MissionZero

CO_2 feedstock considerations in E-SAF

UKRi SAF Cafe

Mar 2024

MissionZero

CO_2 feedstock considerations in E-SAF

Solving for Abundance:
Where does DAC ~~compete~~ fit into the CO_2 supply chain?

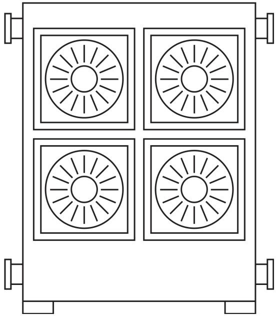
MissionZero

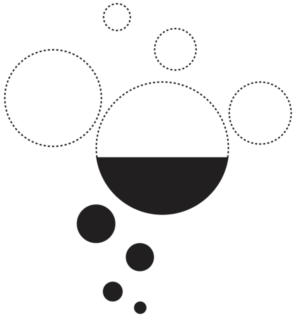
Rewriting our carbon narrative

A collective of scientists, engineers, and creative thinkers on a mission to reinvent carbon for a thriving planet.

We are meeting the climate crisis with carbon creativity — working to turn the historic carbon waste in our air into new climate value.

To deliver the carbon revolution





Synthetic Fuels

Commodity CO_2

Carbon Removals

Building Materials

Stripping carbon
from the air

and regenerating
high-purity CO_2

For permanent removal
and sustainable use

Growing ambitiously

2020
Founded

03
Fully-funded

first-of-a-kind plant1s in 2023/24

01
UK Gov.

02
Commercial

XPRIZE

1 of 15 Global Milestone

Musk Foundation
CDR Competition

UK SAF is at the core of our development

University of Sheffield | TERC
Energy Institute

CNF

Funded by UK Government

MissionZero

Our first plant

Carbon Waste to Jet Fuel

University of Sheffield

Problem

Synthetic Aviation Fuel (SAF) via Power to Liquids (PtL) won't scale unless there is a sustainable supply chain of CO_2.

Solution

Mission Zero provides CO_2 to the University of Sheffield for SAF synthesis via DAC

Benefit

UoS can support industry players such as Rolls Royce, Boeing and others in the decarbonisation of Aviation.

This is a UKCA and CE marked Product

50 tpa Plant online in Q4 2023

What makes us different?

Industry-leading LCA

hyper-efficient and sustainable solution for high net-negative impact

Customer centricity

designed to adapt to any process and use case in any location.

No novel components

using mature, globally-available technologies in a new way

Facilitates renewables build-out

easy co-location and integration with intermittent grids

MissionZero

The world's most versatile DAC

Designed to deliver flexibly anywhere at any scale.

Flexible

Seamless integration in any location

- Modular design
- Modest land footprint
- Highly mobile
- Remotely operated

Scalable

Ready for quick global deployment

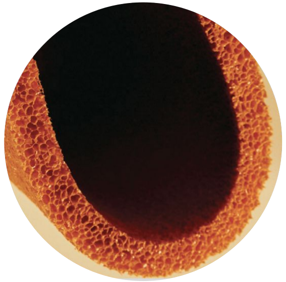
- Mature existing components
- Established supply chains
- Mass manufacturable
- Process agnostic

Efficient

Using energy and resources effectively

- Electricity only
- Heat free
- Built for intermittency
- Continuous operation


MIND THE GAP



Everything made from oil can be made from air and water

Humans have known how to make fuels, textiles, and high-value chemicals from CO_2 for ages. Yet today, these goods are still made from oil.

Alongside permanently removing CO_2 from our atmosphere, by providing it as a carbon feedstock for industry we can quit fossil fuels for good.

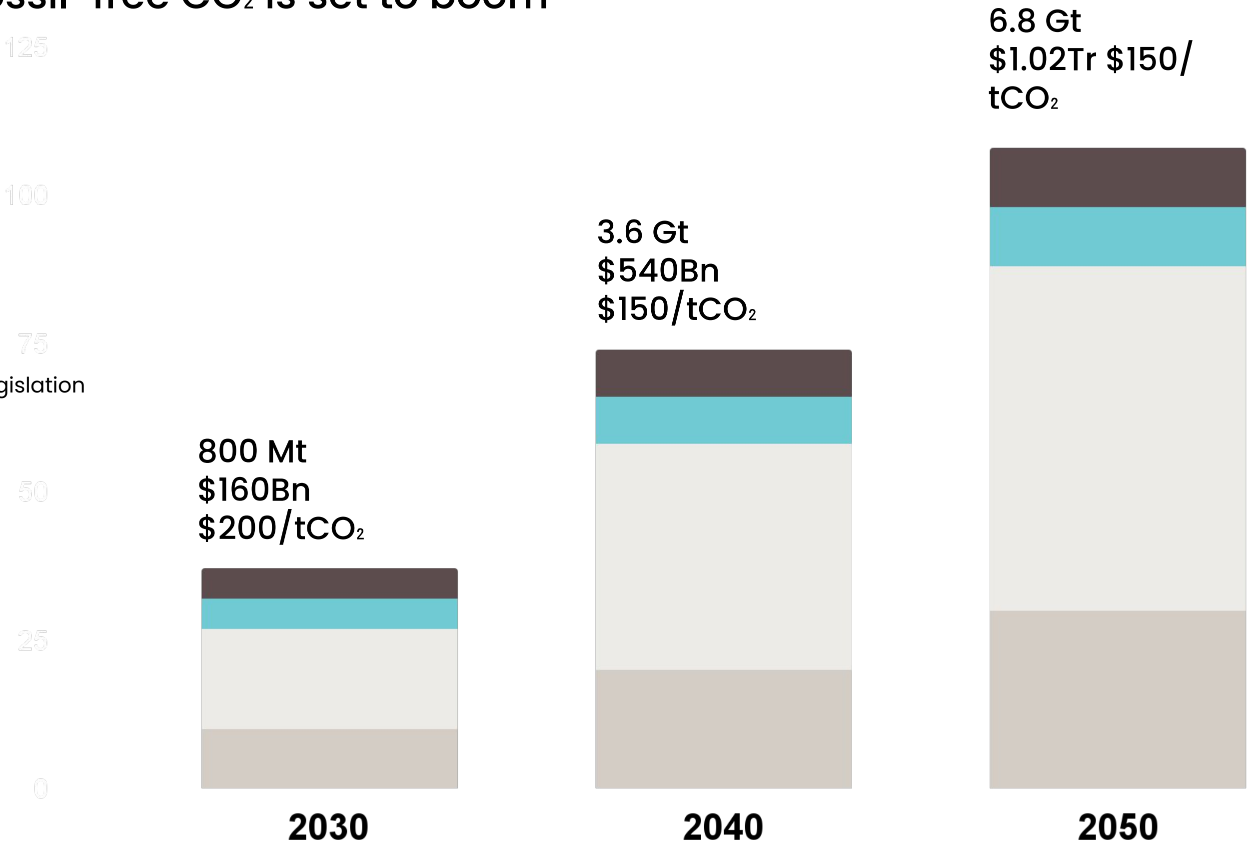
Global demand for fossil-free CO_2 is set to boom

1.2%

of all jetfuel going in or out of the EU is mandated to be e-fuels by 2030.

45Q

in the US gives $130/tCO for fuels and legislation rewards lower CI products

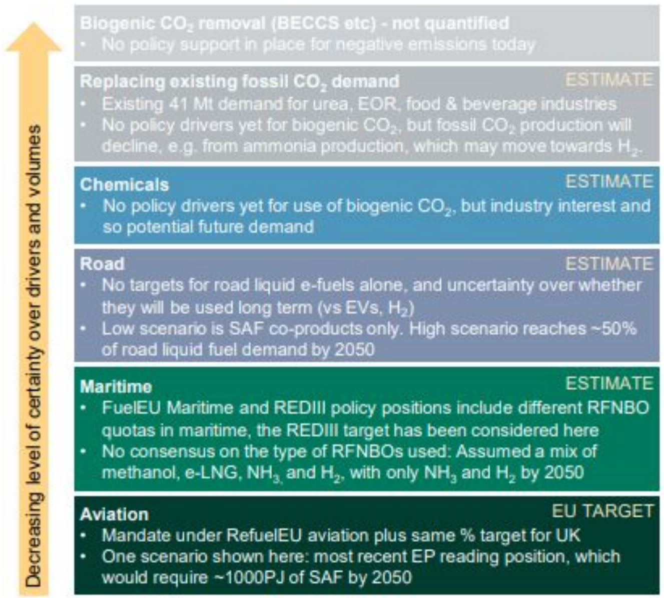


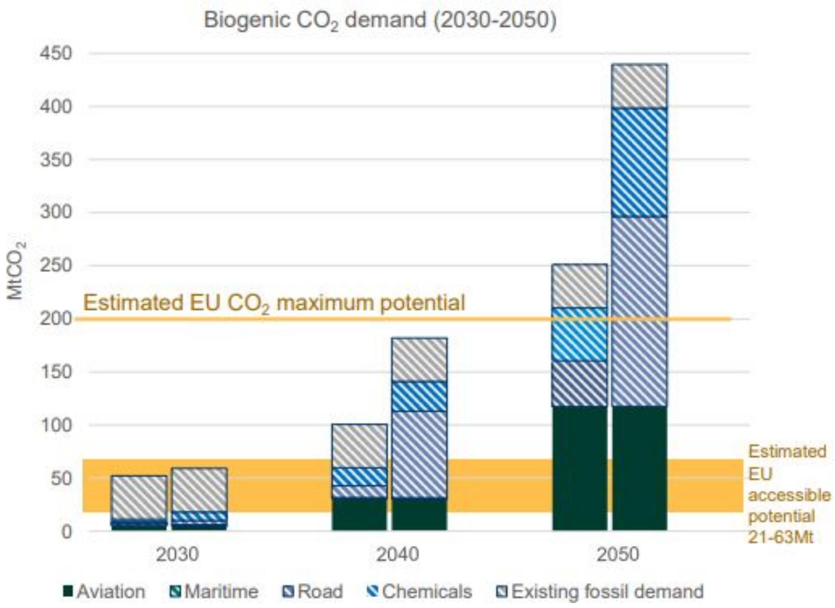
High Value Chemicals · Building Materials

Plastics · Sustainable fuels · Removal

Sources: Energy Transitions Commission (2022)

The carbon revolution is short of sustainable carbon





Source: ERM.com

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E-fuels are not getting to FID

Biogenic supply cannot provide long term feedstock security

- 45 proposed e-SAF projects
- 1.7 MT/a by 2030
- All planned to operate on biogenic sources
- Not one project has passed FID
- Biomass feedstock supply is becoming increasingly difficult to finance even for established industries

Source: Transport and Environment.org

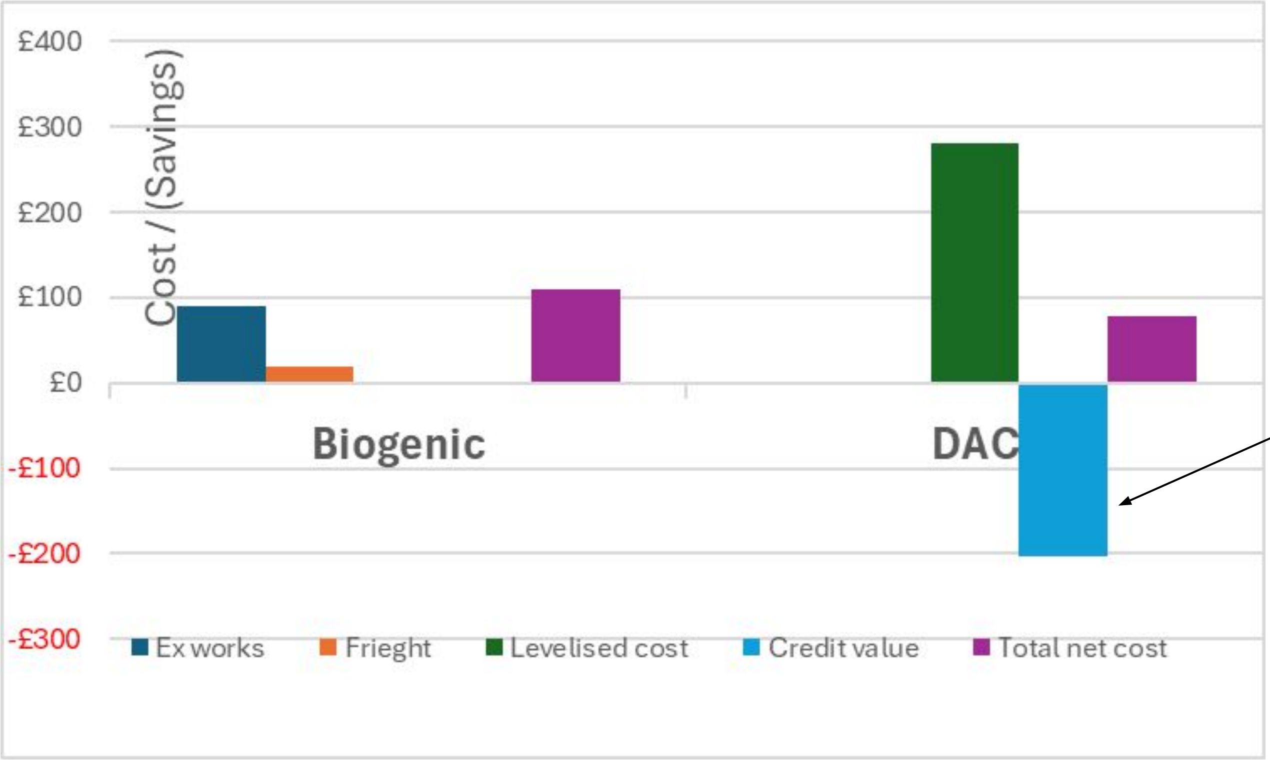
Only DAC can scale to meet those volumes

Offering the most geographically unrestricted and sustainable on-demand source of high-purity fossil-free CO_2.

	Location	Quality	Carbon Intensity
Point Source	Restricted ❌	Poor	High ❌❌
Biogenic	Restricted ❌	[Medium]	"Neutral" ❌
DAC	Unrestricted ✅	Very good ✅ ✅	Negative ✅

An example from building materials

… hidden value



Lower CI generates incremental CDR income to offset the additional costs and restore parity

DAC needs SAF to scale now

… so E-SAF can scale with DAC in the future

- Higher cost but higher value?
- Strategic Partnerships building for the future
- Understanding the full value in use of different CO_2 streams
    - CI
    - Quality
    - Locality
    - Availability & Scalability

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Thank you

missionzero.tech

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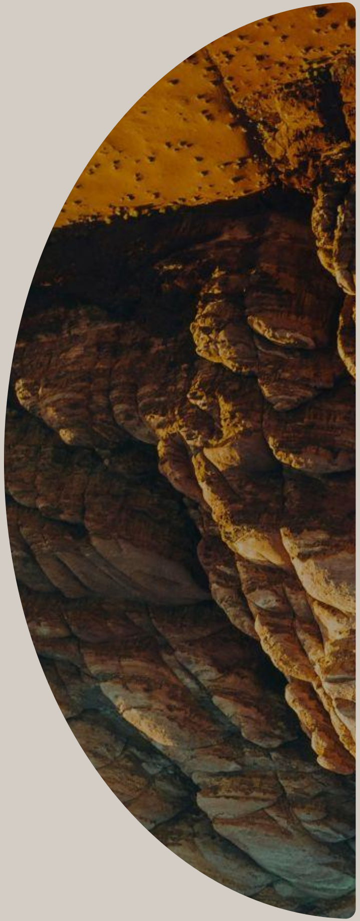
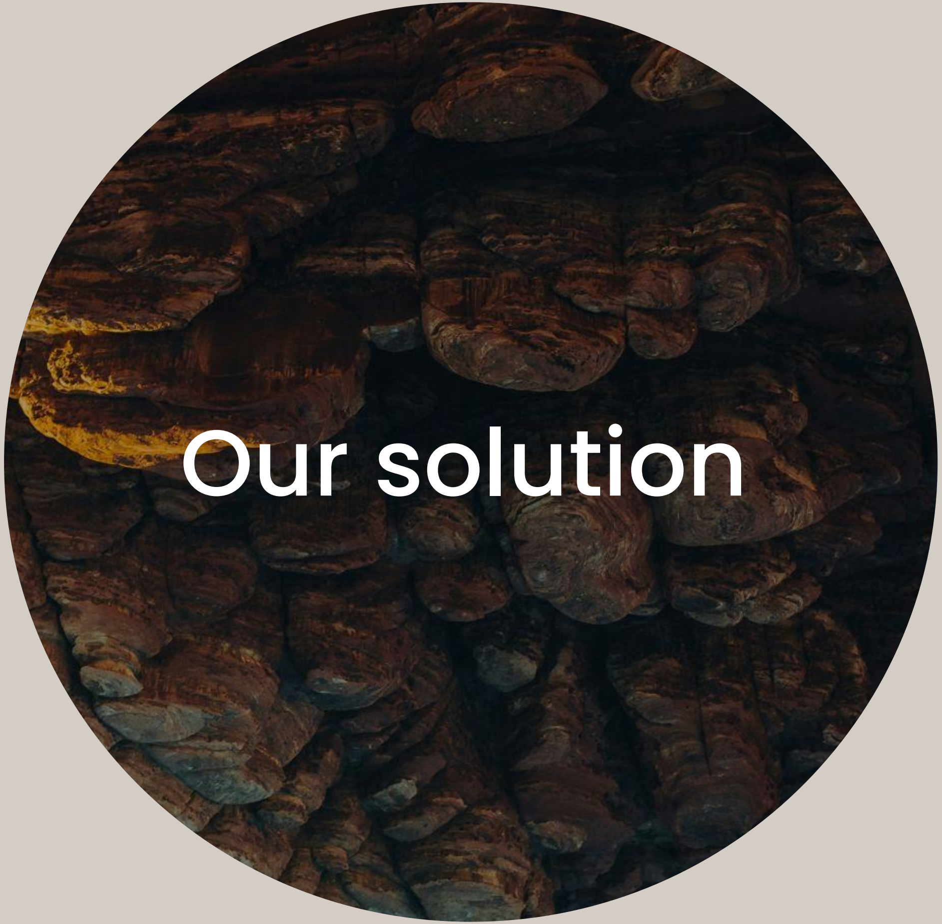
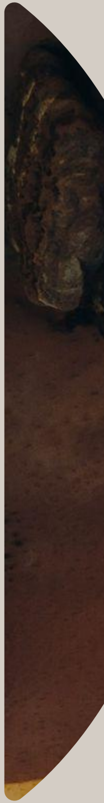


Our solution





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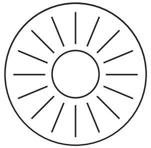
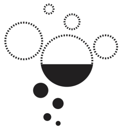
Our supply chain is de-risked
… we have to prove out integration



Atmospheric Carbon Capture

TRL 9

→



Co^2 Regeneration

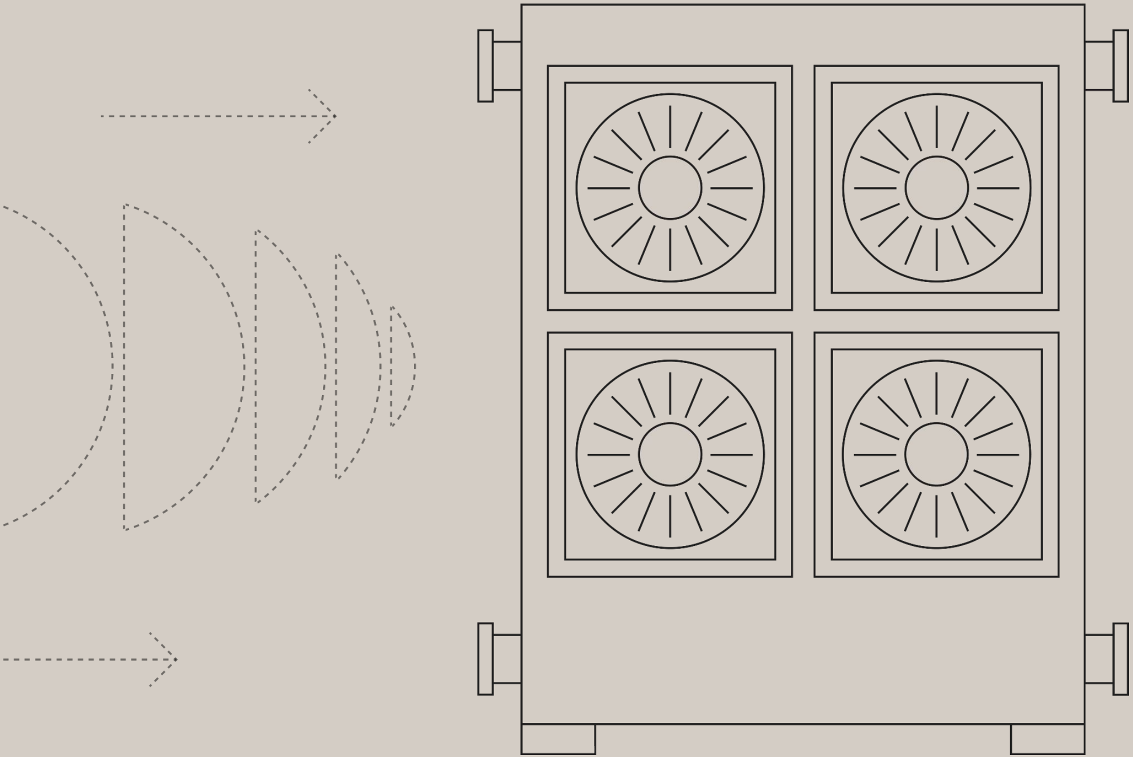
TRL 9

→ Synthetic Fuels

→ Commodity CO_2

→ Carbon Removals

→ Building Materials



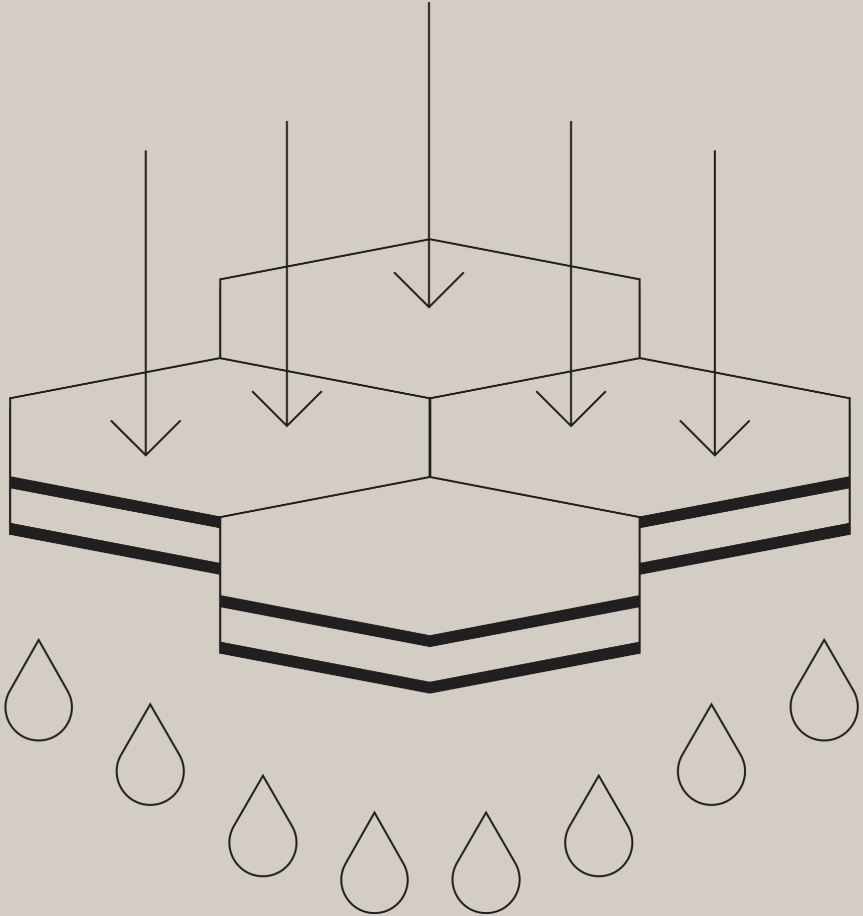
How our technology works

Our electrochemical process is inspired by the biological reactions that manage CO_2 in the body

Step 01

Air

Fans pull in air from the atmosphere — a bit like taking a big breath in.



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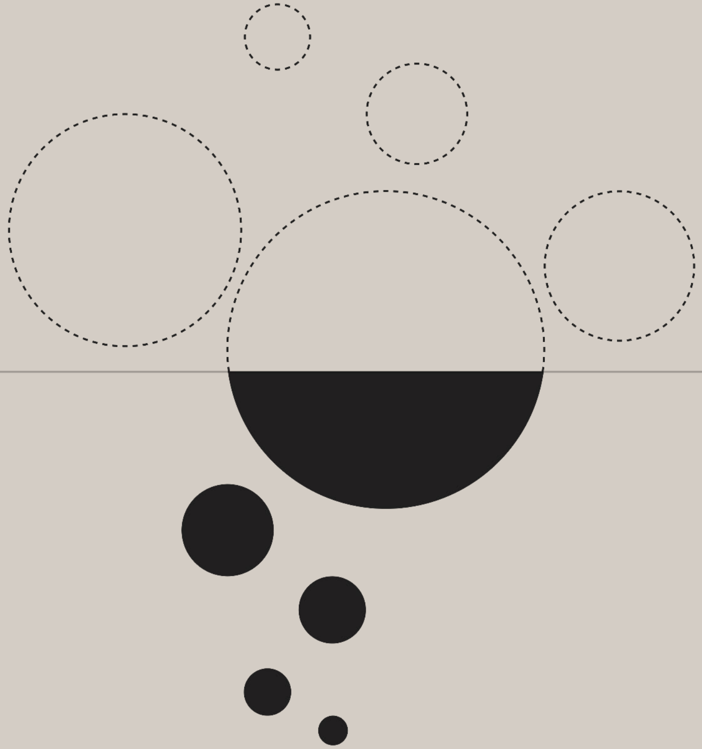
Step 02

Water

The carbon in that air is dissolved in a water-based solvent — like how oxygen enters our bloodstream.



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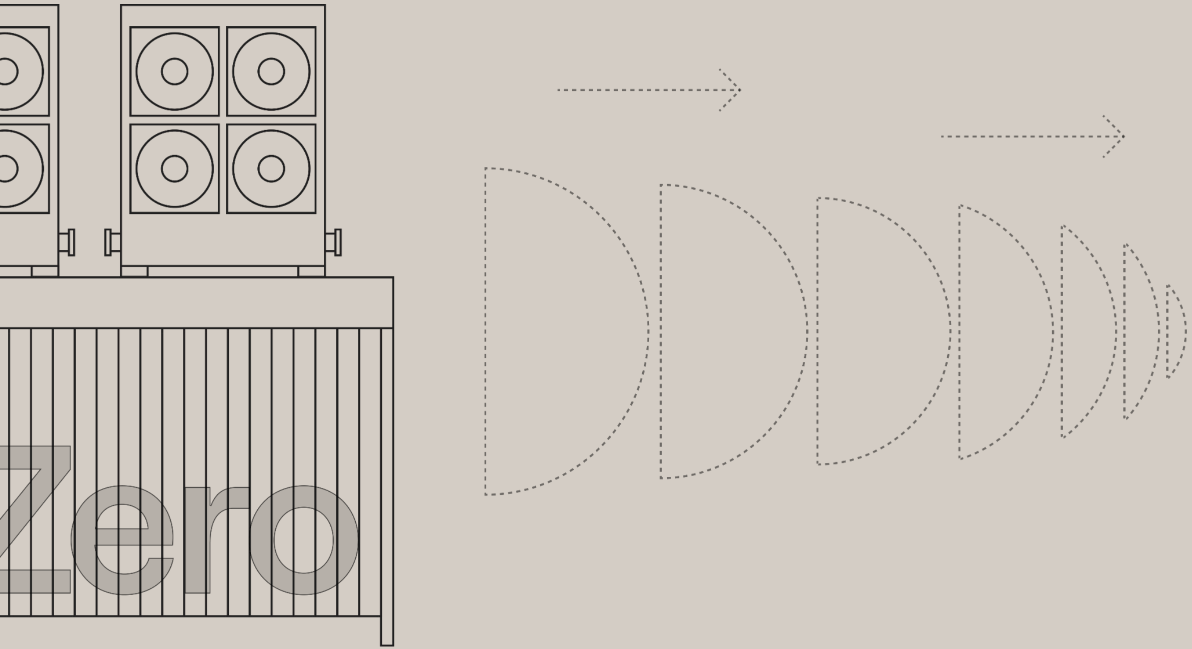
Step 03

Electricity

Electrodialysis releases the carbon from the solvent as a gas — cue a big breath out



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Step 04

Pure CO_2

That CO_2 is ready for sustainable use or permanent removal.

Reinventing carbon for a post-fossil world