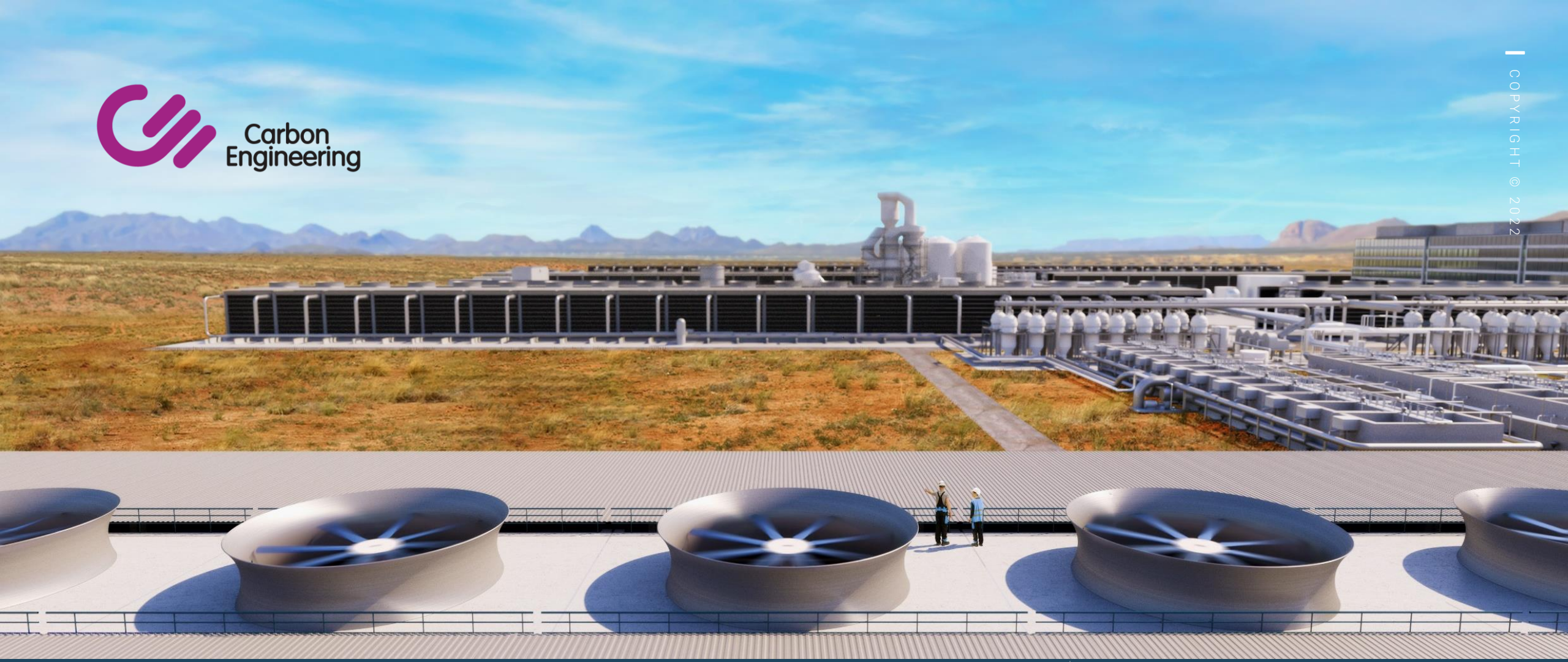


Carbon Engineering, Pioneering Direct Air Capture

Innovation Cool Earth Forum

PRESENTED BY:
Business Development

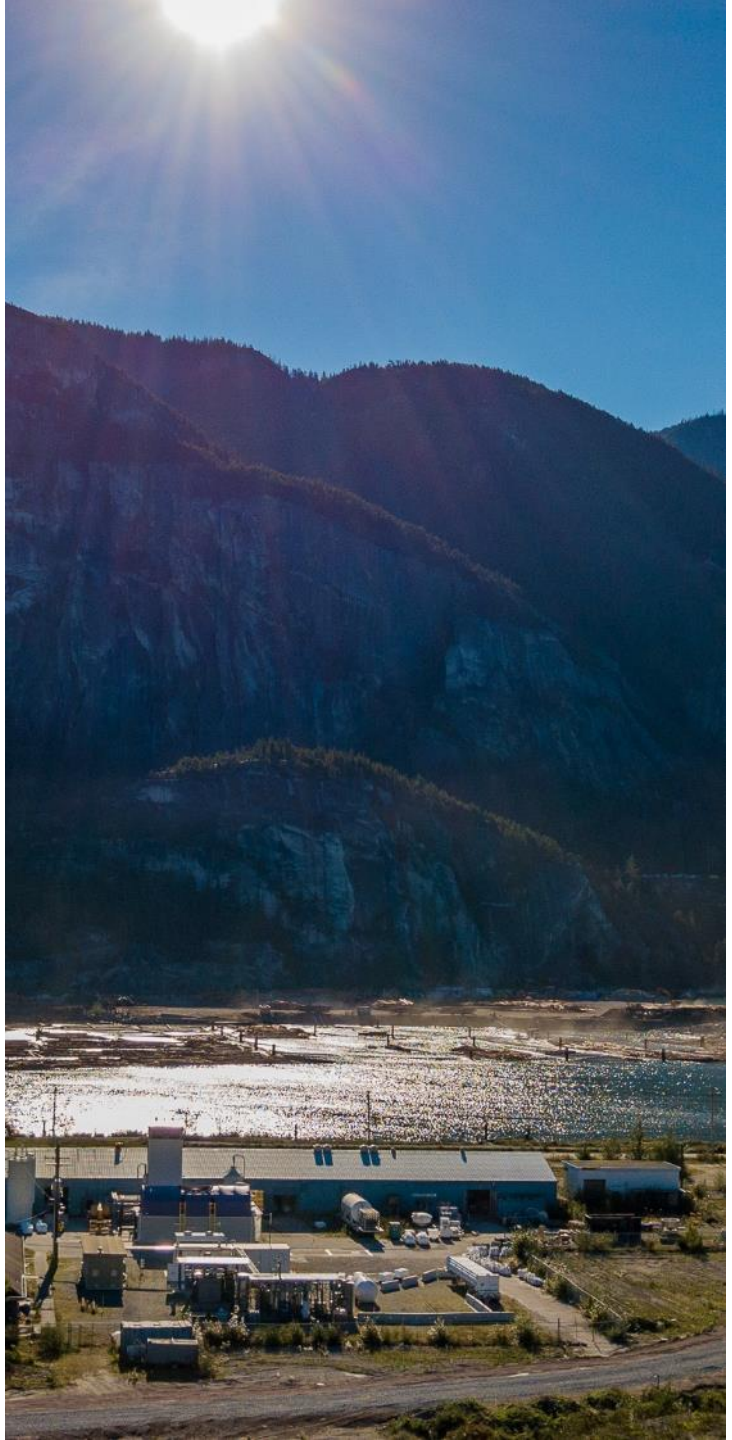
COMPANY:
Carbon Engineering Ltd.

DATE
October 5-6, 2022

Agenda & Video Links

Press the links below to enhance your experience with narration on the presentation from our business development experts

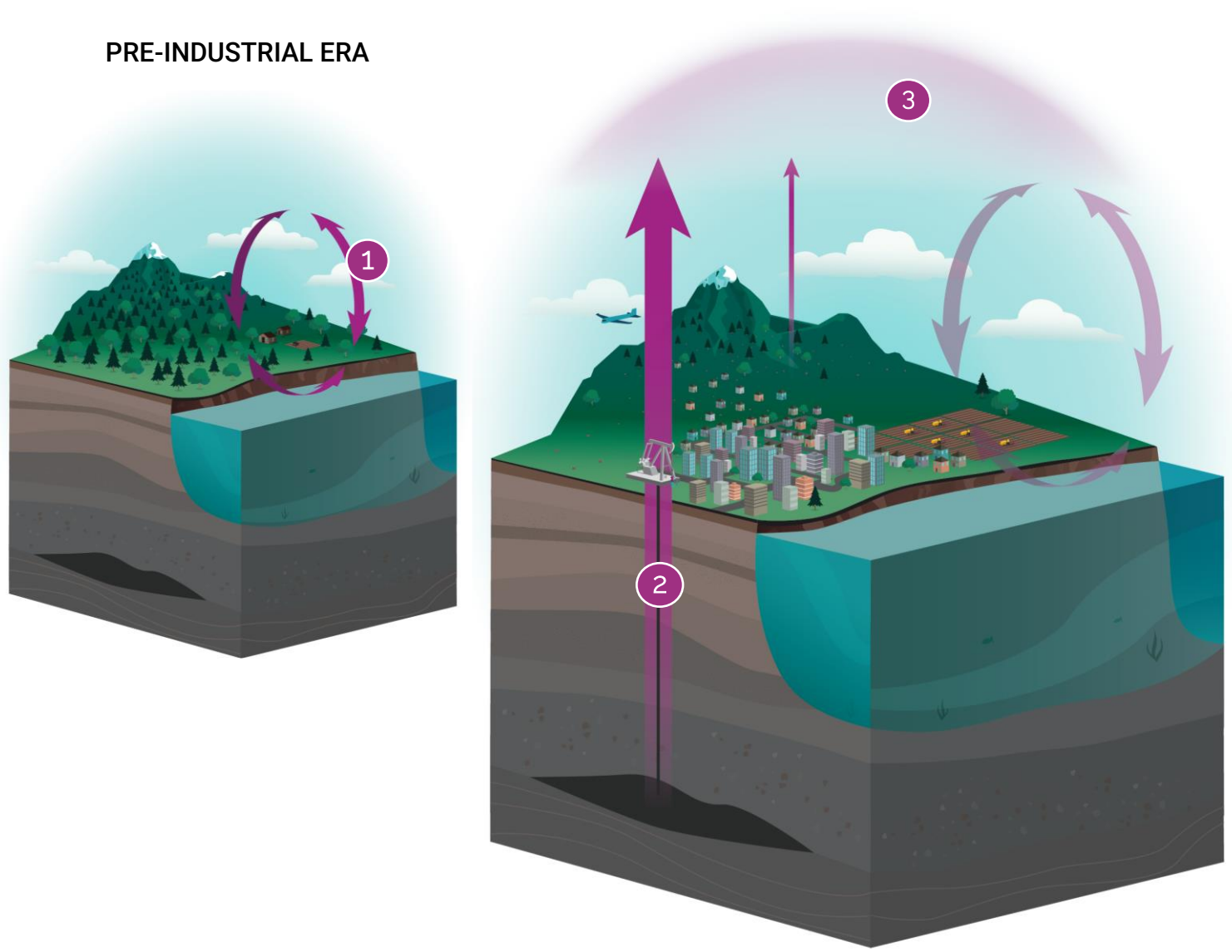
- The climate challenge
- Carbon Engineering (CE) introduction
- How to work with CE:
  - To decarbonize your organization as a customer
  - To learn about how policy can support economic growth and Direct Air Capture
  - To create a new low-carbon business by partnering with Carbon Engineering



The Carbon Cycle is Out of Balance

1. **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.
2. **INDUSTRIAL ERA:** For ~200 years, humans have extracted large quantities of fossil fuels out of the geosphere, resulting in a one-way flow of CO_2 into the atmosphere. Deforestation and agricultural practices also release CO_2 into the air.
3. 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 ~415 ppm** today.*[1]

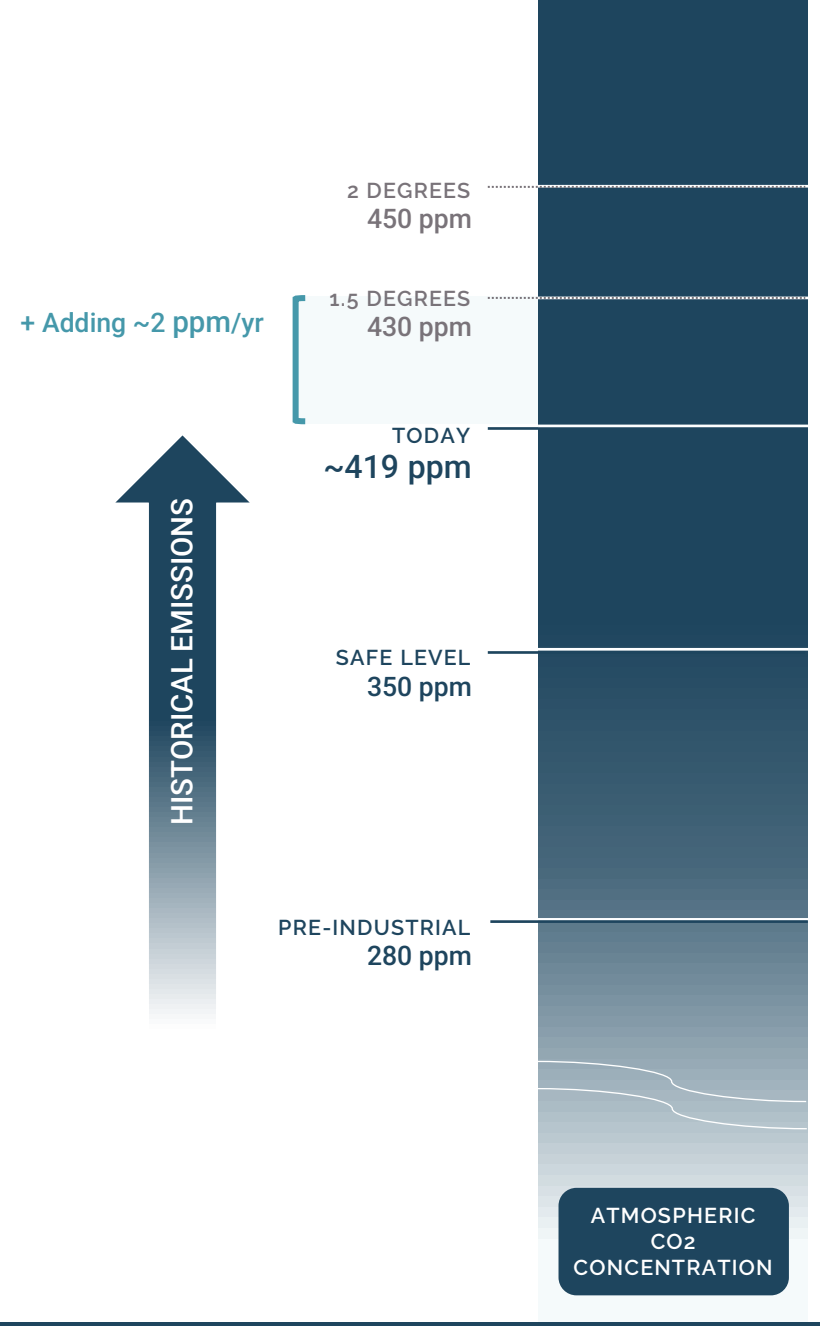


[1] **Data Source:** The Kneeling Curve

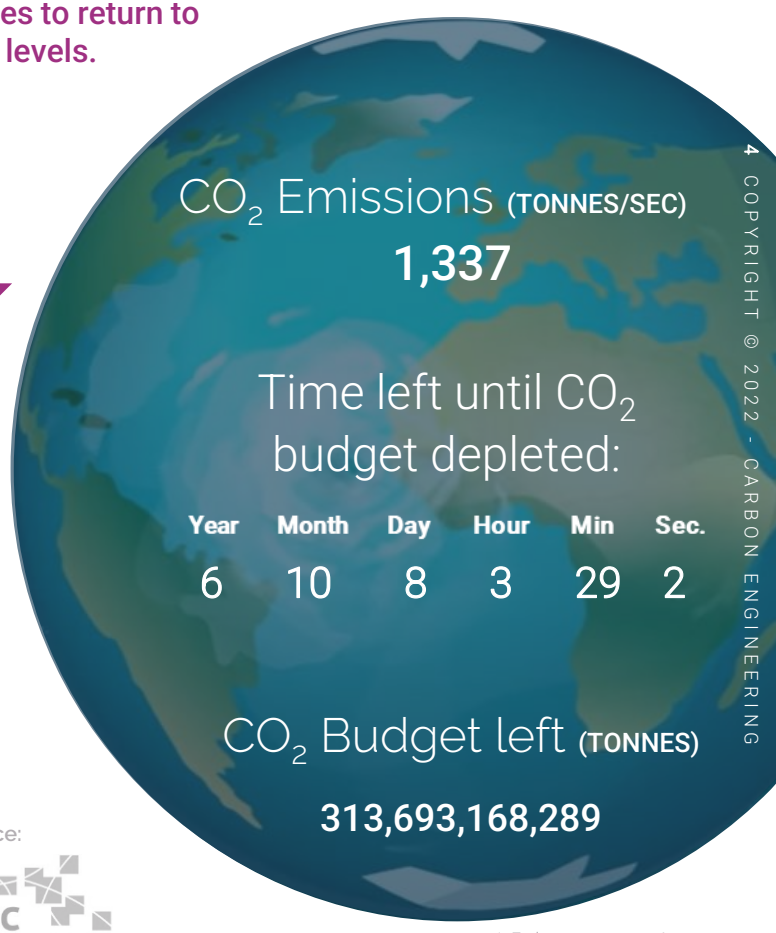
EXCESS CO2 IN OUR ATMOSPHERE IS CAUSING CLIMATE CHANGE

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.



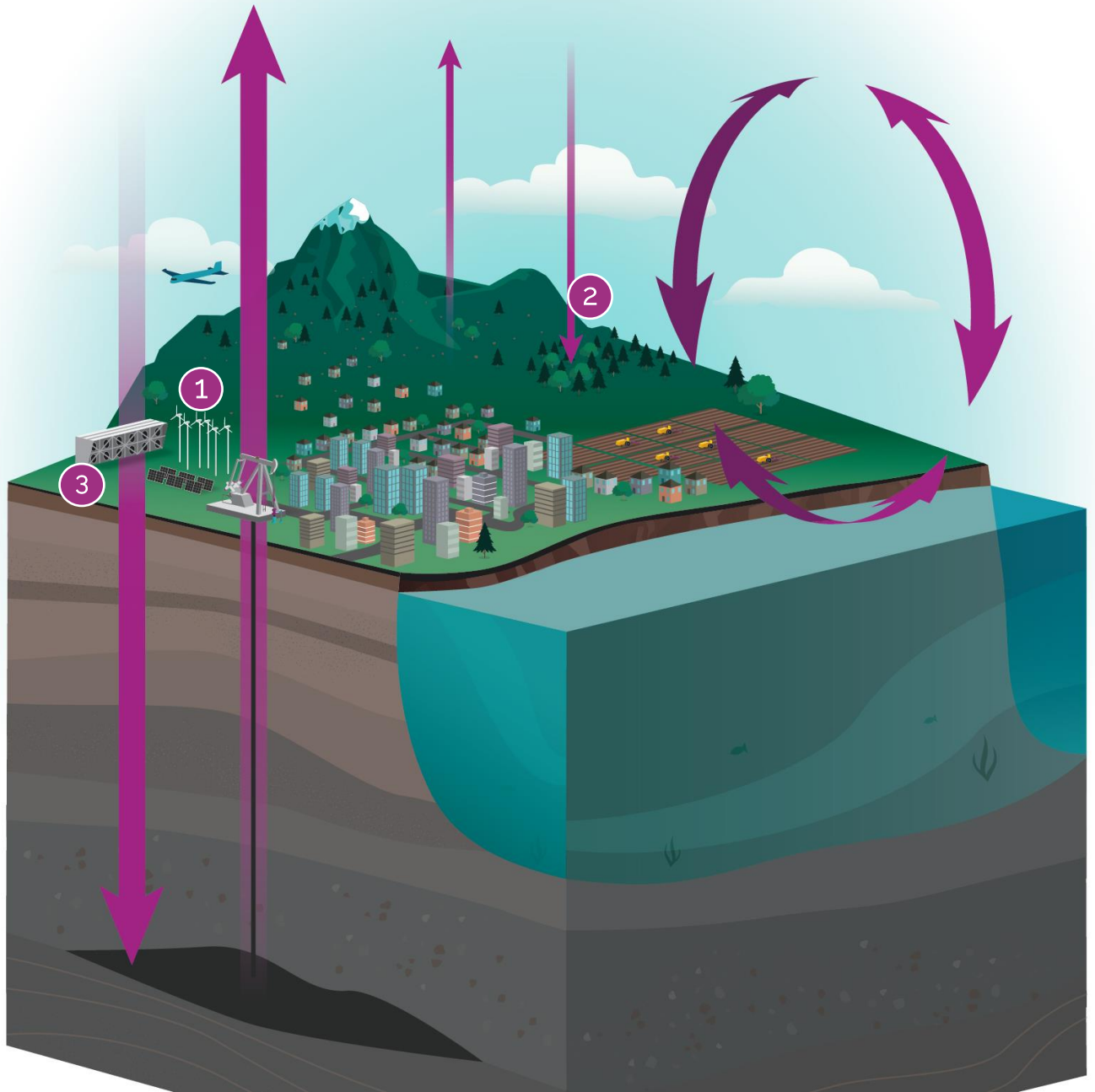
Source:
MCC
Mercator Research Institute on Global Commons and Climate Change

1.5-degree scenario
Data from 2022-09-14

THE CARBON CLOCK IS TICKING; THE CLIMATE PROBLEM IS URGENT

We Need an All-of-the-Above Approach

- The scale of the CO_2 problem is so large that no single solution is a silver bullet to solve it.
- We need all the tools in our toolbox to balance out the carbon cycle again, including:
  1. emissions reduction strategies
  2. biological carbon removal, and
  3. technological carbon removal solutions.



The push for net zero

What is net zero?

Net zero emissions -

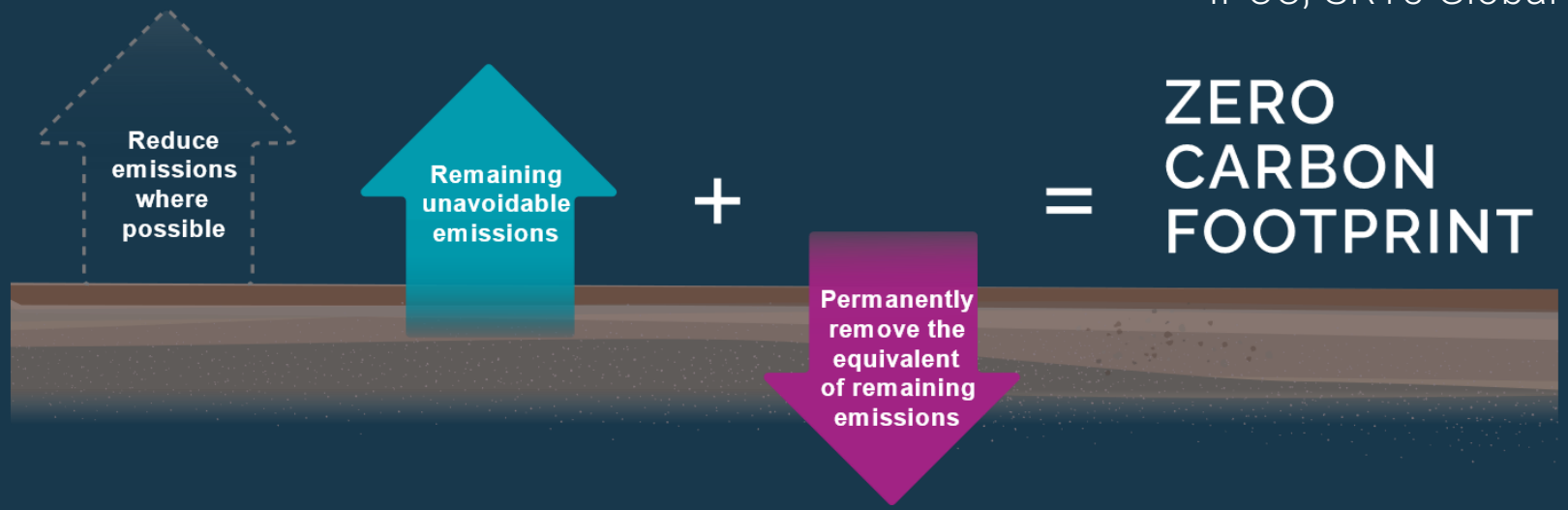
"Net zero emissions are achieved when anthropogenic emissions of GHG to the atmosphere are balanced by anthropogenic removals over a specific period."

Intergovernmental Panel on Climate Change (IPCC), SR15 Global Warming of 1.5˚C

What is carbon dioxide removal?

Carbon dioxide removal (CDR) – "Anthropogenic activities removing CO_2 from the atmosphere and durably storing it in geological, terrestrial, or ocean reservoirs, or in products. It includes existing and potential anthropogenic enhancement of biological or geochemical sinks and direct air capture and storage, but excludes natural CO_2 uptake not directly caused by human activities."

IPCC, SR15 Global Warming of 1.5˚C



Increasingly, sovereign nations and industry giants are committing to Net Zero by mid-century or earlier

5,000+

COMPANIES COMMITTED TO NET ZERO BY 2050 [1]

Commitments have increased more than 10x since 2019

136

COUNTRIES COMMITTED TO NET ZERO TARGETS [2]

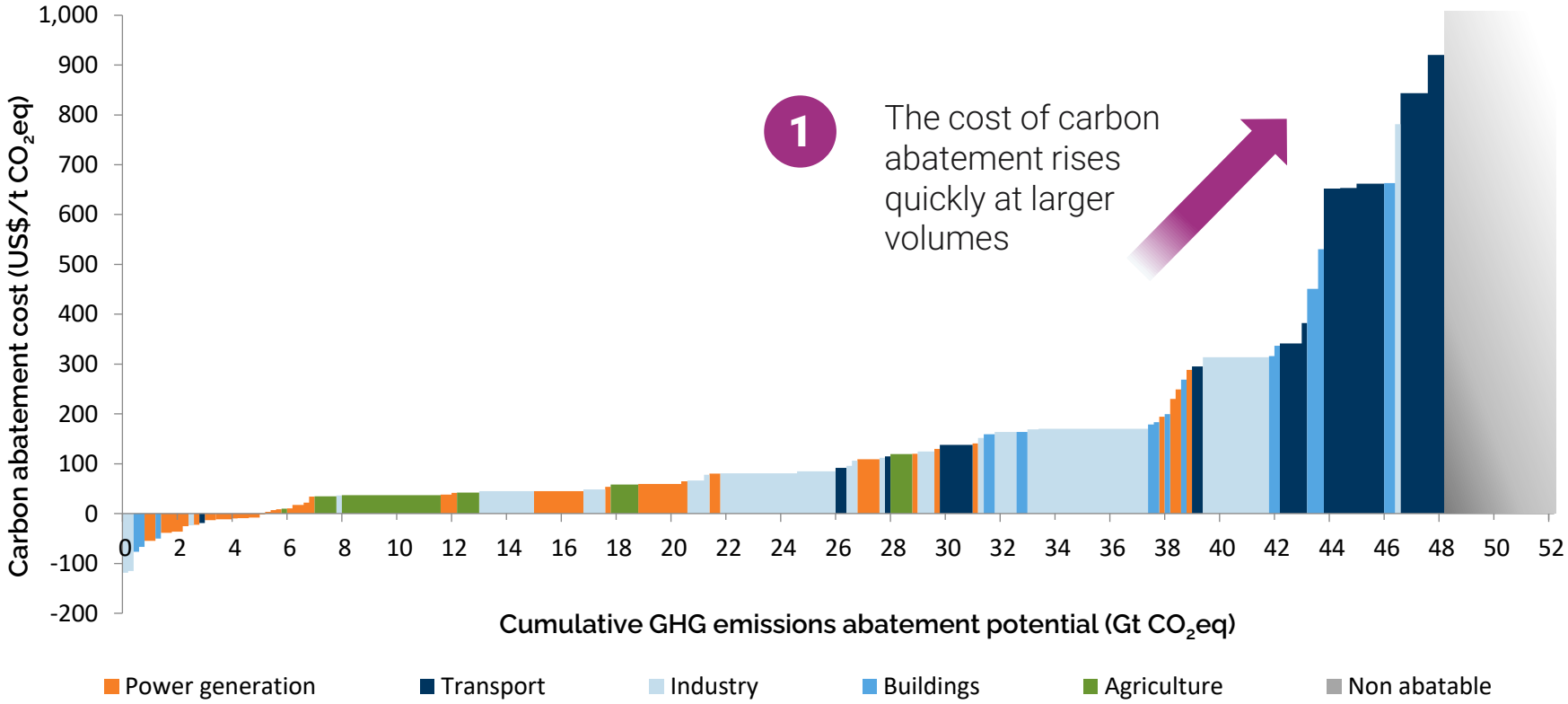
Commitments have increased more than 9x since 2018

Sources:
1. UNFCC Race to Zero
2. Energy & Climate Intelligence Unit, Net Zero Tracker. Represents countries with targets under discussion, in-policy document, proposed legislation or law with regard to national net-zero commitments.

Three primary challenges in achieving net zero & climate restoration

Carbon Abatement Curve

Carbon abatement costs based on currently available solutions.



1 The cost of carbon abatement rises quickly at larger volumes

2 Current global emissions continue to rise

3 None of this addresses legacy CO_2 already in the atmosphere

Sources:
Carbon abatement costs based on currently available solutions; data from Goldman Sachs, Carbonomics, November 2021

THE NET ZERO CHALLENGE IS IMMENSE:

THE WORLD NEEDS STRONG LEADERSHIP AND ACCELERATED TECHNOLOGICAL SOLUTIONS

A technological missing piece

CE brings a solution with potential to address three key climate problems:

1. **COST**
   Is cheaper than alternatives for many hard-to-abate emissions

2. **GROWTH IN EMISSIONS**
   "Has the potential to be almost infinitely scalable" [1]

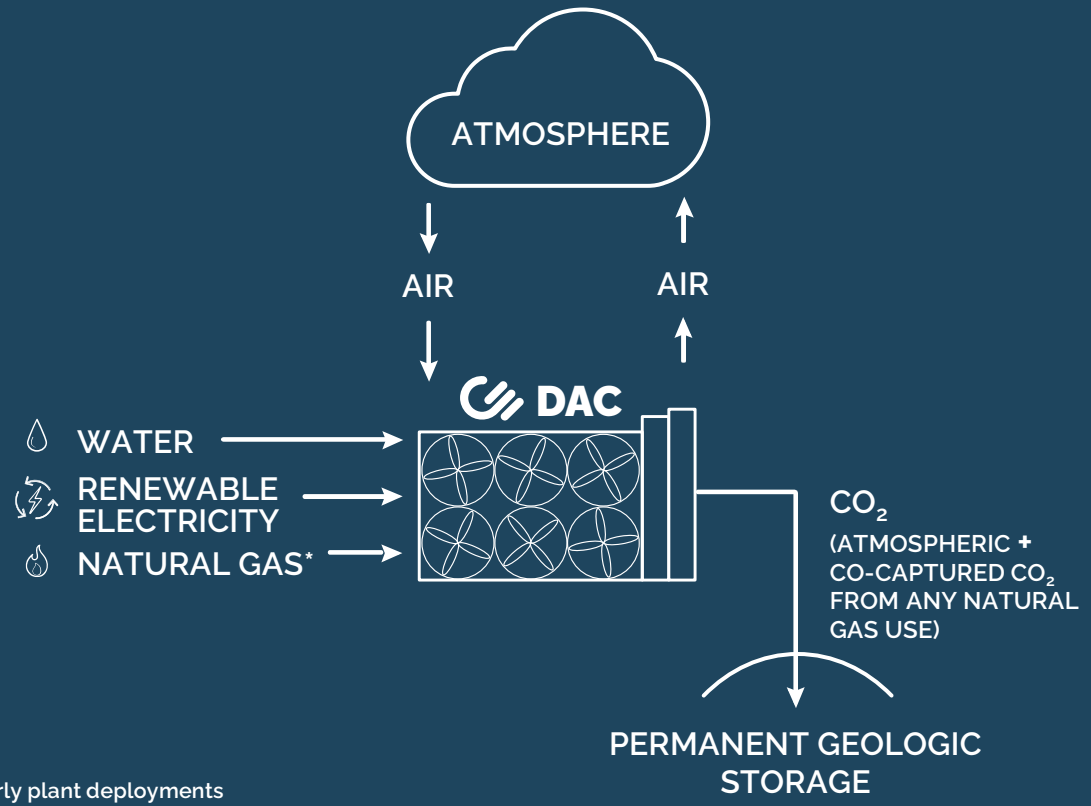
3. **NON-DISRUPTIVE**
   Can address any emission from any point in time; can offset today's emissions and supports climate restoration through permanent removal of atmospheric CO_2

[1] Goldman Sachs – Carbonomics: The Future of Energy in the Age of Climate Change.

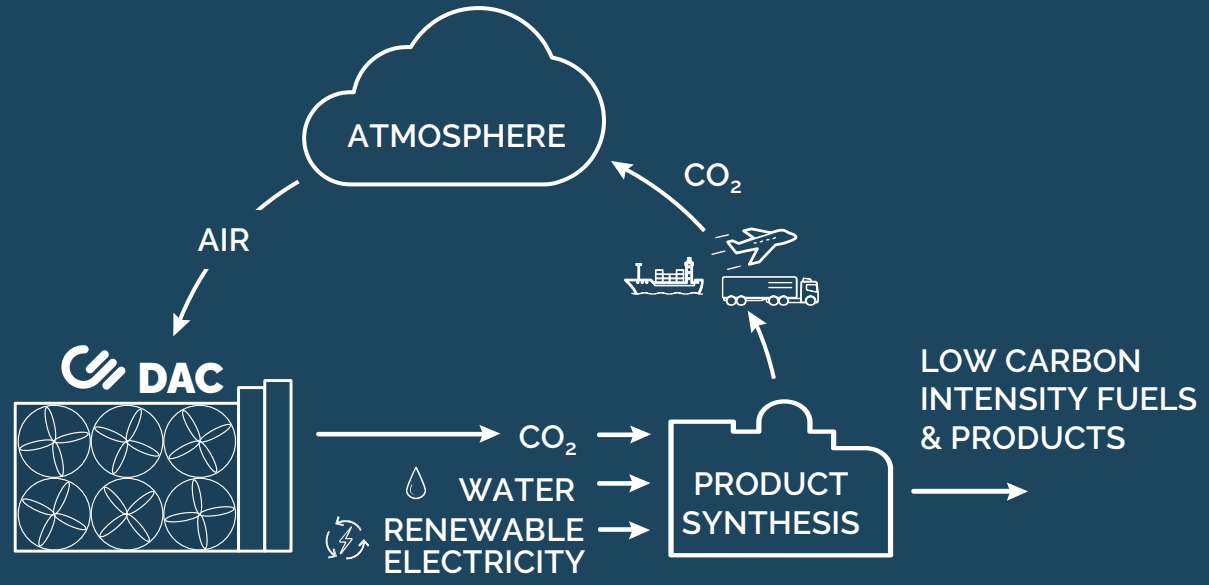
TECHNOLOGY NOW DEPLOYING AT COMMERCIAL SCALE

CE DAC enables complementary solutions for carbon dioxide reduction and removal from the atmosphere

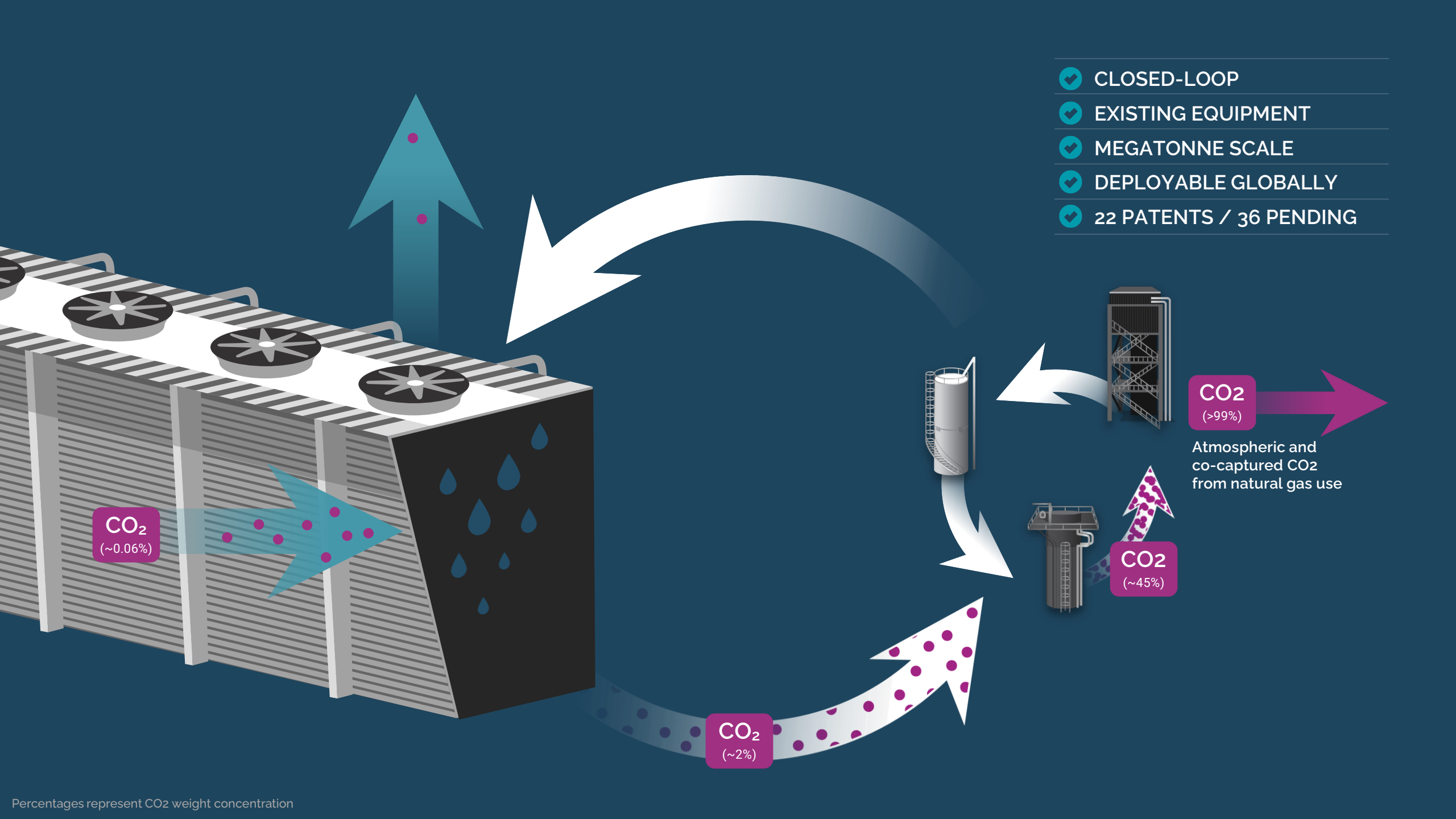
CARBON DIOXIDE REMOVAL



LOW CARBON INTENSITY FUELS & PRODUCTS



* In early plant deployments

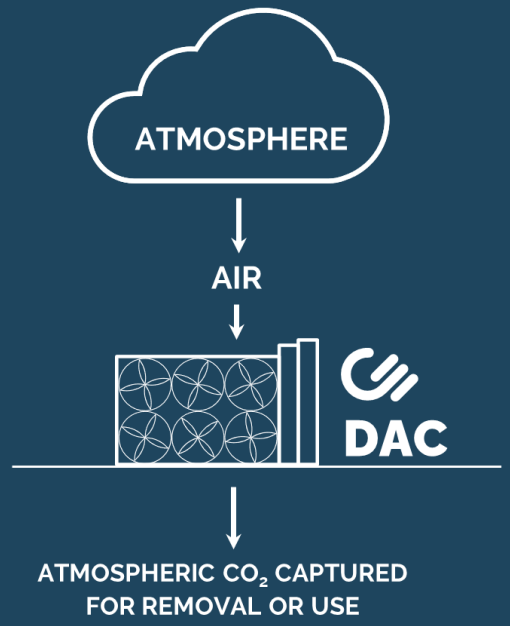


Percentages represent CO2 weight concentration

Carbon Engineering

Pioneering large scale Direct Air Capture (DAC)

Can address any CO_2 emission, from any place and point in time



FOUNDING

13 years development; 7 years pilot plant operations

MILESTONES

2015 DAC pilot plant built

2017 AIR TO FUELS™ pilot plant built

2021 Innovation and R&D centre built

2022 Construction scheduled for Q3 for 1st commercial DAC plant

2024 1st commercial DAC plant expected operational

INTELLECTUAL PROPERTY

22 issued patents & 36 applications in 15 patent families in key jurisdictions

WORLD CLASS PARTNERSHIPS

OXY, Worley (energy | chemicals | resources), 1POINTFIVE, shopify, STOREGGA, HURON CLEAN ENERGY, carbonREMOVAL, Chevron, UNITED, BHP, Virgin

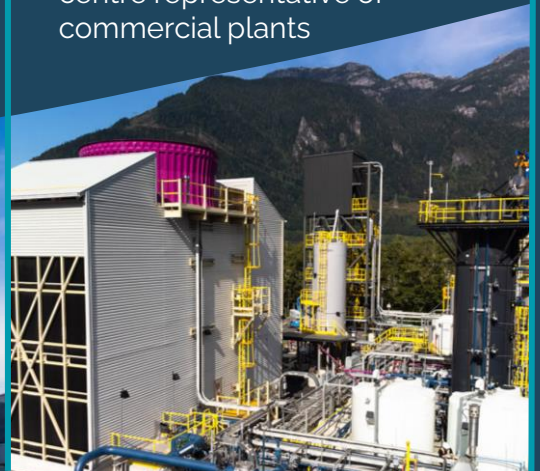
Large scale deployment underway

PILOT PLANT:
BUILT 2015

6 years of data providing high confidence in DAC performance

INNOVATION CENTRE:
CONSTRUCTION COMPLETE 2021

R&D / advanced development centre representative of commercial plants



US DAC-1:
CONSTRUCTION 2022

1POINTFIVE

Up to 1 million tonnes CO_2/y with 250,000+ hours of engineering complete

UK & NORWAY DAC:
ENGINEERING UNDERWAY

STOREGGA

carbonREMOVAL

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

AIR TO FUELS™ PLANT
ENGINEERING UNDERWAY

HURON CLEAN ENERGY

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

GLOBAL
WORKING WITH POTENTIAL HIGH-CALIBER LICENSEES

Artist renderings shown

Working with CE

- **Decarbonize your organization –** Businesses can neutralize hard-to-abate emissions with permanent carbon dioxide removal (CDR) in their journey to net zero by purchasing CE-powered DAC and sequestration. Leading companies including Airbus, Shopify, BMO and ThermoFisher Scientific have already pre-purchased CDR from the CE Network.

- **Advocate for net-zero aligned policy** – Including DAC and carbon removal in policy can help lower the costs of decarbonizing while fostering job creation and investment.

- **Build a new carbon economy business –** Licensing CE's technology is an opportunity for progressive businesses looking to enter the high growth markets of carbon dioxide removal and low-carbon intensity fuels.

DAC, a decarbonization tool

Why should organizations include DAC-products in their suite of solutions to get to net zero?

- Carbon dioxide removal (CDR) is required to get to net zero to address residual emissions, those being the remaining emissions when an organization has reduced emissions as much as possible
- Direct air capture and sequestration provides a measurable, scalable and secure form of CDR to ensure an organizations emissions are neutralized while capping the costs of decarbonization
- Additionally, CE's AIR TO FUELS™ technology can power your existing fleet with low carbon intensity synthetic fuel – made from air, water, and renewable energy. AIR TO FUELS™ facilities can deliver industrial quantities of clean fuels to meet your organization's needs
- Learn more about CE's CDR with this short video
- Come talk to our CDR experts to learn how CE's products can be a part of your decarbonization roadmap. Email us at business@carbonengineering.com

Founding customers of permanent carbon removal through CE DAC are playing a critical role in kickstarting the industry

ThermoFisher SCIENTIFIC

BMO

shopify

AIRBUS

Virgin RED

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

Mark Carney, UN Special Envoy on Climate Change

Good carbon policy supports economic growth

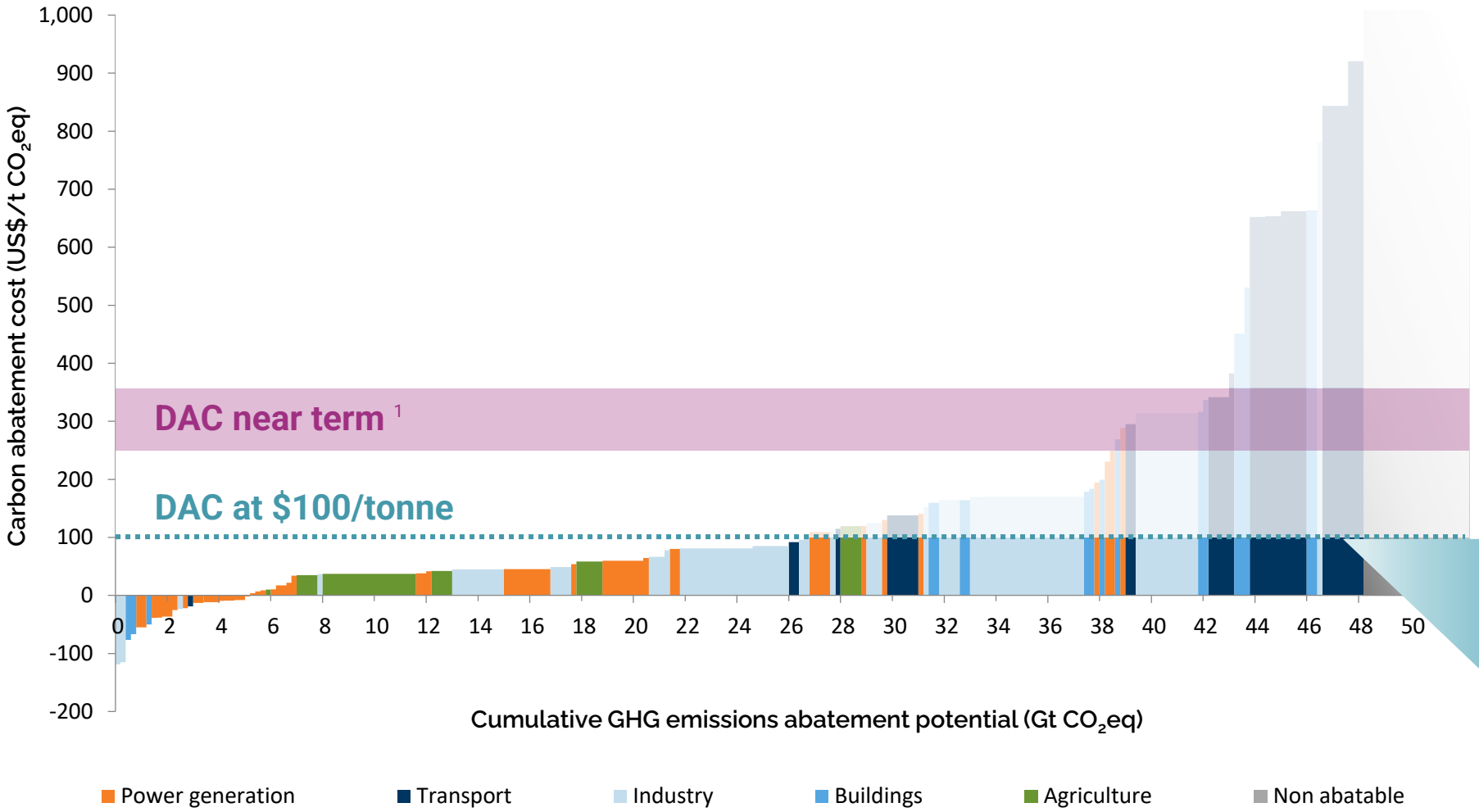
Reducing costs, creating jobs

- Lower costs of CO_2 abatement
  - Permanent carbon dioxide removal (CDR) through DAC to sequestration is a cost effective and scalable solution that can be used to neutralize an equivalent amount of emissions (i.e., net zero), providing a powerful tool for the most hard-to-abate sectors as well as financial certainty
  - Permanent CDR is already more affordable than reducing gigatonnes of society’s hardest-to-abate GHG emissions on a cost of abatement basis (see next slide)
- Job creation in the new carbon economy - studies from the Rhodium Group have estimated that DAC plant deployments have the potential to create thousands of jobs, helping to support a just transition for labour forces[1]
- Attract investment/GDP increases – when the right policies exist, DAC can serve decarbonization markets, creating significant revenue for Mt-scale plants and diversify economies. DAC plants also attract large sums of capital to finance the deployments
- Regulations to support DAC already exist – leading governments have created policy to support DAC with different mechanisms to meet the needs of their jurisdictions. Most notably, the United States’ Inflation Reduction Act could be a catalyst for DAC production

Sources:
1. Rhodium Group, Capturing New Jobs

DAC can cap the cost of decarbonization

DAC provides an economic solution for distributed & hard to abate emissions



5-10 Gt/yr

Emissions with abatement cost >$300/tonne

>10 Gt/yr

Emissions with abatement cost >$100/tonne

$Trillions/yr

Potential cost advantage over alternative solutions to achieve Net Zero

<$100/tonne

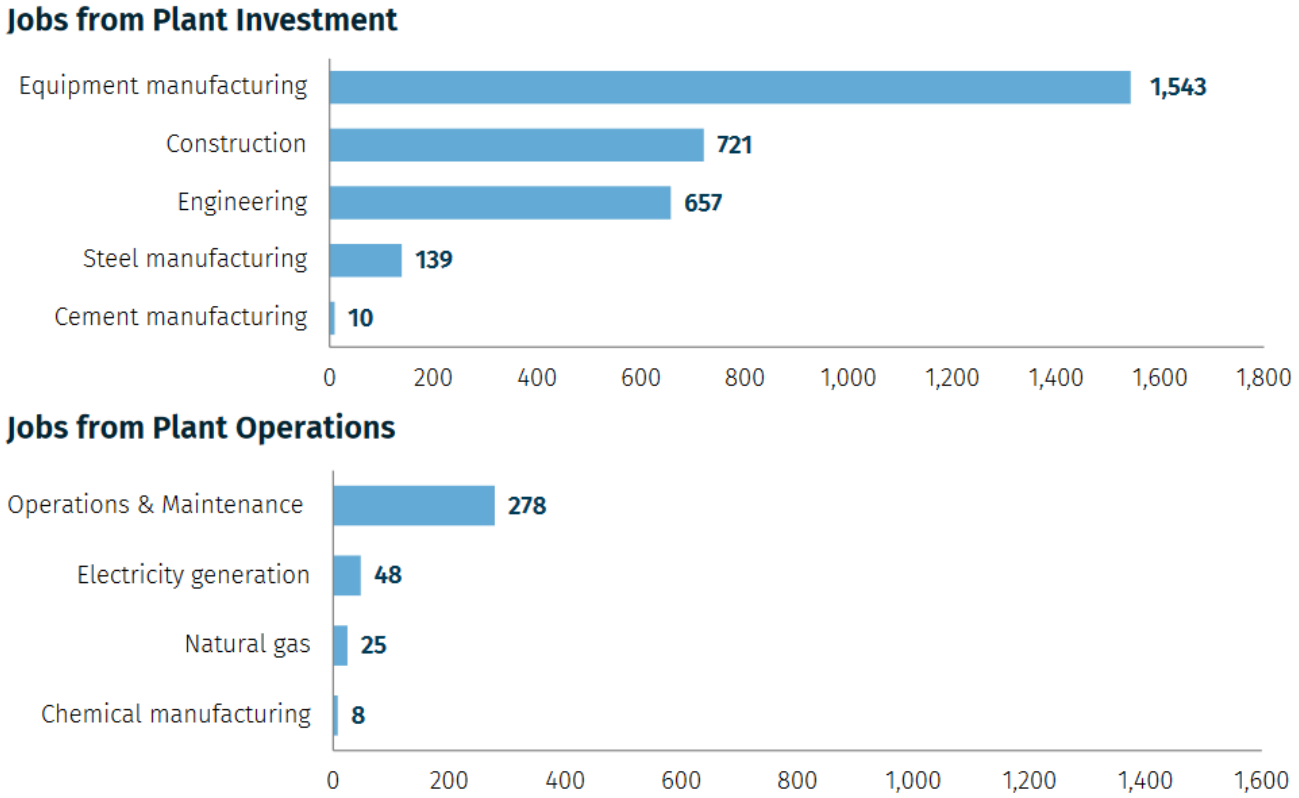
US DOE 'Carbon Negative Shot' stated long-term program goal

Carbon abatement costs based on currently available solutions; data from Goldman Sachs, Carbonomics, November 2021

1. DAC cost range shown based on current cost estimate for liquid sorbent DAC from McKinsey, June 2021, How negative emissions can help organizations meet their climate goals, and is aligned with Oxy's announced 2025-2030 cost expectations for commercial deployments

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 earn USD billions in revenue 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.

DAC Policy Primer

Why do we need policy? Public policy is required to value the carbon removal that DAC enables, create revenue streams, overcome financing barriers related to upfront capital needs and development timelines, and ultimately, create viable long-term markets.

Market Creation

- **Low carbon fuel standards** – mandate carbon intensity reductions for transportation fuels in a market-based trading system. Including DACS as an eligible pathway for credits creates a revenue path. DACS eligibility can be applied to other compliance markets like emissions trading systems and international transport (e.g., ICAO CORSIA).

- **Direct procurement** – governments can directly purchase DACS to address their own emissions.

Financial Support

- **Tax credits** – provide a direct incentive through production or investment tax credits to improve project economics.

- **Project-based support** – Direct funding for DAC projects and/or hubs can catalyze the market and centralize activity with multiple market participants.

Market Facilitation

- **CO_2 storage protocols** – provide the guidance and legal environment to allow operators to safely store CO_2 and meet required regulations

- **Capacity targets** – signal government support of DACS by establishing specific objectives over time.

Jurisdictions that have developed supportive policy environments are attracting project interest and investment

Inflation Reduction Act & DAC Hubs

The largest public investment for US clean tech

- **The Inflation Reduction Act (IRA) –** passed into law this August and is the largest climate-related bill in the United States' history
- **Significant capital deployments** – providing $369B for carbon capture and storage, zero carbon power generation, transportation and emissions reductions power
- **For Direct Air Capture and Storage:**
  - 45Q Carbon Capture Tax Credit increase from $50/tonne to up to $180/tonne for standalone sequestration
  - Inclusion of direct pay for the production year + next four years until 2033, increasing the financeability of the program
- **Supporting related industries** – notably, hydrogen production, renewable energy and sustainable aviation fuel (SAF)
- **Accelerating DAC Hubs** – the US DOE is deploying $3.5B over the next five years to create four DAC hubs each capable of capturing and storing at least 1Mt of CO_2 per annum

The opportunity to lead on climate

Bringing scalable and affordable decarbonization solutions to market

License CE technology and leverage the expertise of a DAC leader.

CE brings world-class knowledge on top of technology solutions and is ready to contribute both at the project-level and through ongoing support

Project-level assistance:

- Proven technology
- Early-stage engineering
- Technical assistance in technology, construction experience, supply chain, etc.

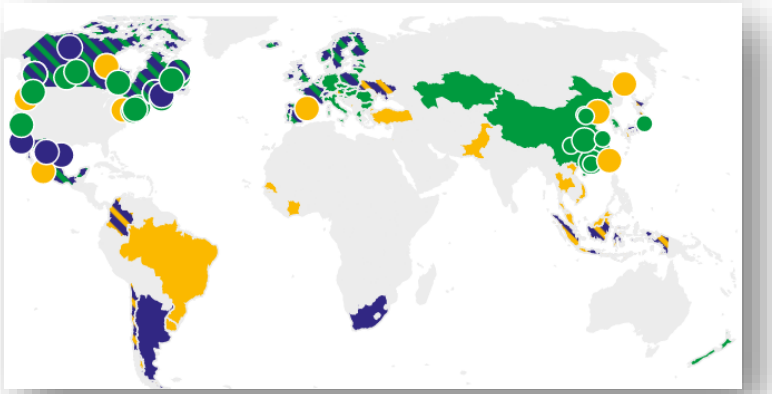
OXY LOW CARBON VENTURES

Worley energy | chemicals | resources

Ongoing support:

- Compliance market support
- Voluntary market access
- Policy assistance and advocacy

Worldwide Carbon Pricing Momentum



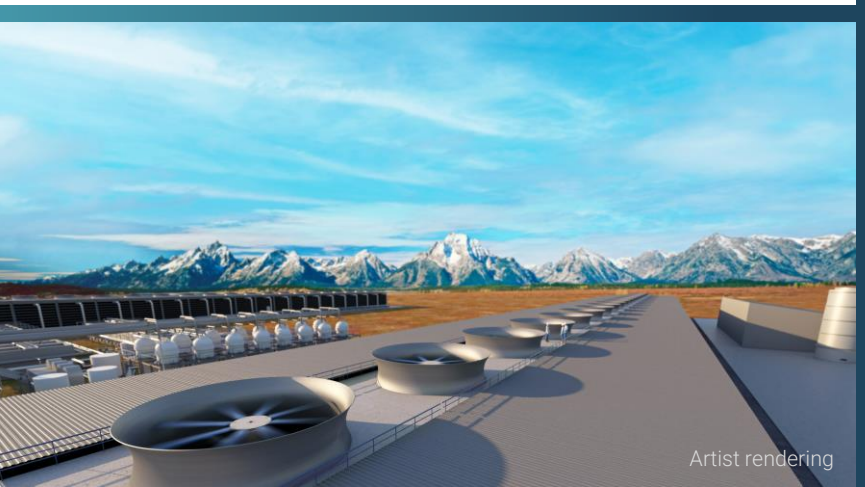
- ETS implemented or scheduled for implementation
- Carbon tax implemented or scheduled for implementation
- ETS or carbon tax under consideration

LICENSE LEADING DAC TECHNOLOGY – A TURN-KEY SOLUTION FOR THE CLIMATE

Turnkey solutions for net-zero infrastructure deployment

Franchise-like deployment platform

- Together with our global deployment team, we deliver full turnkey solutions to prospective plant owners
- We provide the license for our DAC solutions and the experienced implementation team to build and operate plants
- Ongoing R&D program targeted at optimizing DAC technology in real-world operations and reducing the cost of capture per tonne



Artist rendering

Global deployment team

OXY ZERO IN™

- Global leader in development and operation of CO_2 handling & storage projects (400MtCO_2 sequestered)
- Track record in large project execution
- Transitioning towards a future as a carbon management company

Worley
energy | chemicals | resources

- Leading global provider of project and asset services in energy, chemicals and resources
- 47,000 employees, operating in 54 countries

Regional project partners

- We work with regional partners bringing complementary expertise in local policy, regulatory & permitting, business, and financing capabilities

ANNOUNCED REGIONAL PARTNERS

1POINTFIVE

STOREGGA

HURON CLEAN ENERGY

carbonREMOVAL

Get in touch

If you're a business, government or institution working towards reduced, net zero, or even net negative emissions, we can help.
Contact us at:
business@carbonengineering.com

MORE INFORMATION CAN BE FOUND AT:

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@CarbonEngineer

CarbonEngineering