climeworks

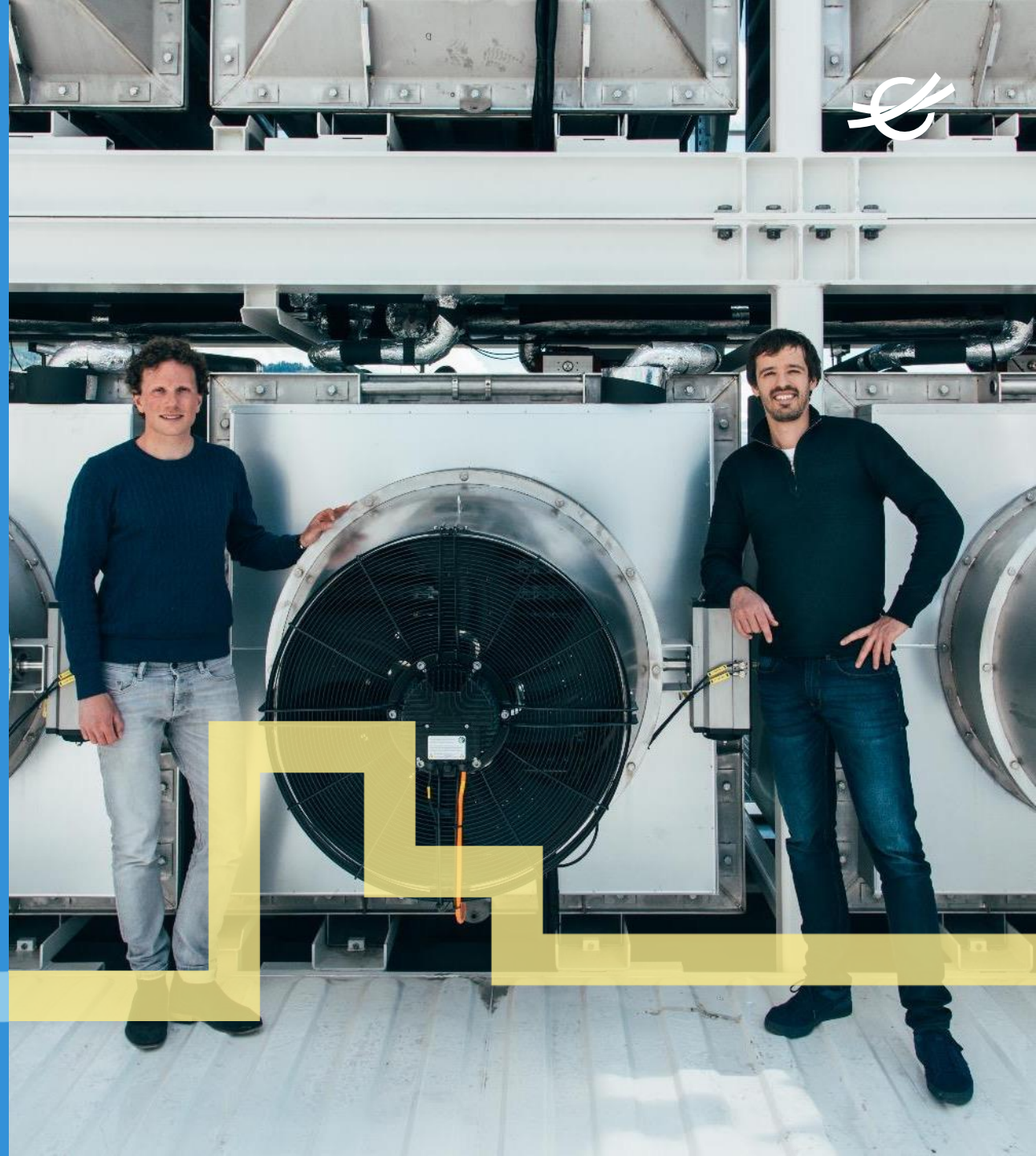
DAC - Closing the carbon cycle with e-fuels from air

Heat-to-fuel 9th of March

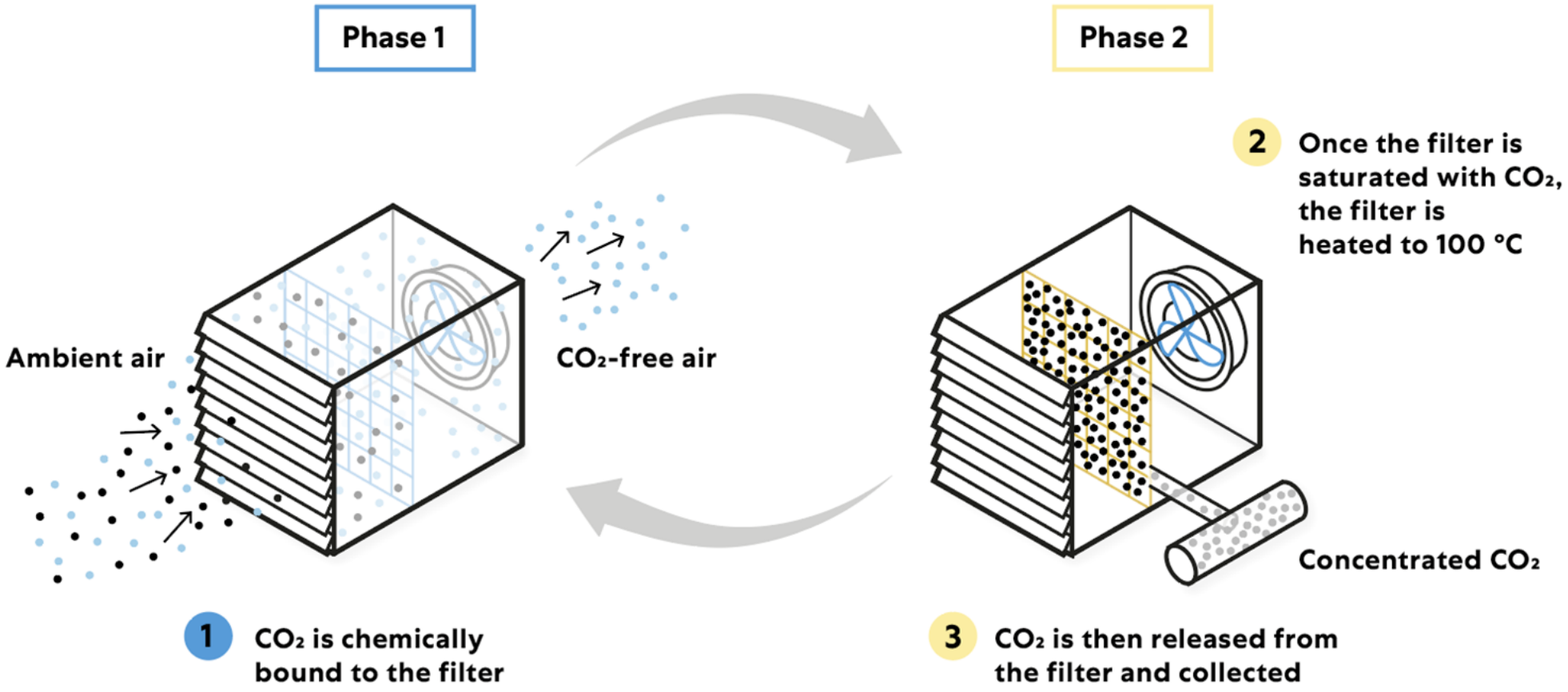
Public

Our company

- 120+ Climeworkers
- Headquarter in Zurich, Switzerland
- Subsidiary in Cologne, Germany and Hellisheiði, Iceland
- Raised more than USD 150 million equity and grants



How our technology works



The Climeworks solution

- **World's first** company supplying air-captured CO_2 to customers
- **Scale-up** via mass production of modular CO_2 collectors
- **Low-temperature heat** (renewable or waste) as main energy source
- **Minimal carbon footprint:**
  90% net efficiency (mid-term target 96%)

Climeworks plant locations

- **14 plants** currently in commissioning/operation across Europe
- **Many 10’000 hours** of operational experience
- Across a **wide range of climatic conditions** (Southern Italy vs. Iceland)

CO_2 for E-fuels : DACU vs. CCU

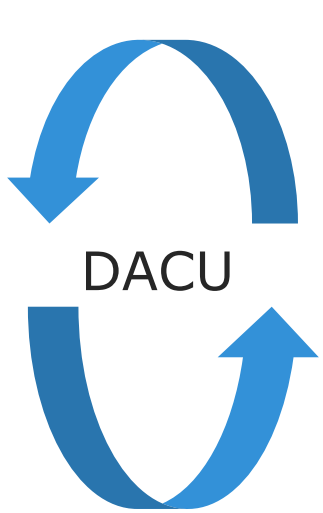
- **Direct Air Capture & Use**
  Air is an unlimited CO_2 source. Thus, the fuel potential is only restricted by the availability of renewable energy.

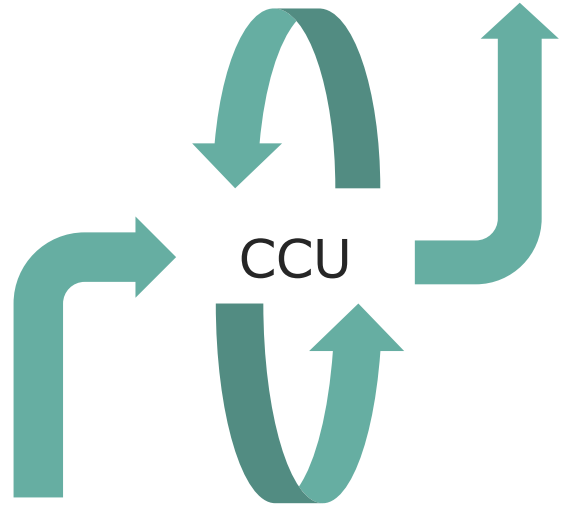
- **Carbon Capture & Use**
  Fuels from point sources have a lower emission reduction potential, since the carbon comes from fossil sources and is only recycled once.

➢ Independent of point sources, DAC e-fuels can be produced where electricity is cheap.

100%
Emission reduction potential

50%
Emission reduction potential





E-fuels from Air

E-fuels from Point sources

Renewable fuels projects

KOPERNIKUS POWER-TO-X

- Power-to-Liquids
- Supplied Climeworks Demonstrator
- 46 Partners, EUR 30 million budget

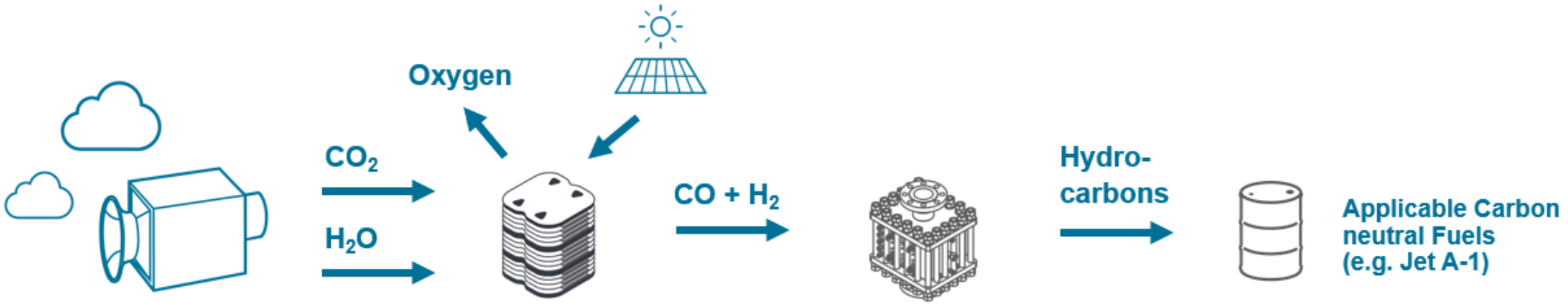
STORE&GO

- Power-to-Methane
- Supplied Climeworks Plant DAC-3
- 27 Partners, EUR 27 million budget

Powerfuel

- Power-to-Liquids
- Supplied Climeworks Plant DAC-1
- 8 Partners, EUR 4 million budget

The solution: E-Fuels from air and water



Direct Air Capture

Sustainable CO_2 captured from the air to ensure a closed carbon cycle. Fuels plant can be located where electricity costs are low.

Co-Electrolysis

Simultaneous separation of CO_2 and water into syngas. Highly efficient conversion of renewable energy. > 80% efficiency.

Micro FT Reactor

Production of hydro-carbons free of sulphur and aromatics. Can easily withstand load cycles and is therefore suitable for renewable energy input.

Refining

Refining liquid hydro-carbons into applicable carbon neutral fuels. Internal product streams are recycled to ensure a high carbon efficiency.

to the warming effect caused by the low reflectivity of forests and agricultural areas. Enhanced weathering affects water chemistry such as rising pH levels in rivers.

** Including energy provision via PV.

Norsk e-fuel

Until 2023 10 Mio. liters

- 10 million liters renewable fuel
- Start of operating of the first industrial plant in Herøya

Upscaling to 100 million liters in 2026

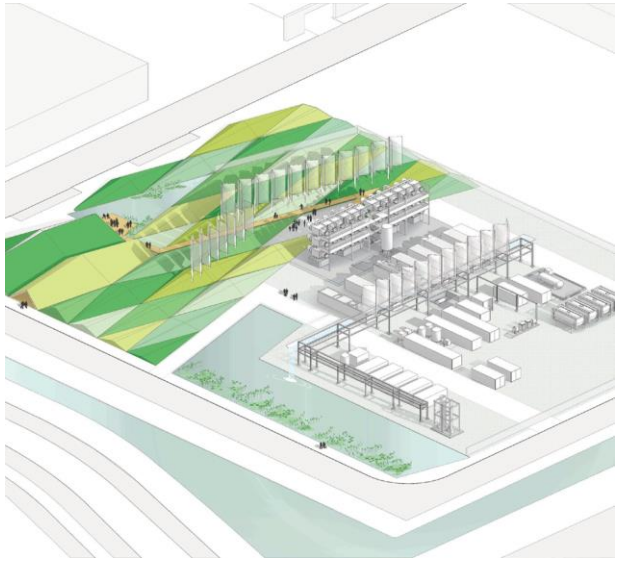
- Capturing CO2 from air
- Syngas produced from CO_2 and water using 100% renewable electricity
- Renewable fuels generated from syngas
- Refined to final product
- Utilization of renewable fuels releases CO_2 back in the atmosphere

The future: Climate neutral transportation

Valinor climeworks sunfire PAUL WURTH SMS group

Zenid

- Large scale and fully integrated demonstration plant for Jet Fuel from Air: 1,000 liters per day
- A lighthouse project for the aviation industry showing that sustainable flying is within reach
- Kick-starts the development of Jet Fuel from air to an industrial scale.



SkyNRG

zenid

CLIMEWORKS
Capturing CO_2 from air

Schiphol Group

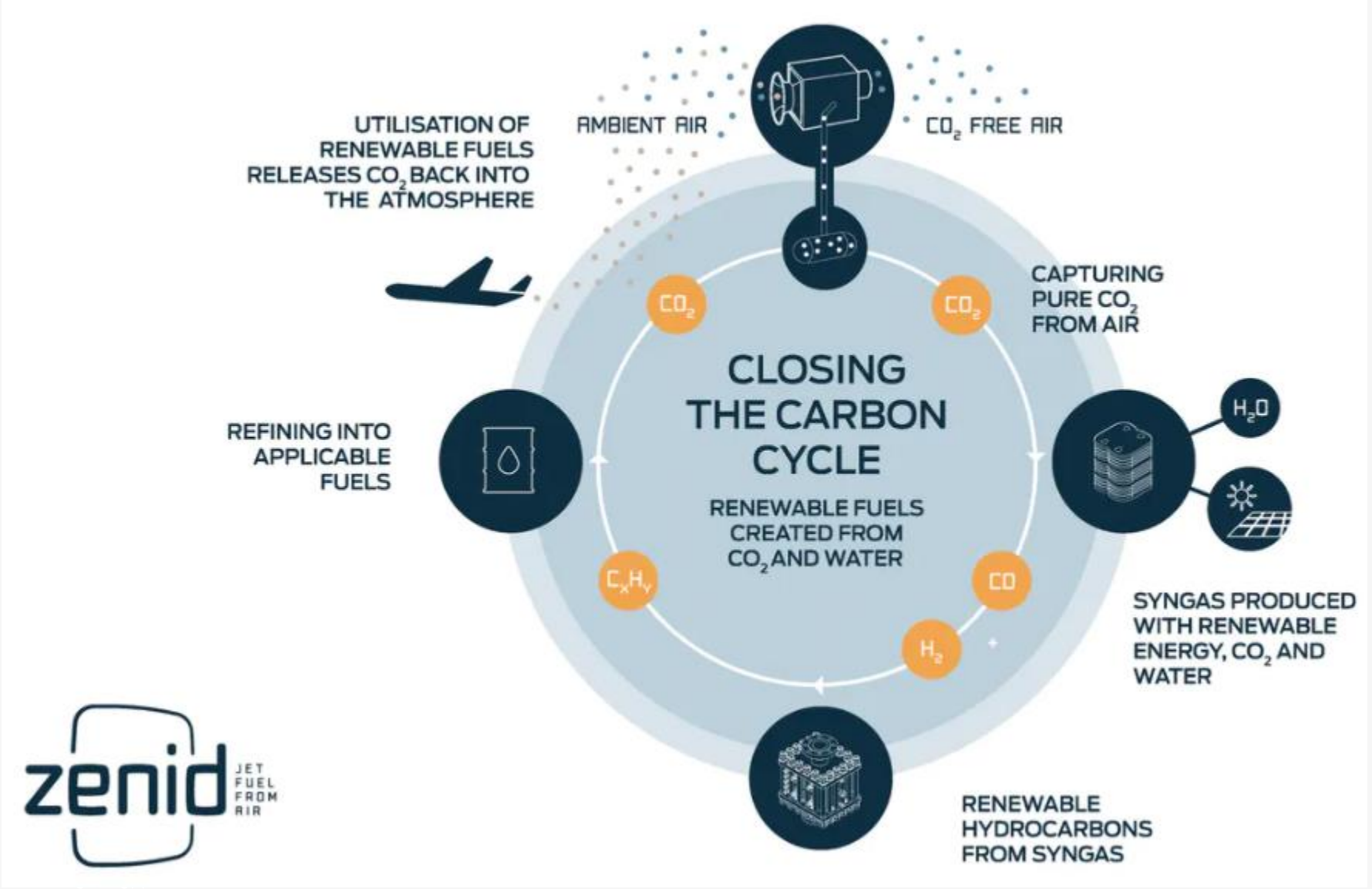
sunfire
- Technology Leader Power-to-Liquid with Solid Oxide Cell Co-Electrolysis Technology

INERATEC
- Technology Leader Power-to-Liquid with Modular Reactor Technology

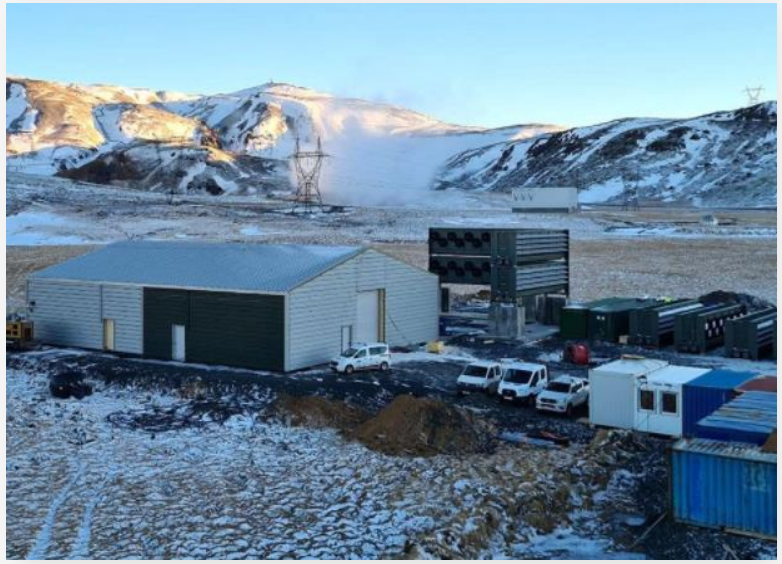
EDL
PÖRNER GRUPPE
- Specialized and Innovative Engineering Contractor and Technology Supplier for the Process Industry including Power-to-Liquid

URBAN CROSSOVERS
- Rotterdam based Initiator and Coordinator of the Project at the Airport

Closing the carbon cycle



Orca construction site, February 2021



Orca

- 4,000 tCO_2 per year
- Location: Close to Hellisheidi, Icleand
- Energy supply: Geothermal
- Carbfix CO_2 storage approach

To inspire 1 billion people to remove carbon dioxide from the air.

Climeworks AG
Birchstrasse 155
8050 Zurich

+41 (0)44 533 29 99
contact@climeworks.com

www.climeworks.com