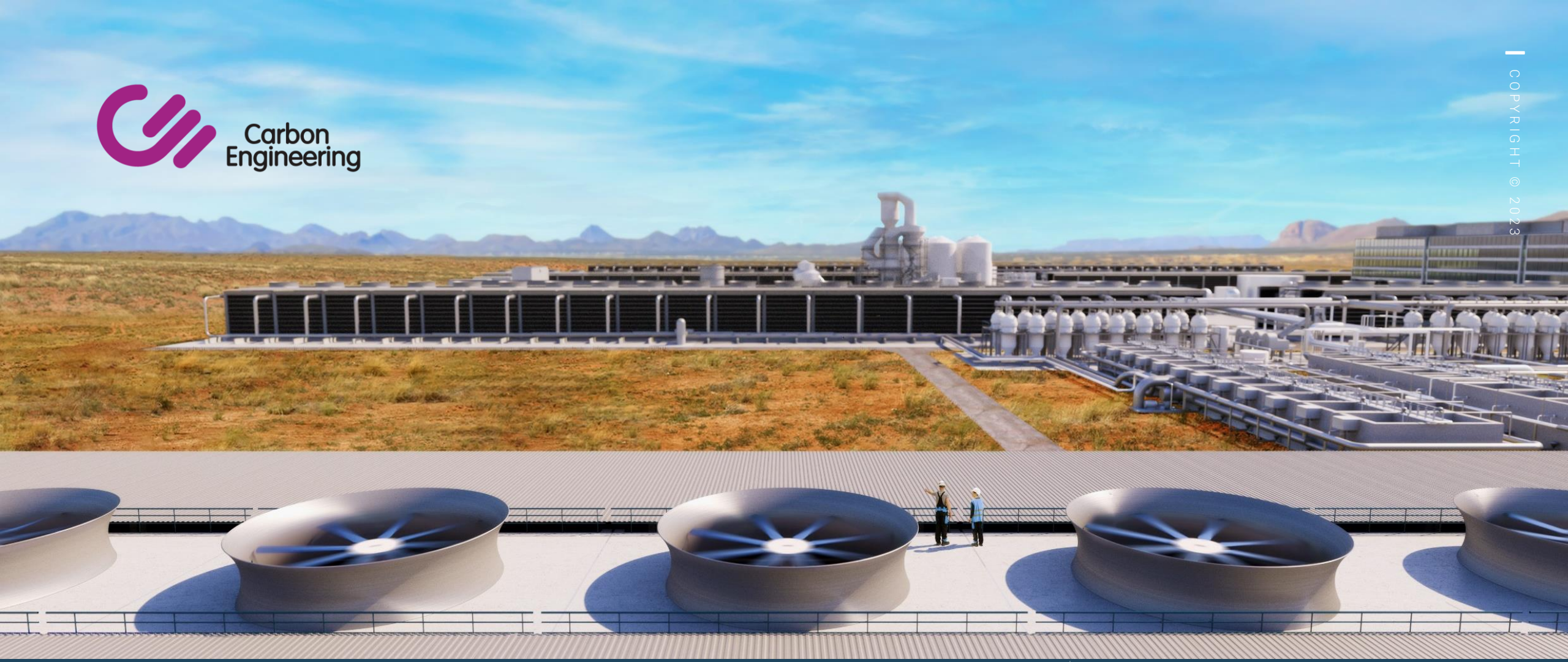


Direct Air Capture: The Opportunity in Asia *(DRAFT)*

ASIA CCUS NETWORK
Knowledge Sharing Conference

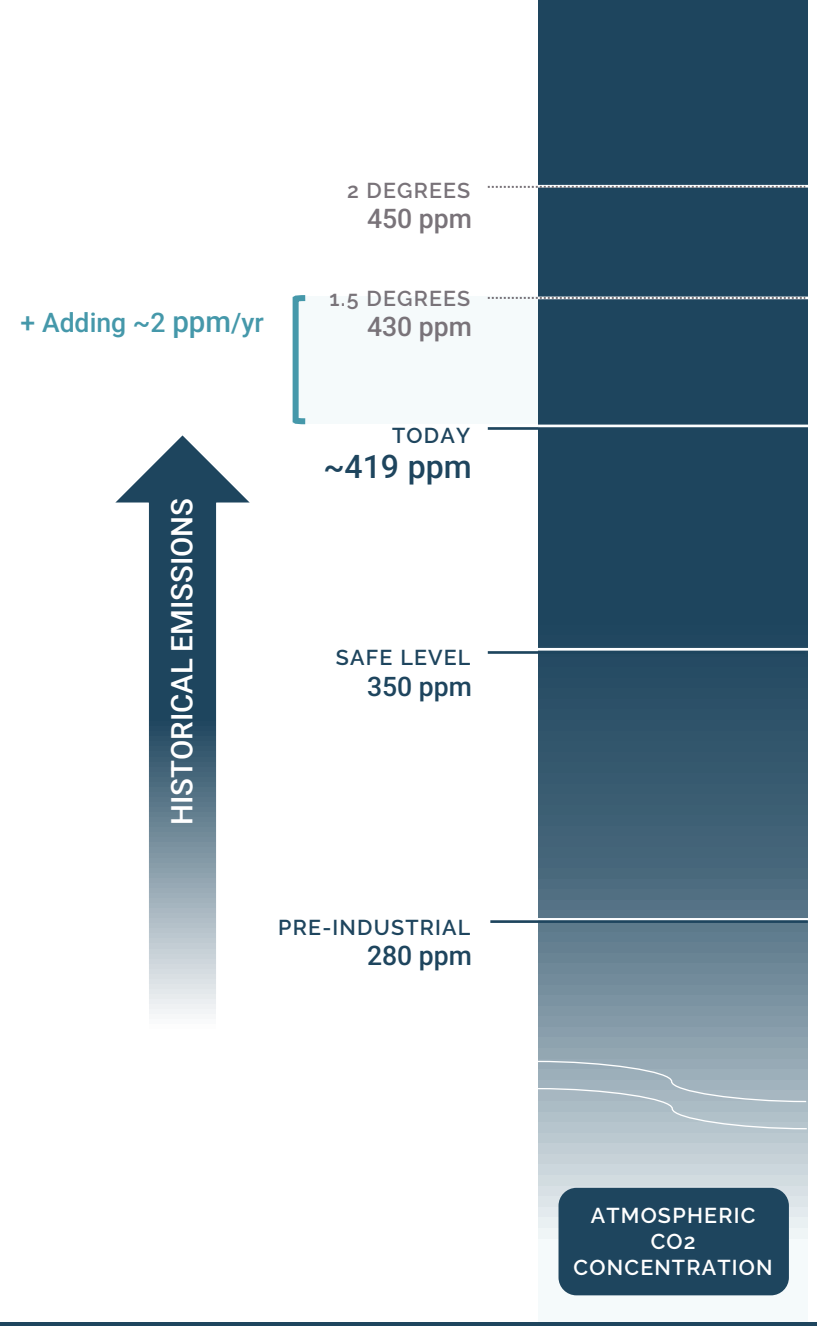
31 January 2023

Topics

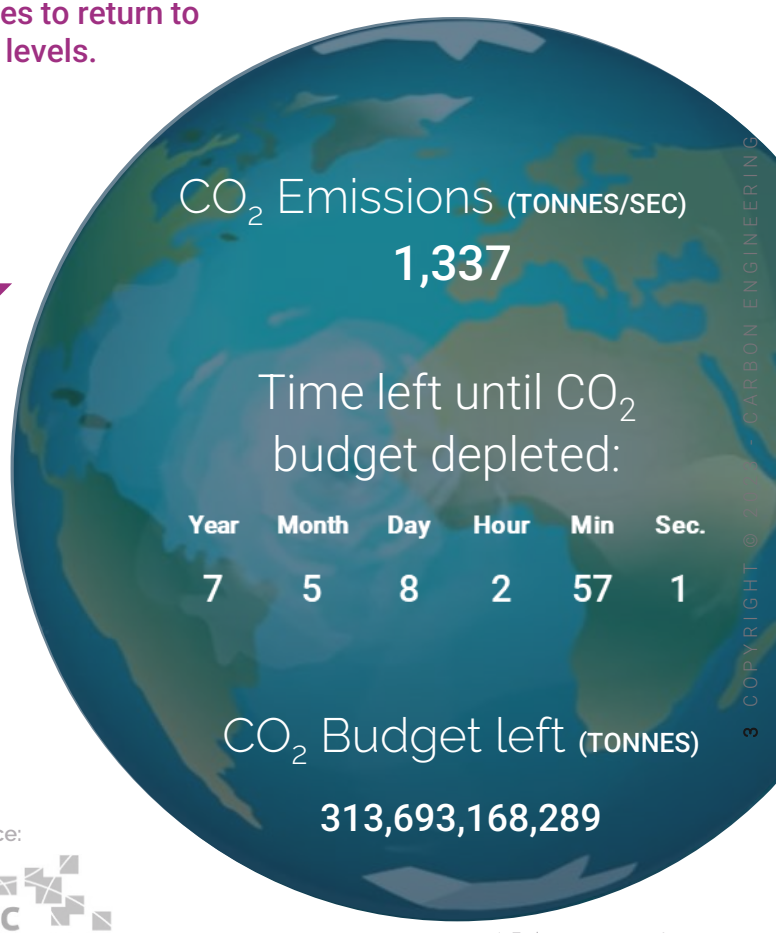
- Importance and urgency of DAC
- CE technology and deployment approach
- CE/1PointFive DAC commercial status
- Asia's opportunity
- Policies to unlock economic benefits

Remaining carbon budget

We have fewer than **7.5 years left on the carbon clock** before an expected average of 1.5 degrees of warming



Remove ~1 Trillion tonnes to return to safe levels.



Source:
MCC
Mercator Research Institute on Global Commons and Climate Change

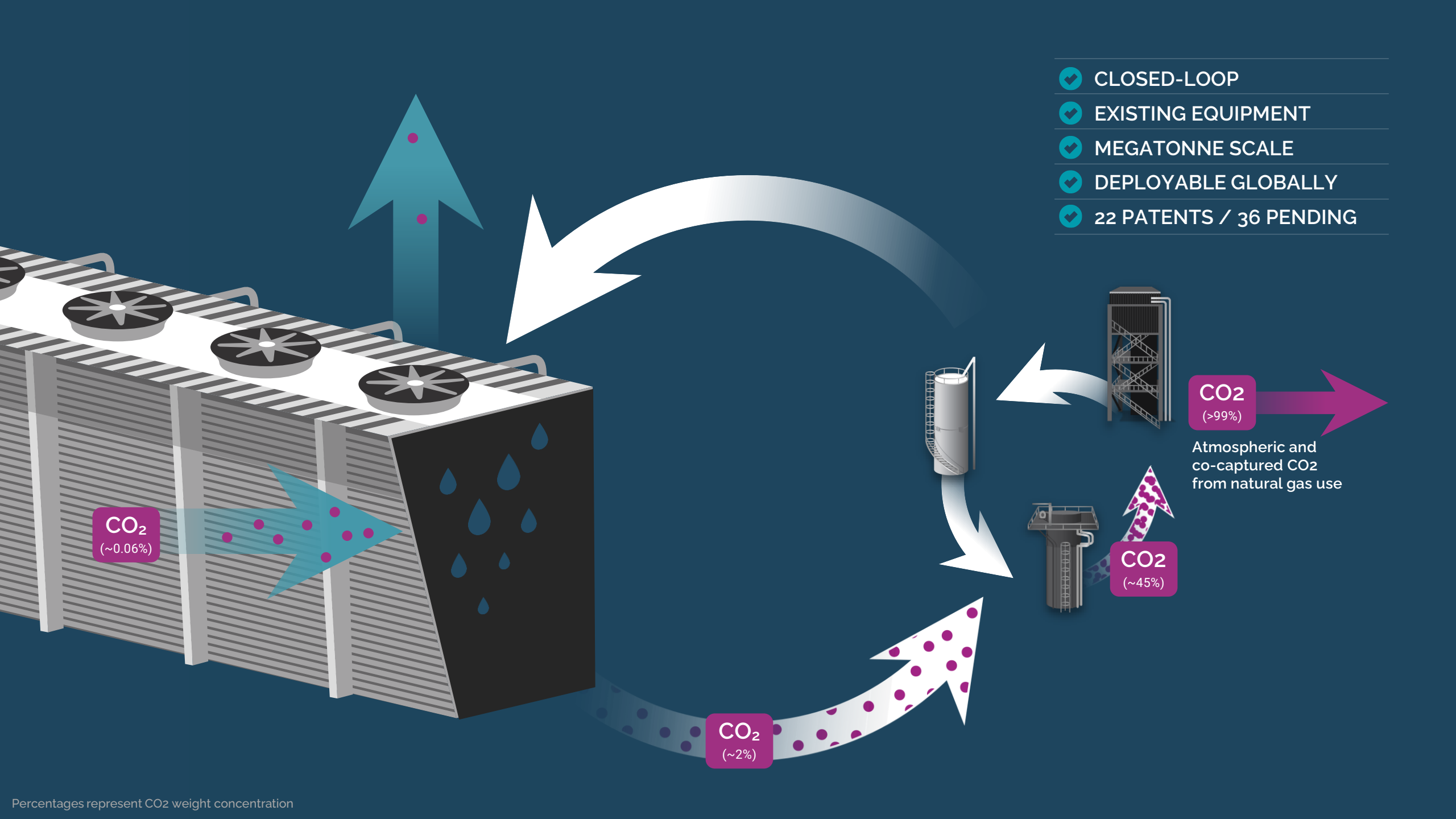
1.5-degree scenario
Data from 2023-02-14

THE CARBON CLOCK IS TICKING; THE CLIMATE PROBLEM IS URGENT

CE's Innovation Centre in Squamish, B.C.

Carbon Engineering has been pioneering large scale Direct Air Capture (DAC) since 2009

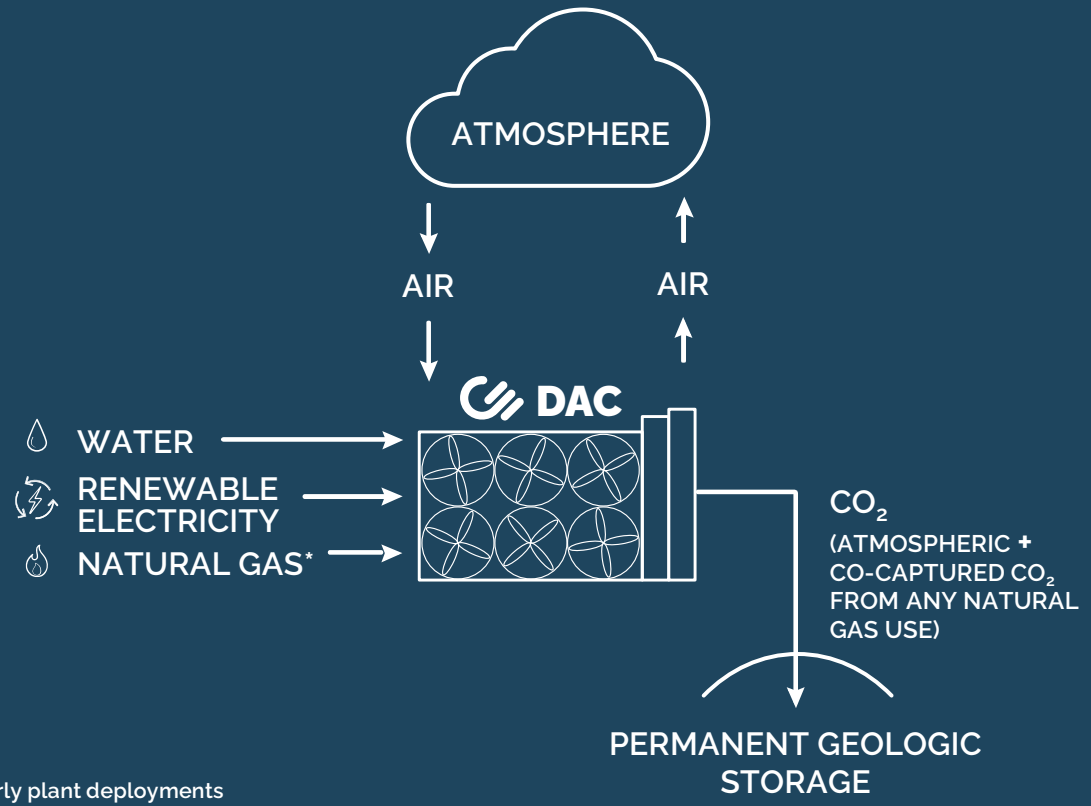
Dedicated R&D allows continued optimisation and innovation for insertion into commercial facilities worldwide



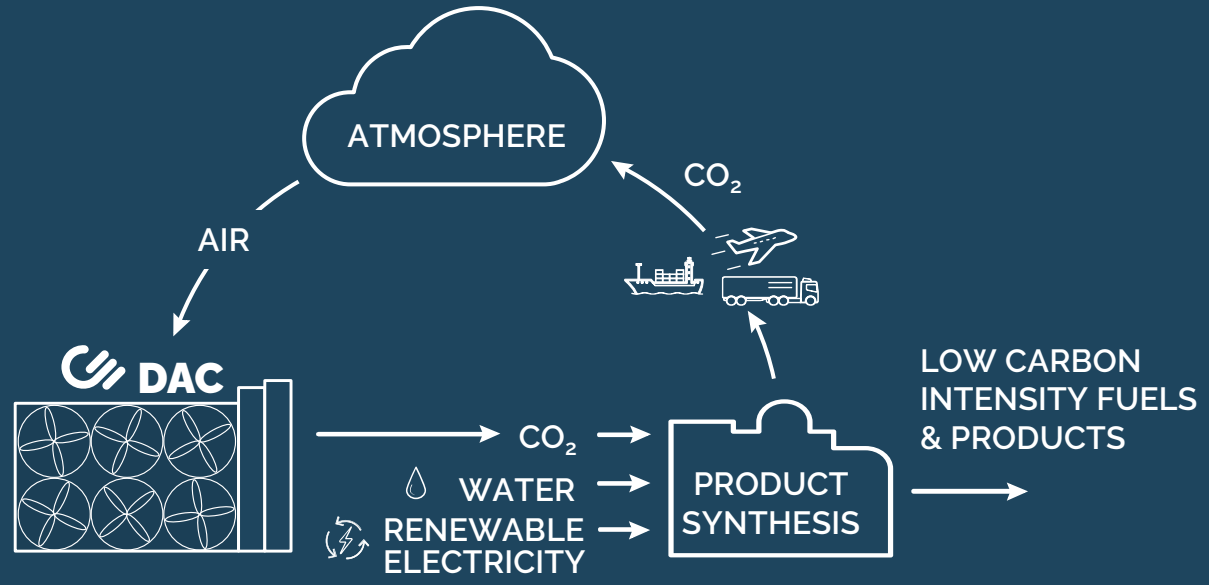
Percentages represent CO2 weight concentration

CE DAC enables complementary solutions for reduction and removal

CARBON DIOXIDE REMOVAL

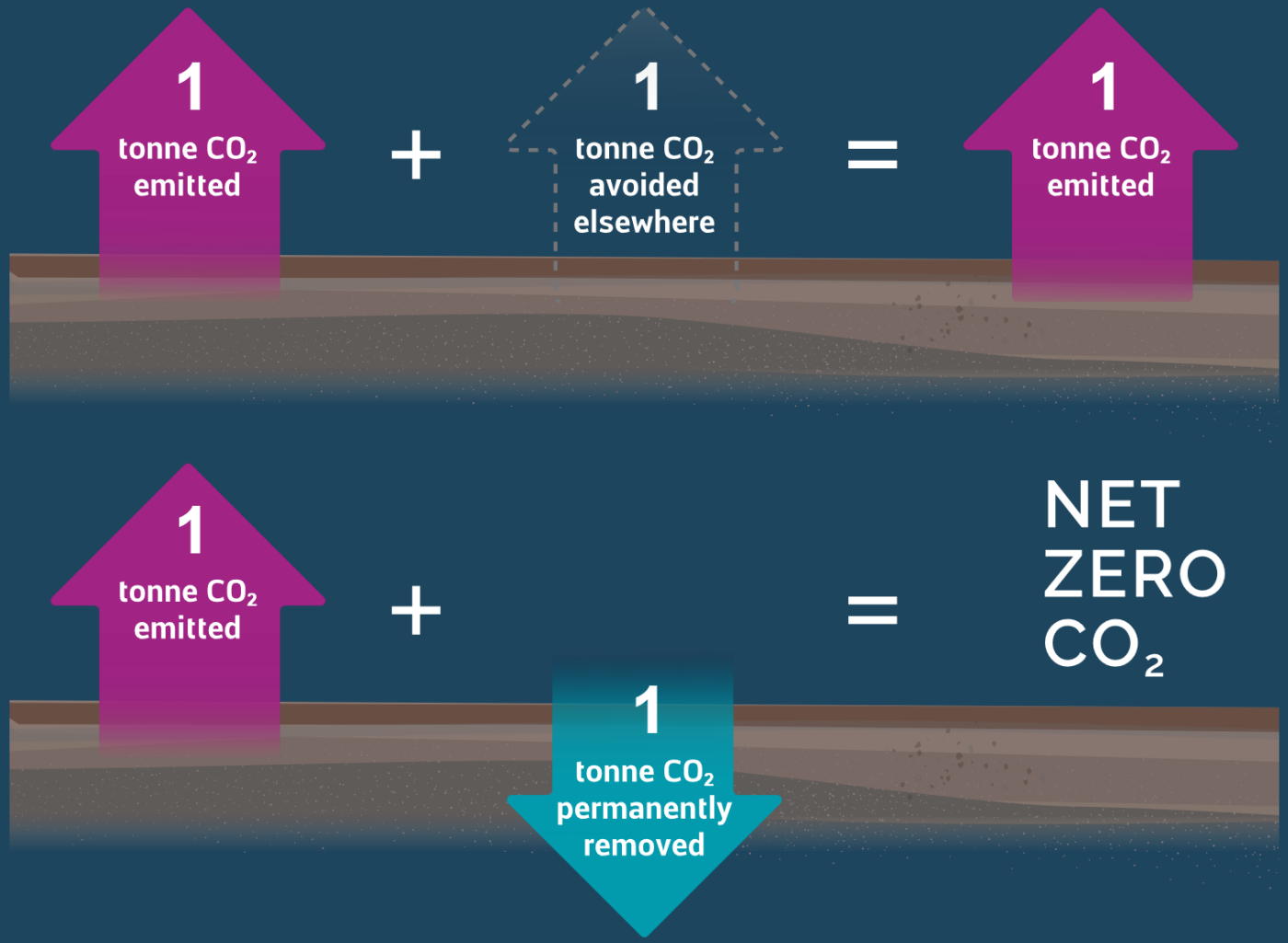


LOW CARBON INTENSITY FUELS & PRODUCTS



* In early plant deployments

Permanent carbon removal vs. avoided carbon offsets



CO_2 REMOVAL DIFFERS FROM OFFSETS THAT PROVIDE A CREDIT FOR AVOIDED EMISSIONS

Large scale deployment underway

PILOT PLANT:
BUILT 2015

Developed CE's DAC technology and first captured CO2 from the air in 2015

INNOVATION CENTRE:
BUILT 2021

R&D platform for technological advancements to incorporate into commercial plants

US DAC-1:
CONSTRUCTION UNDERWAY

500,000 tonnes CO_2/yr once fully operational with potential to scale to 1Mt/yr

UK & NORWAY DAC:
ENGINEERING UNDERWAY

Expected to capture 500,000 – 1 million tonnes CO_2/y each

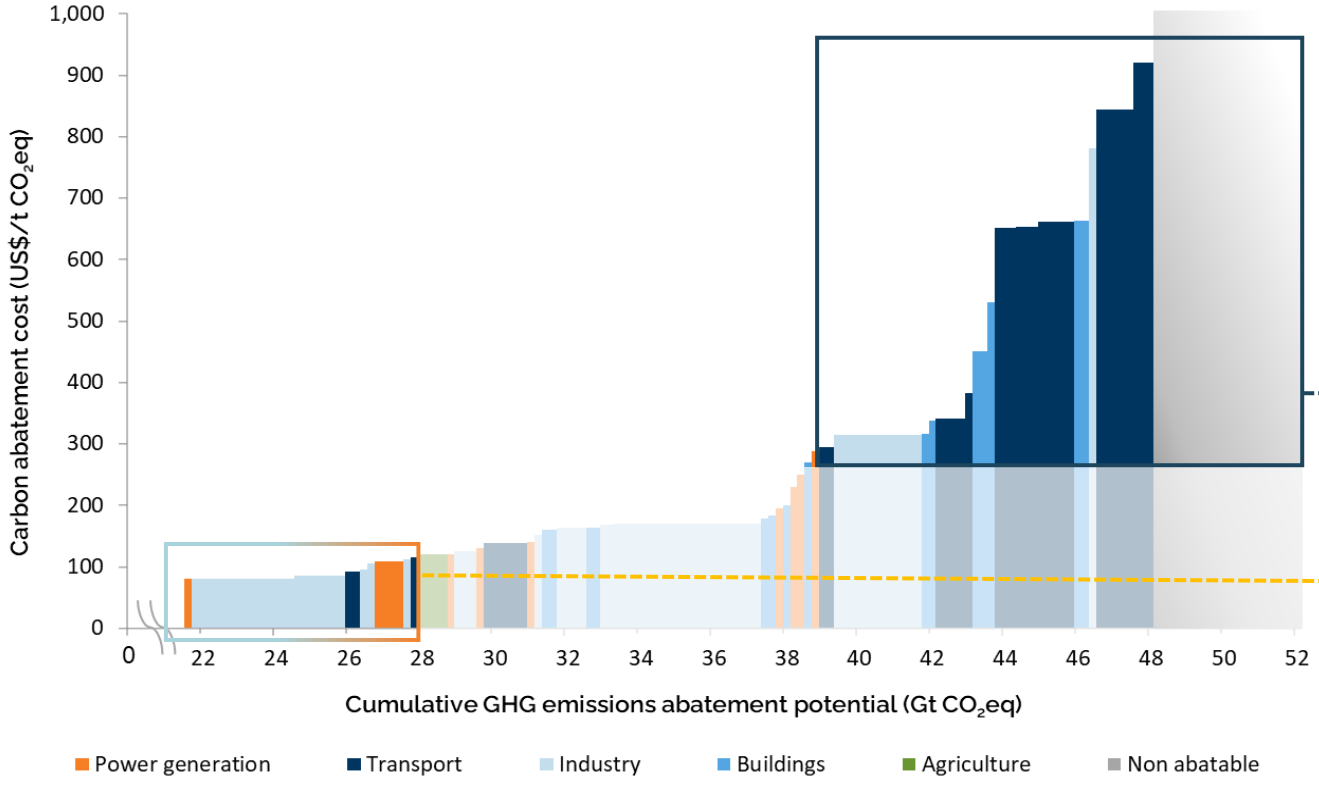
AIR TO FUELS™ PLANT
ENGINEERING UNDERWAY

Planned for B.C. Canada with expected capacity up to 100 million L/y

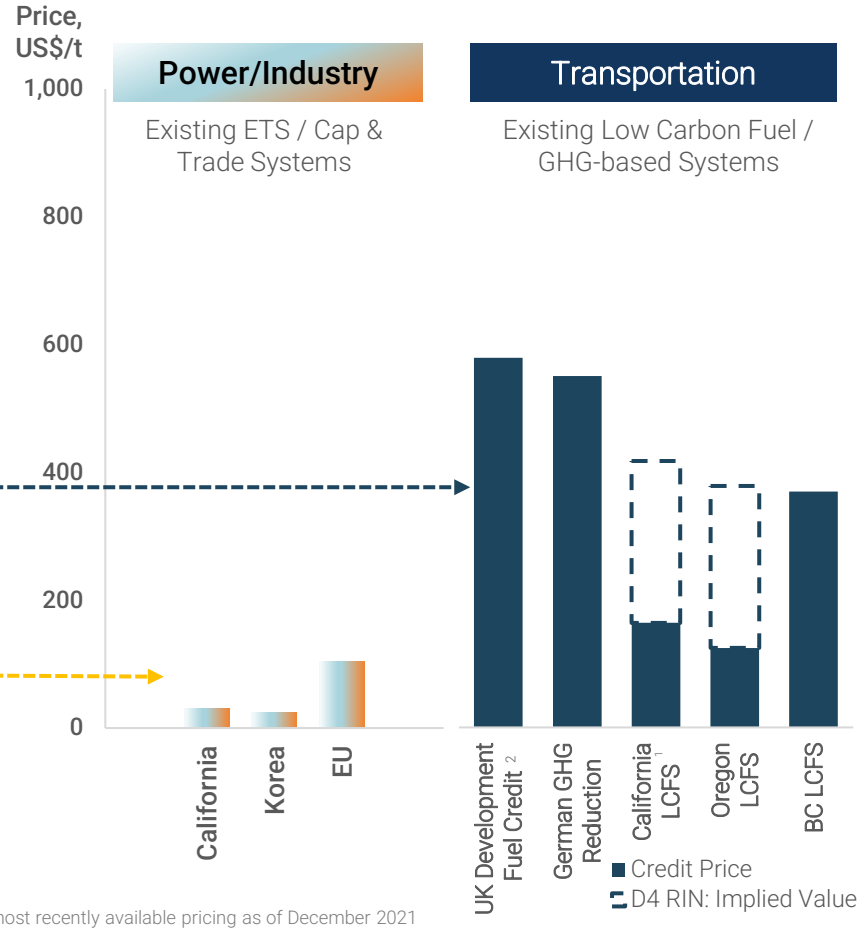
Artist renderings shown

Regulated Market is driven by transportation policies

Different abatement costs for each sector…



…require different carbon policies by sector



Represents most recently available pricing as of December 2021
1. California value includes the LCFS value plus the implied value of a D4 RIN for a low CI fuel, noting that "air" is not yet an eligible feedstock under the RFS
2. Based on early spot trading in development fuel credits; implied per-tonne value for a low CI fuel
Source: CARB, Argus, EPA, Energy Census

Source: Goldman Sachs, Carbonomics, November 2021

GROWTH IN REVENUE-PROVIDING TRANSPORTATION POLICIES EXPECTED TO CONTINUE

Government support is necessary to get DAC started

Good carbon policy supports economic growth

Supportive policies for DAC are needed to:

- Value the measurable, immediate, and very long duration carbon removal that DAC enables
- Create climate investment and viable long-term markets
- Create jobs and transition opportunities

Examples include:

- Market creation policies (e.g. low carbon fuel standards; direct procurement)
- Financial support policies (e.g. output-based subsidies; tax credits; project-based support)
- Market facilitation policies (e.g. CO_2 storage protocols; capacity targets, market linkage)

Jurisdictions that have developed **supportive policy environments** are **attracting project investment**

“Achieving Net Zero could turn an existential risk into the greatest commercial opportunity of our time.”

- Mark Carney, UN Special Envoy on Climate Change

Source: Chloe Farand, Climate Change News, 27/2/2020

MORE INFORMATION CAN BE FOUND AT:

www.carbonengineering.com

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Carbon Engineering Ltd.

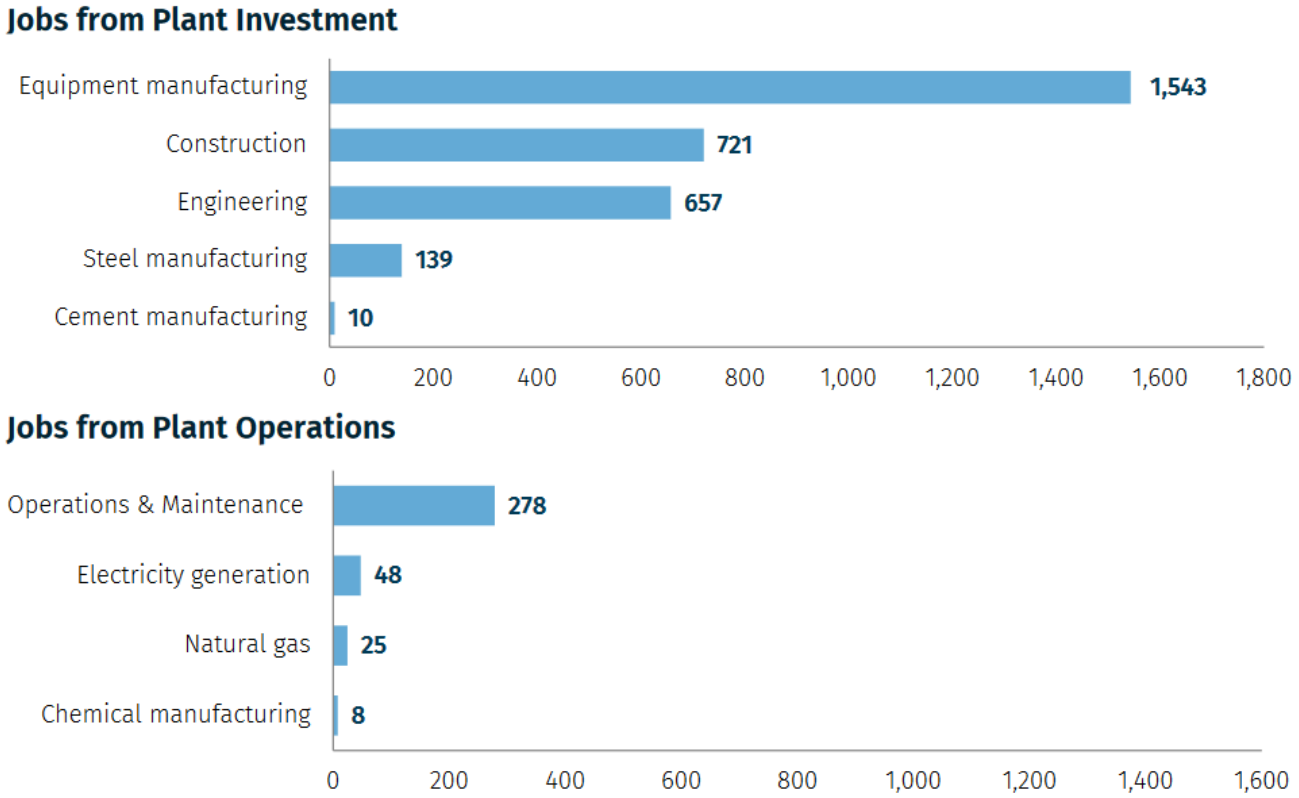
@CarbonEngineer

CarbonEngineering

BACKUP

DAC deployments can create jobs, attract investment and grow revenues

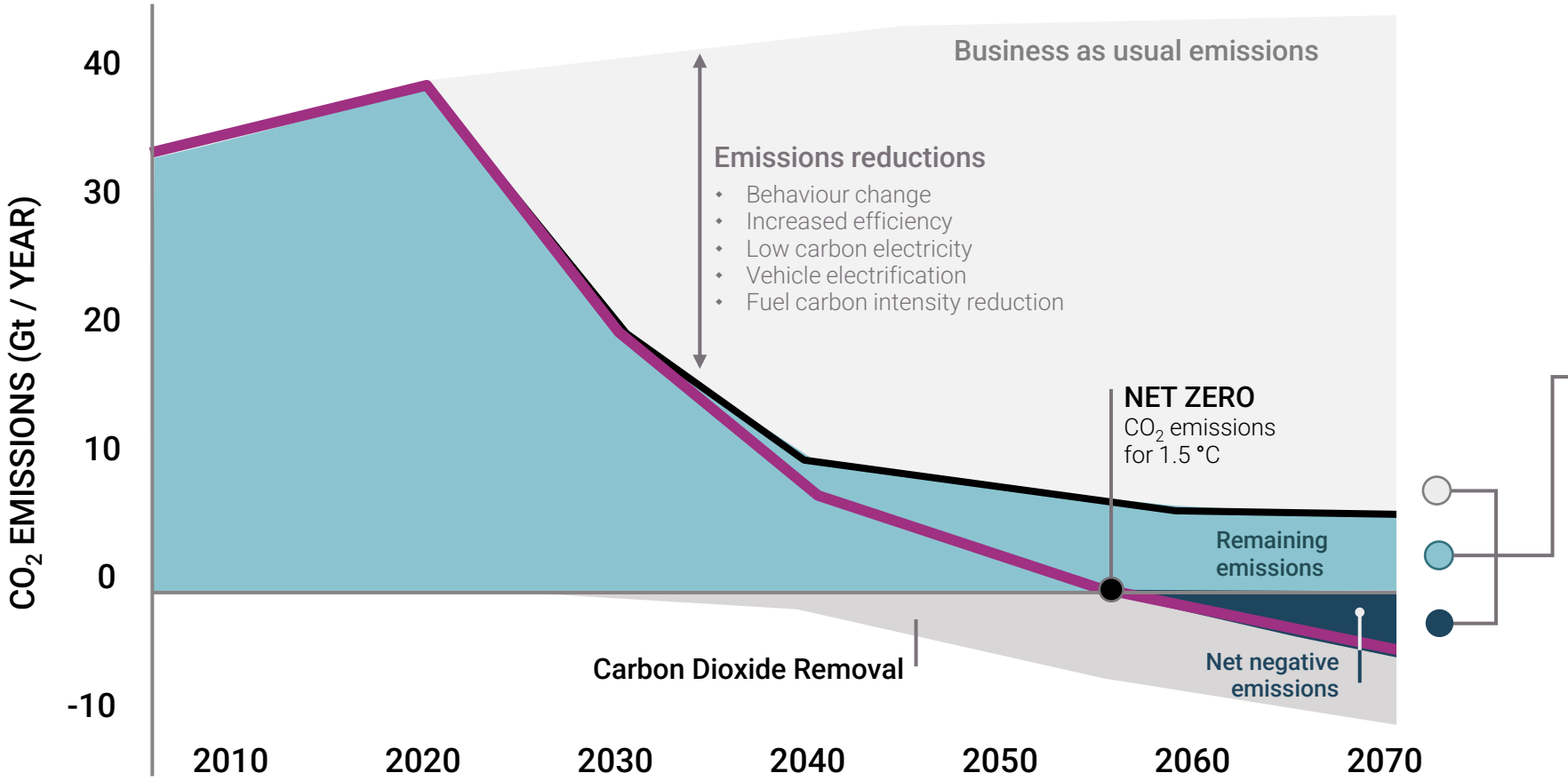
- Skills needed to build and operate DAC technology overlap heavily with existing industry
- Each 1Mt DAC plant:
  - was estimated to support ~3,500 jobs, including ~300 steady-state jobs[1]
  - could create USD billions in GDP impact over 30-year plant life
  - could see the DAC supply chain stimulate domestic industries (e.g., construction, materials)



1: https://rhg.com/wp-content/uploads/2020/06/Capturing-New-Jobs-Employment-Opportunities-from-DAC-Scale-Up.pdf
2: Graph reproduced from above report based on Rhodium group analysis, and presented here for illustrative purposes – actually varies vary depending on local conditions and project specificities.

1.5˚C requires large-scale and rapid mitigation

Carbon Dioxide Removal (CDR) can compensate for emissions from sectors that cannot completely decarbonize [1]



Sources:
1. IPCC Special Report on 1.5 degrees
2. Illustrative chart adapted by Carbon Engineering to illustrate market opportunities for DAC based on median emissions levels across the 46 pathways in the SR15 scenario database that are 1.5°C compatible calculated by Climate Analytics

Market Opportunities

- LOW CARBON INTENSITY FUELS & PRODUCTS
- HARD TO ABATE EMISSIONS
- LEGACY EMISSIONS REMOVAL

A turn-key solution

CE's process was designed to be deployed at scale

1 INDUSTRIAL EQUIPMENT WITH PRECEDENT

- A combination of pre-existing technologies adapted and combined with patented innovations and proprietary know-how
- Reduces scale up risk & improves cost estimation

2 CLOSED CHEMICAL LOOPS

- Non-volatile non-toxic chemical process
- Meets environmental health and safety standards

3 FREEDOM OF LOCATION

- Plants can be located where economics are optimum to take advantage of low-cost local energy or proximity to sequestration sites or demand centre

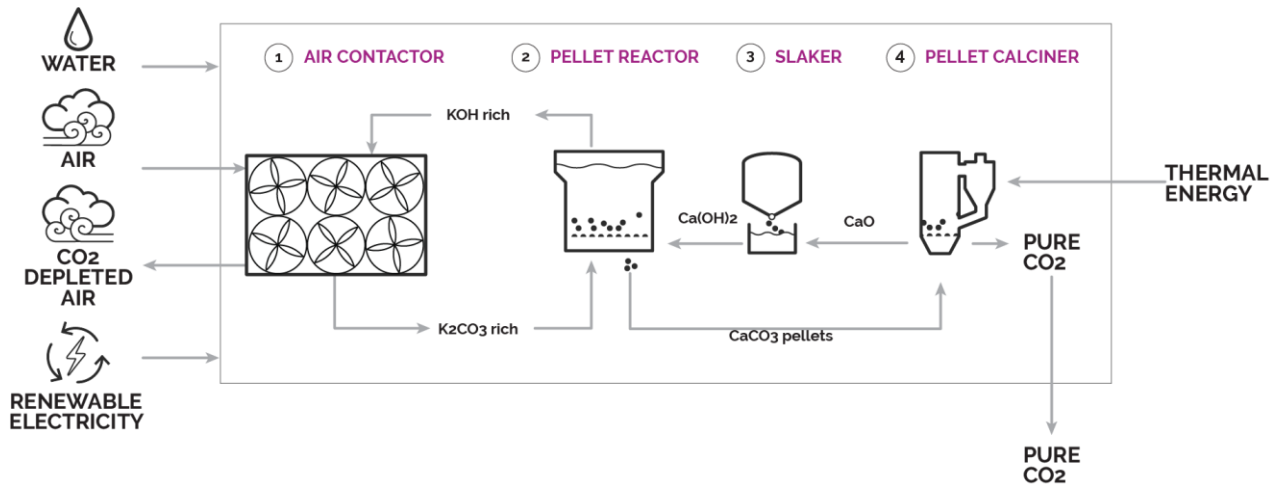
4 LICENSED PROCESS BUSINESS MODEL

- Partners with experienced plant developers and world leading EPCs
- Many partners enables faster deployment

1

EQUIPMENT	INDUSTRIAL PRECEDENT
AIR CONTACTOR	Industrial cooling tower
PELLET REACTOR	Water treatment technology
SLAKER	Standard equipment for converting Calcium Oxide to Calcium Hydroxide
CALCINER	Refractory lined circulating fluidized bed calciners are commonly used in mining for ore processing

2



For more information, visit the Joule paper on CE's process