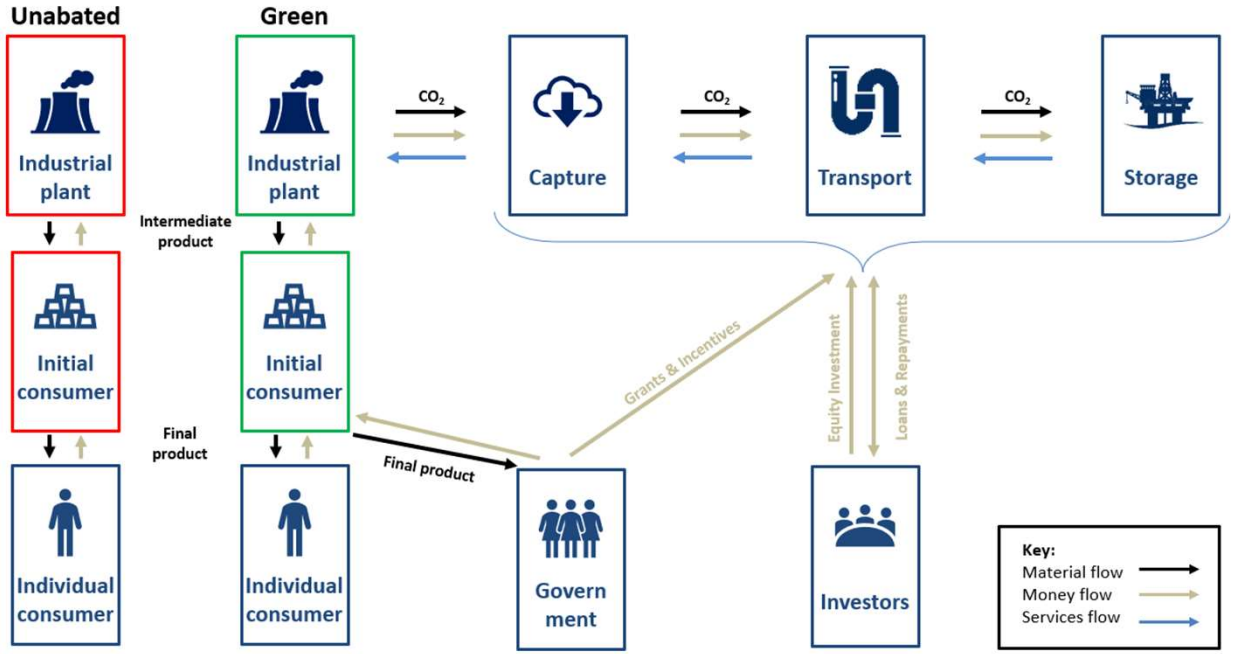
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 884418.

Baseline

Development of a viable business model is vital to driving CCUS adoption in Europe

- Currently, there are **not sufficient drivers for widespread CCUS adoption** in industrial plants across Europe and beyond.
- The context of our study is **shortlisting and developing business models that could drive long-term integration of CCUS** in industrial clusters, using the North Sea Port and the Iron & Steel sector as examples.
- The aim is to **develop a viable business model** for an industrial plant:
  - One that allows a business to charge a certain price for the value it is creating, such that the business brings in enough money to continue operating.
- Key considerations of our study are:
  - What are the **drivers/barriers to CCUS** adoption for an industrial plant?
  - How can CCUS be seen as a **worthwhile investment** in the future?
  - How can progress be made towards a **long-term market for CCUS**?

Key Actors in the CCUS Value Chain (illustrative, non-exhaustive interactions)

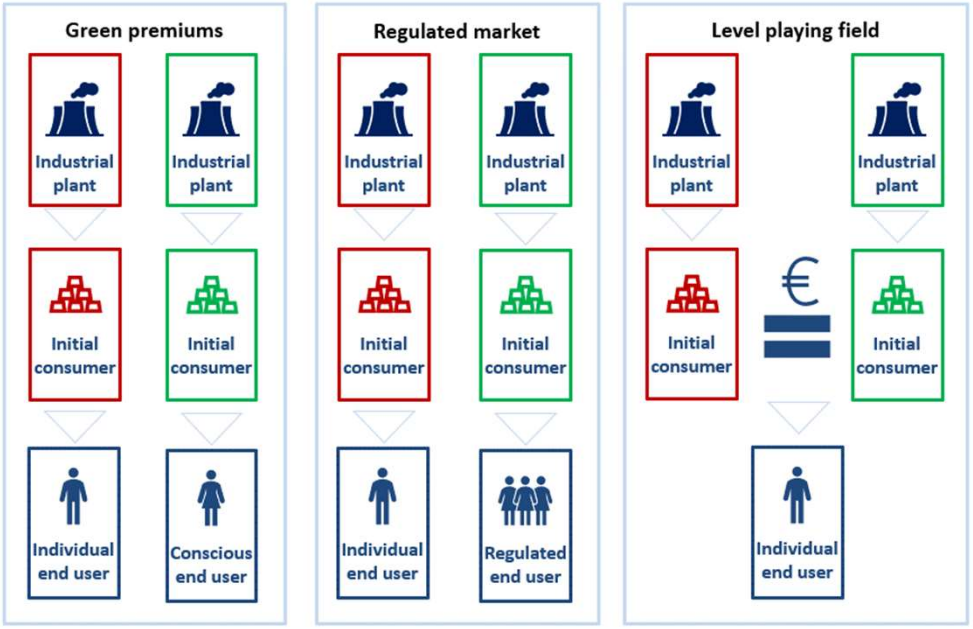


Methodology

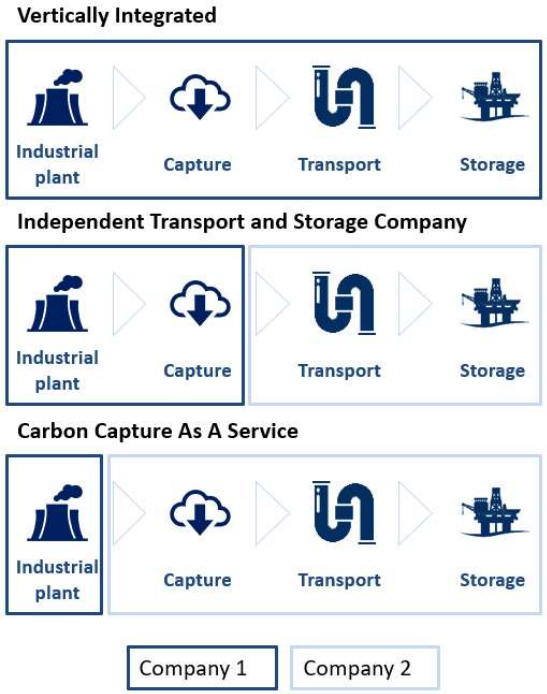
Revenue model, ownership structures and capital financing were considered separately

- Three parts of the CCUS value chain were considered in this study – revenue model, ownership structures and capital financing.
- For each of these components, testing against levers and complexities impacting CCUS adoption was carried out.

1. Revenue models



2. Ownership structures



3. Capital financing

Results

Different barriers to CCUS adoption will impact the viability of each business model

High risk/impact | **Medium risk/impact** | **Low risk/impact**

Revenue models	Variable/uncertain policy support	Willingness of the final consumer to pay	Public perception of CCUS	Impact to product quality	Energy price fluctuations
Green premium					
Regulated market					
Level-playing field					

Ownership structures	Coordination between infrastructure owners	Transport mo	Storage monopoly	Risk from stakeholder withdrawal
Vertically integrated				
Joint Venture				
Carbon capture as a service				

Capital financing	Availability of debt	Success of first-of-a-kind projects	Variable interest ra	Uncertainty in capital sts
Public equity				
Private equity				
Debt/loans				

Stakeholder Impact

Policymakers / investors can support CCUS development through a viable business model

- **Given the current incentives available, CCUS does not add sufficient value** to an industrial plant
  - It is unclear to industrials, policy makers and the markets on how best to drive CCUS adoption.

- The final output of the study will be a **short-list of three CCUS business models** including:
  - The pros and cons of each
  - Suitability for different industrial sectors

- The development of viable business models will show how value can be created from CCUS, to **allow industrial plants to make an investable business decision** on its adoption

- The study will help to **clarify the roles of policymakers, investors, industrial plants and consumers in overcoming barriers to CCUS adoption** and how each can contribute to creating a viable CCUS business model in both the near-term and long-term

November 14th, 2023
Brussels, Belgium

Funded by the European Union

Thank You

For Your Attention

GET IN TOUCH

ERM, 33 St Mary Axe, London, EC3A 8AA

+44 20 3206 5403

https://www.erm.com/

hannah.galbraith-olive@erm.com

Project

ERM's expertise in industrial decarbonisation strategy is applied to the C4U Project

ERM

- ERM is the **largest global pure play sustainability consultancy** with a diverse team of 8,000+ world-class experts combine strategic transformation and technical delivery to help clients operationalize sustainability at pace and scale.
- We partner with the world's leading organizations, creating **innovative solutions to sustainability challenges** and **unlocking commercial opportunities** that meet the needs of today while preserving opportunity for future generations.
- ERM acquired Element Energy and E4tech in 2021, which are part of the **Sustainable Energy Solutions team** consisting of over 150 specialists bringing **deep expertise in the development, commercialisation, and implementation of emerging low-carbon technologies** across a wide range of sectors, including industrial decarbonisation.

C4U

- The C4U project aims to demonstrate two highly efficient solid based CO_2 capture technologies as well as considering the safety, environmental, societal, policy and **business aspects for successful adoption of CCUS** in the North Sea Port industrial cluster.
- ERM's role in the project is to **develop long-term business models** to support the adoption of CCUS through market, stakeholder and scenario analysis.
- Knowledge gained by ERM from **working closely with a range of industrial sites** on their decarbonisation strategies, in the UK, Europe and beyond, has contributed a **wide variety of stakeholder insights** into the development of a viable business model for CCUS adoption.