Carbon Engineering's Direct Air Capture Commercial deployment underway

Presented to
GCCUS Winter Meeting & International Symposium

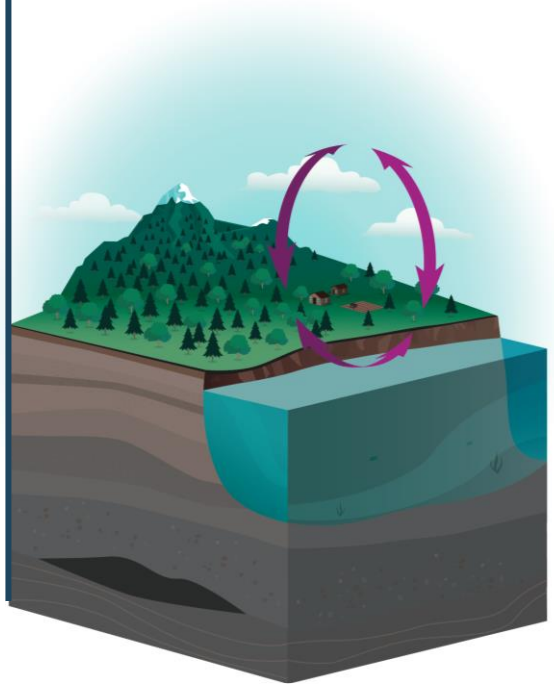
Presented by
Caroline Jiwon Jung

Date
December 1, 2023

An all-of-the-above approach is needed to restore to unbalanced carbon cycle

PRE-INDUSTRIAL ERA

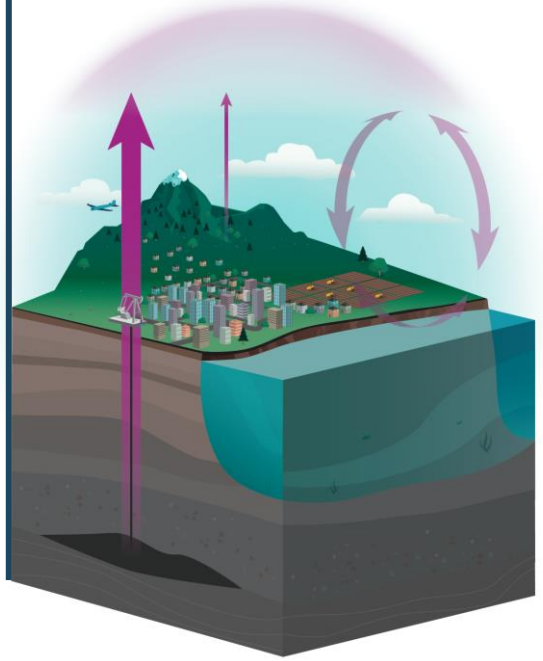
Carbon flows naturally between the air, plants, land, and oceans in a balanced "carbon cycle" that helps keep the Earth's climate relatively stable.



INDUSTRIAL ERA TO TODAY

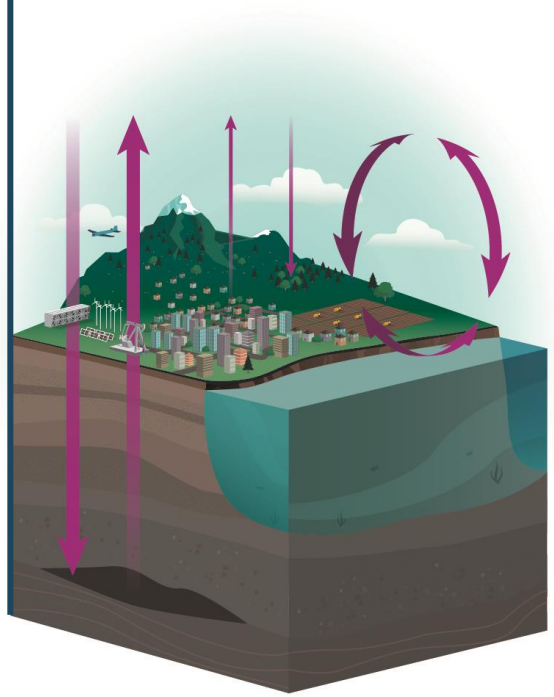
CO_2 is building up in the atmosphere, throwing the carbon cycle out of balance, resulting in rapid and dangerous climate change.

The concentration of CO_2 in the atmosphere has **increased from ~280 ppm in pre-industrial times to ~419 ppm** today.[1]



AN ALL-OF-THE-ABOVE APPROACH

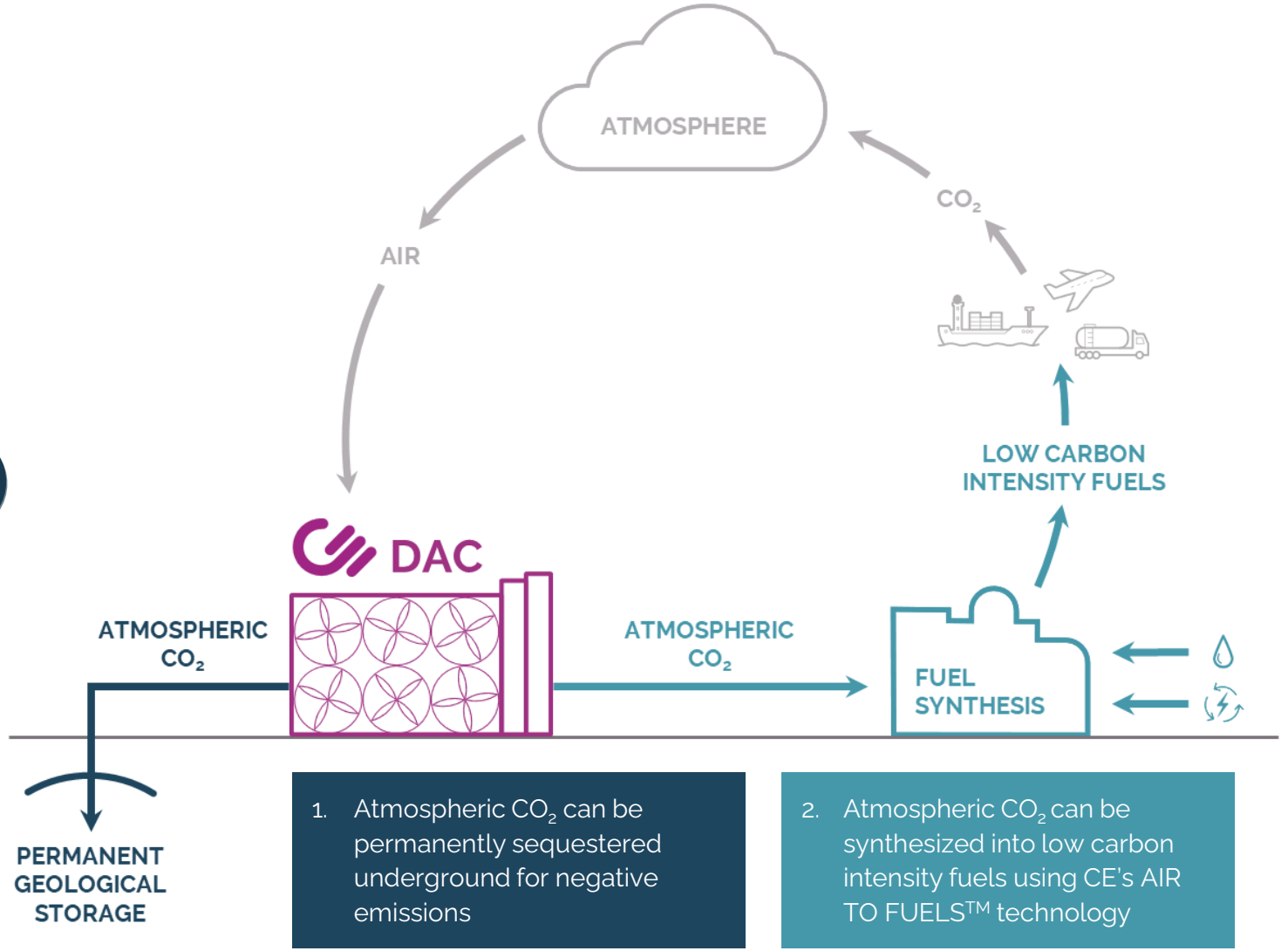
We need all the tools in our toolbox to solve climate change and balance out the carbon cycle again, including emissions mitigation strategies, natural carbon removal and **technological carbon removal solutions**.



CE Direct Air Capture brings solutions at climate-relevant scale

Direct Air Capture (DAC) & AIR TO FUELS™ technologies deliver:

- **Carbon Dioxide Removal (CDR)**
- **Drop-in compatible synthetic fuels**



DAC CAN ADDRESS ANY CO2 EMISSION, FROM ANY LOCATION AND ANY POINT IN TIME

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

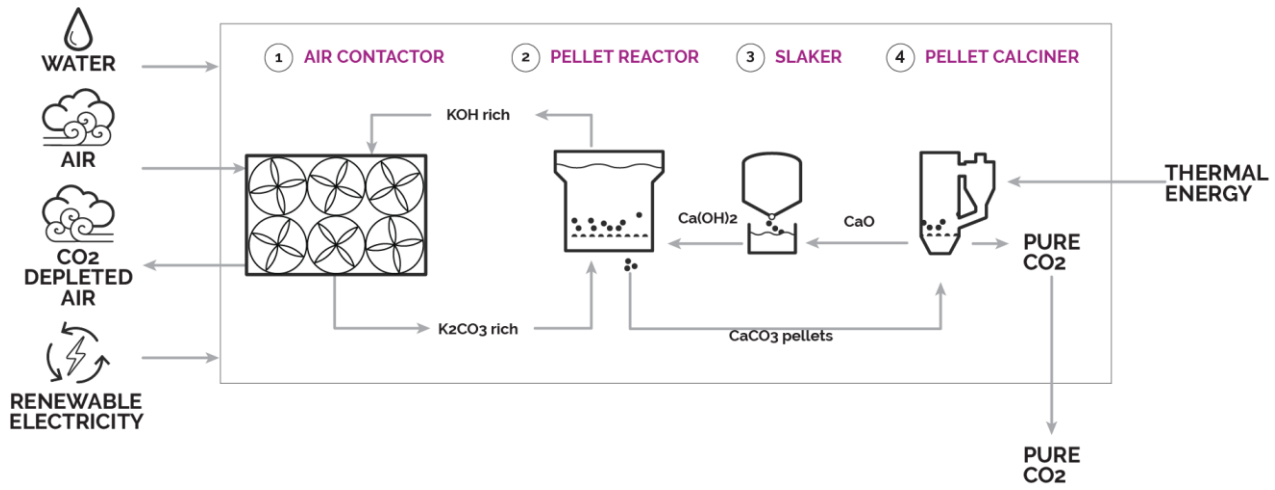
FREEDOM OF LOCATION

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

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



Large Scale Deployment Underway

AIR TO FUELS™ DEMO
BUILT 2017

PILOT PLANT
BUILT **2015**
Piloted elements of CE's DAC technology.

INNOVATION CENTRE
BUILT **2021**
R&D platform for technological advancements to incorporate into commercial plants.

STRATOS (DAC 1) WEST TEXAS
CONSTRUCTION UNDERWAY
Expected to be largest in the world (500,000 tCO_2/yr)

SOUTH TEXAS DAC HUB
ENGINEERING UNDERWAY
Enables potential for **30 MTPA DAC**

100 Mt by 2035
1POINTFIVE DEV. SCENARIO
Advancing feasibility studies and plant designs in other locations across the globe

STRATOS (DAC 1)

Construction underway for a First-of-its-kind, large scale DAC facility in Texas

- **500,000-tonnes CO_2** per year capacity
- **Over 30% complete**, commercial ops expected in 2025
- BlackRock secured as JV partner with $550M investment
- Sequestration permit application filed with US EPA

More Projects Underway

South Texas DAC Hub (DAC 2)

- Front-End-Engineering Design underway for the first 1 Mt CO_2 per year plant, at a site that can support up to 30 Mt per year
- Selected as one of two projects to share **$1.2 billion** DOE grant

Partners are joining CE & 1PointFive to accelerate DAC

March 2022

Airbus pre-purchased **400,000 tonnes** of CDR from 1PointFive & announced a CDR collaboration with seven other airlines & airline groups in July 2022

AIRBUS
1POINTFIVE
AIR CANADA
AIRFRANCE KLM
Lufthansa
easyJet
LATAM
virgin atlantic
IAG INTERNATIONAL AIRLINES GROUP

November 2022

Carbon Engineering announced significant R&D investments by Airbus and Air Canada

AIRBUS
AIR CANADA

2023

Amazon agreement to purchase **250,000 tonnes** of CDR

TD Bank Group agreed to purchase **27,500 tonnes** of CDRs

All Nippon Airways agreed to purchase **30,000 tonnes** of CDR, becoming the first airline to directly purchase CDR

ANA

"The Net Zero Scenario requires the immediate and accelerated scale-up of Direct Air Capture, calling for an average of **32** large-scale plants (**1 $MtCO_2$ per year each**) to be built each year between now and 2050."

- IEA, April 2022