

Chemicals from captured industrial CO₂ to demonstrate a novel CCU value chain



Project Pitch K1-MET

ElevateCEE Working Conference 2026

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Coordinated by

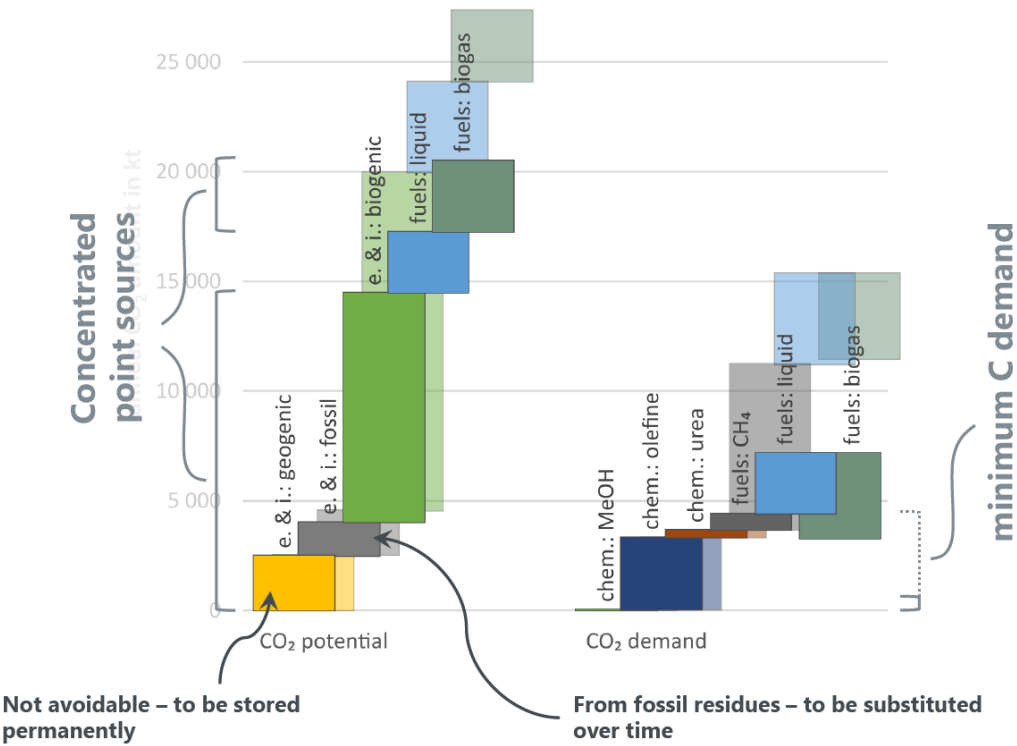


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Motivation: Closing the carbon cycle with carbon capture and utilisation (CCU)

Austria Scenario 2050

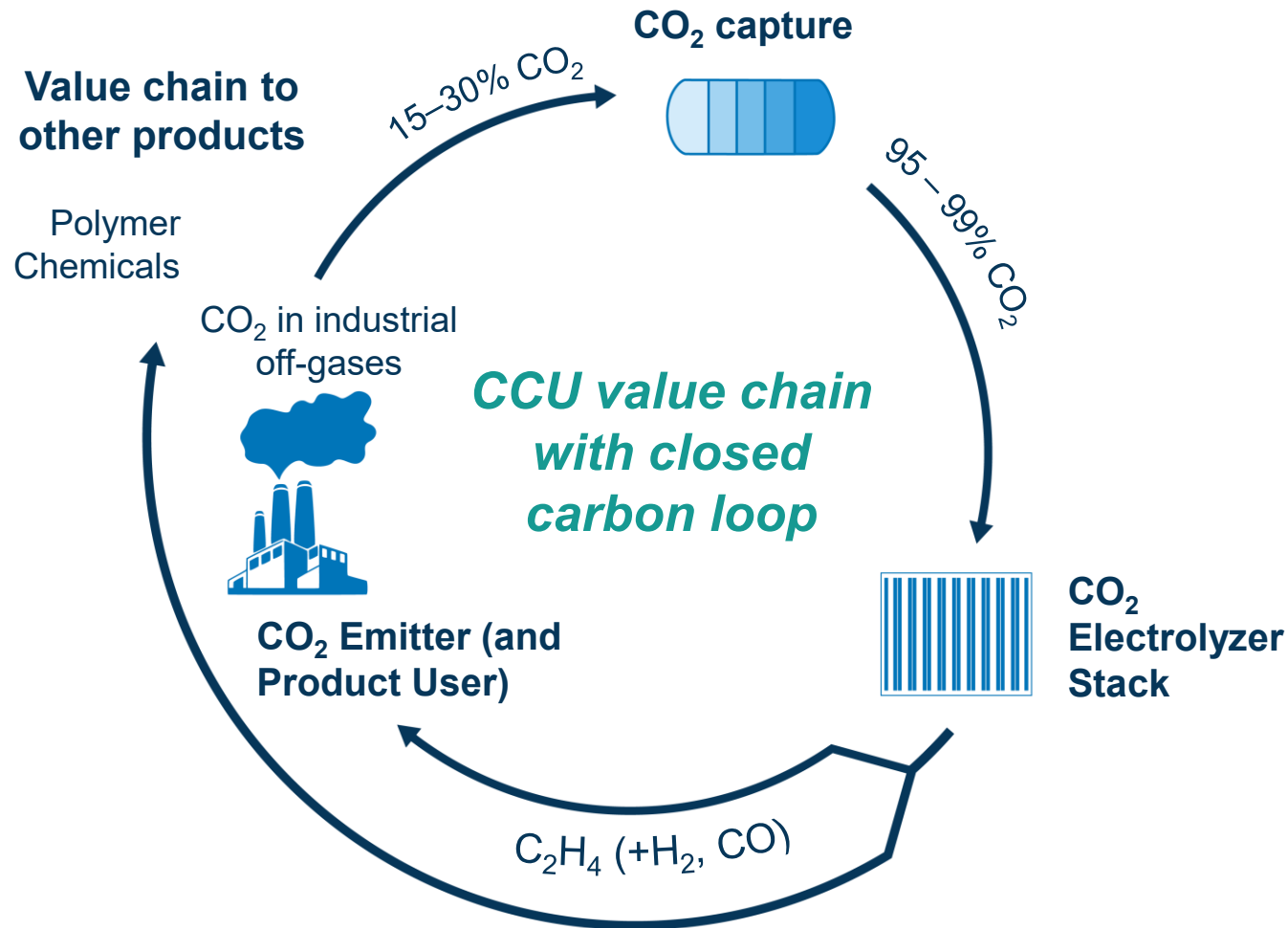


https://project-cactus.at/wp-content/uploads/2025/03/Policy-Brief_CaTUS_Potenziale_2025.pdf

De-fossilization of energy intensive industries in Austria Scenario 2050

Total CO ₂ emissions	~17.3 – 27.3 Mt/a
CO ₂ point sources capturable	~14.5 – 23.2 Mt/a
Unavoidable CO ₂ emissions from raw materials (e.g., limestone, iron ore)	~4.0 – 4.6 Mt/a
Industrial demand for CO ₂	~3.3 – 15.4 Mt/a

→ Demand for **sector coupling**



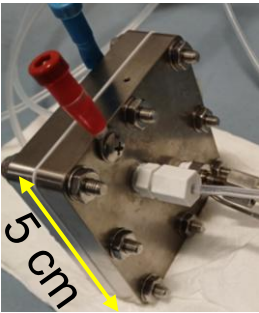
Project Goal:

*Demonstrate climate-neutral CO₂ capture and utilization (CCU) value chain from **industrial flue gas** to **Ethylene (C₂H₄)** and its usage in the chemical industry*

State-of-the-art and how the project goes beyond

CO₂ electrolysis to C₂H₄

Most studies:
1-5cm² electrodes



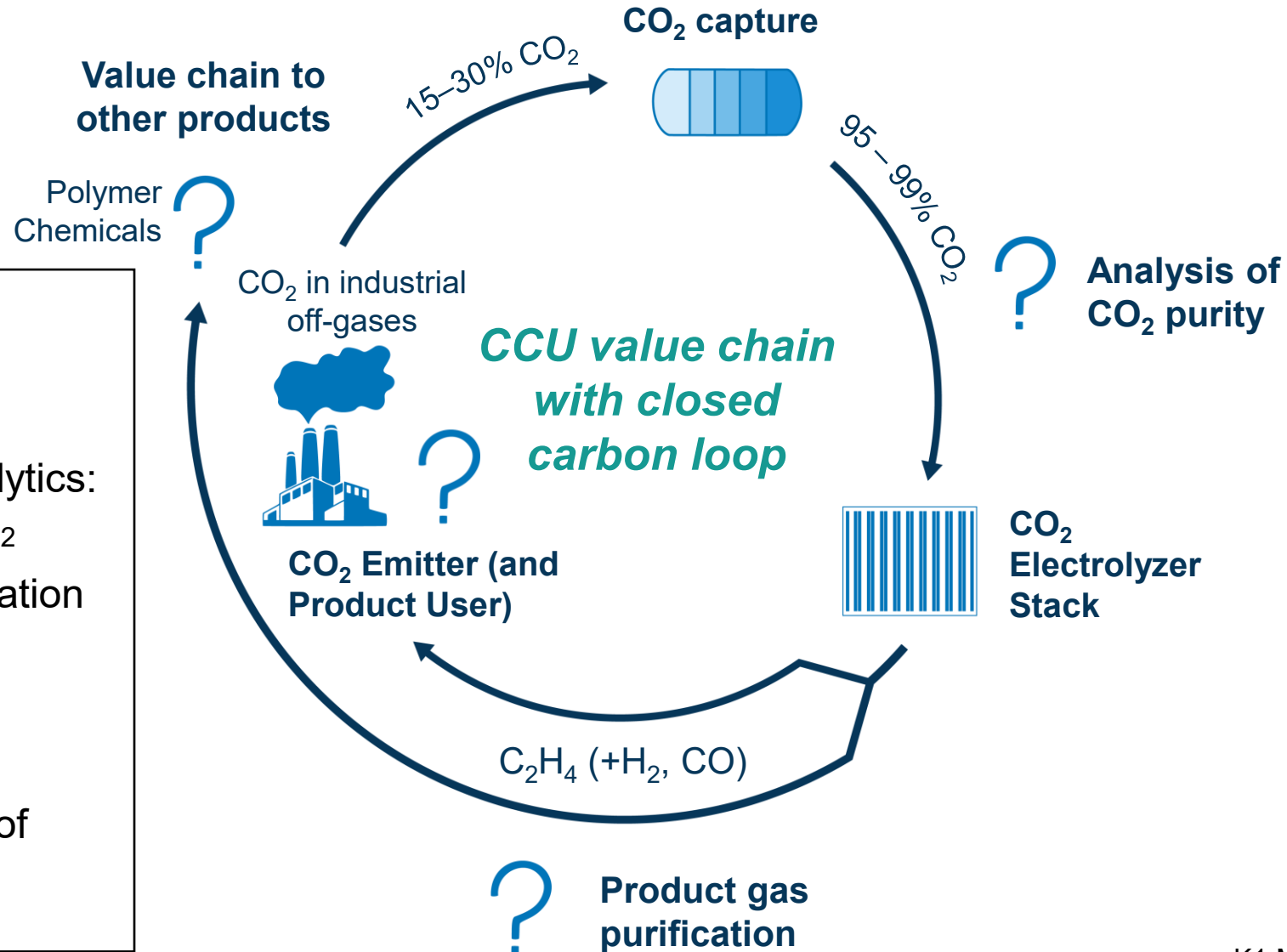
Cell stack
demonstrator
(100cm² cell area)

Key performance indicators (KPIs)	State-of-the-art	Our Project
Energy efficiency	15 – 30%	30 – 50 %
Lifetime	2 – 100h	> 1000h
CO ₂ source	Highly pure (5.0 or 4.5)	CO ₂ captured from real industrial flue gas via amine scrubbing
C ₂ H ₄ product purification/utilization	Theoretical considerations	Practical demonstration
Technology Readiness (TRL)	4	5 – 6

1. Study the interplay of different electrolysis cell components and operating conditions on the durability of CO₂ reduction reaction to C₂H₄ to **increase system lifetime at high energy efficiency** (*WP1: CO₂ electrolysis to C₂H₄ using high-purity CO₂ feeds*)
2. Determine the impact of various industrial flue gas compositions on the CO₂ electrolysis to run a **demonstrator with industrial flue gas >1000h** (*WP2: CO₂ electrolysis to C₂H₄ with CO₂ captured from industrial flue gas*)
3. Demonstrate a CCU value chain **from flue gas via ethylene to valuable chemical products** (*WP3: Chemical synthesis from ethylene as CO₂ electrolysis product*)

Chemical products from captured industrial CO₂

What we need



? Partners needed

- Advanced gas analytics: purity captured CO₂
- Product gas purification
- CO₂ emitters from energy intensive industries
- Support utilization of C₂H₄ as chemical building block

Project timeline:
2027 – 2031

Funding:
FFG COMET

*in-kind or cash
contribution from
industrial partners*

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