ELECTROCHEMICAL CONVERSION OF CO_2 TO RENEWABLE FUELS

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Aim → Electrochemical conversion of CO_2 to added-value chemical commodities

Why CO_2?

- **Main cause of greenhouse effect responsible for climate change**
- **Main target of mitigation actions fighting it**

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Current efforts far from resolving an issue that could lead to a 'Hothouse Earth'

W. Steffen et al., PNAS 115 (2018) 8252-8259

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Atmospheric CO_2 levels must be addressed by complementing current mitigation efforts with **CCUS technologies** (Carbon Capture, Utilisation and Storage)

J. Rockström et al., Science 355 (2017) 1269-1271

Opportunity ➡ H2020 funding to bring CCU technologies to TRL 5

- **Call:** LC-SC3-RES-26-2020
  Development of Next Generation Renewable Fuel Technologies from CO2 and Renewable Energy (Power and Energy to Renewable Fuels)
- **Project budget:** €3-5M, fully-reimbursable
- **Deadline:** 20 April 2020

Proposal → Electrochemical conversion of CO_2 to renewable fuels

Why Electrochemistry?

- **Conversion of CO_2 into added-value commodities (fuels, chemicals)**
- **Conversion of hard-to-store excess electricity into easy-to-store energy in chemical form**

D.T. Whipple, P.J.A. Kenis, J. Phys. Chem. Lett. 1 (2010) 3451-3458

BUT…

- **Most research focused on electrocatalysts**
  J. Qiao et al., Chem. Soc. Rev. 43 (2014) 631-675
- **<5% of research on use of flow-reactors (only practical way to overcome mass transport limitations preventing scale-up)**
  B. Endrődi et al., Prog. Energ. Combust. 62 (2017) 133-154

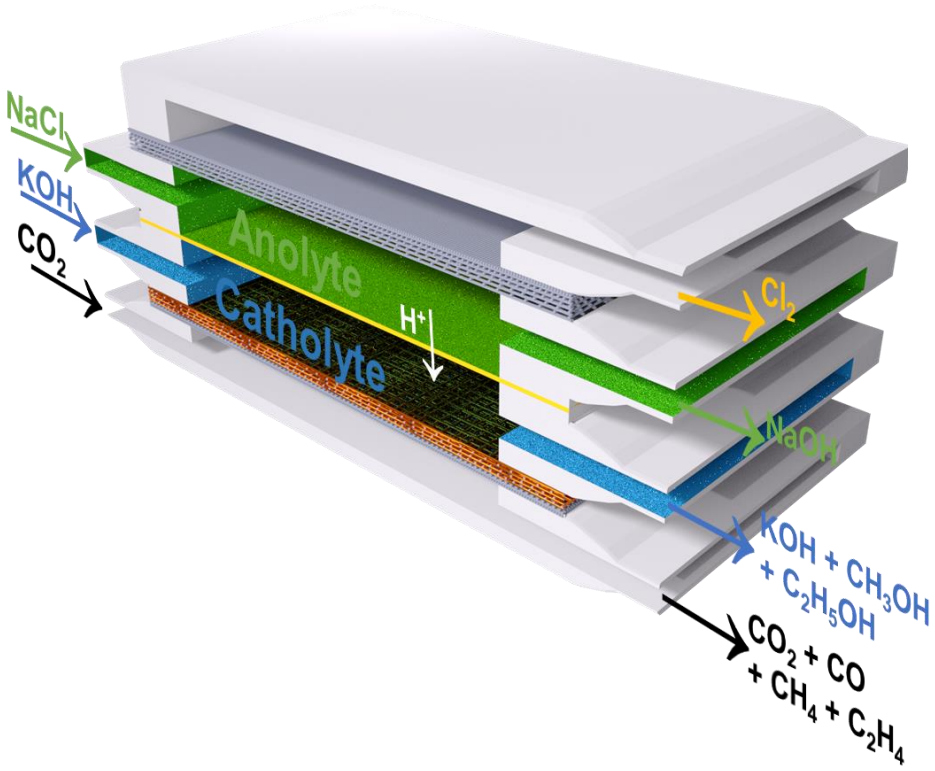
→ **Novel approaches to enhance mass transport must be developed**

UoE working on innovative electrochemical CO_2 technology

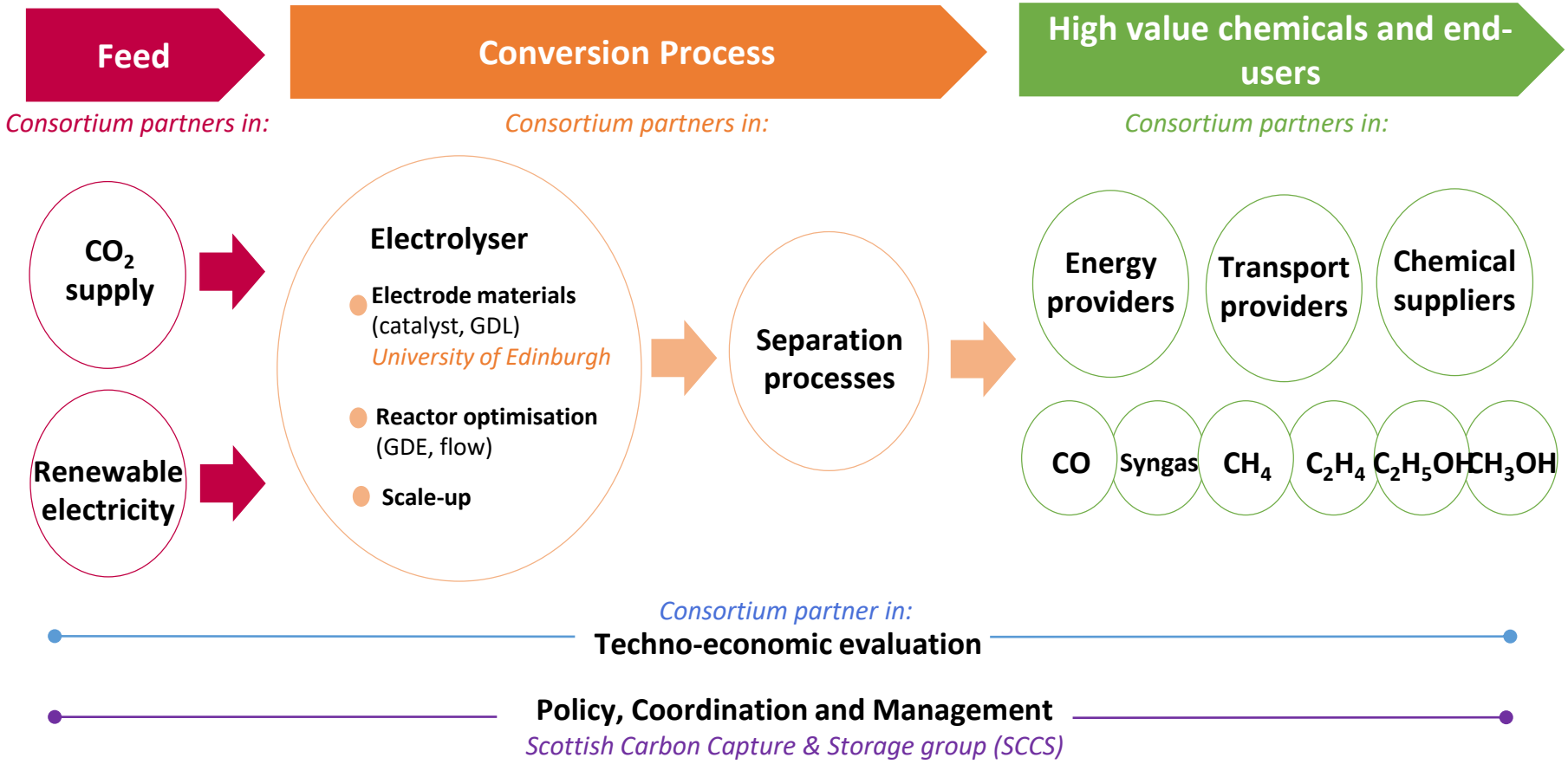
Scalable approaches to tackle mass-transport limitations

Decarbonisation of the transport, energy and chemical sector

Value and wealth generation from CO_2 emissions



H2020 PROPOSAL CONCEPT: FROM SUPPLY TO HIGH VALUE CHEMICALS



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