



# Net Zero and Carbon Removal – The role of Direct Air Capture

March 31st 2022. Christoph Beuttler, Head of Climate Policy

Public



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



# Why direct air capture?

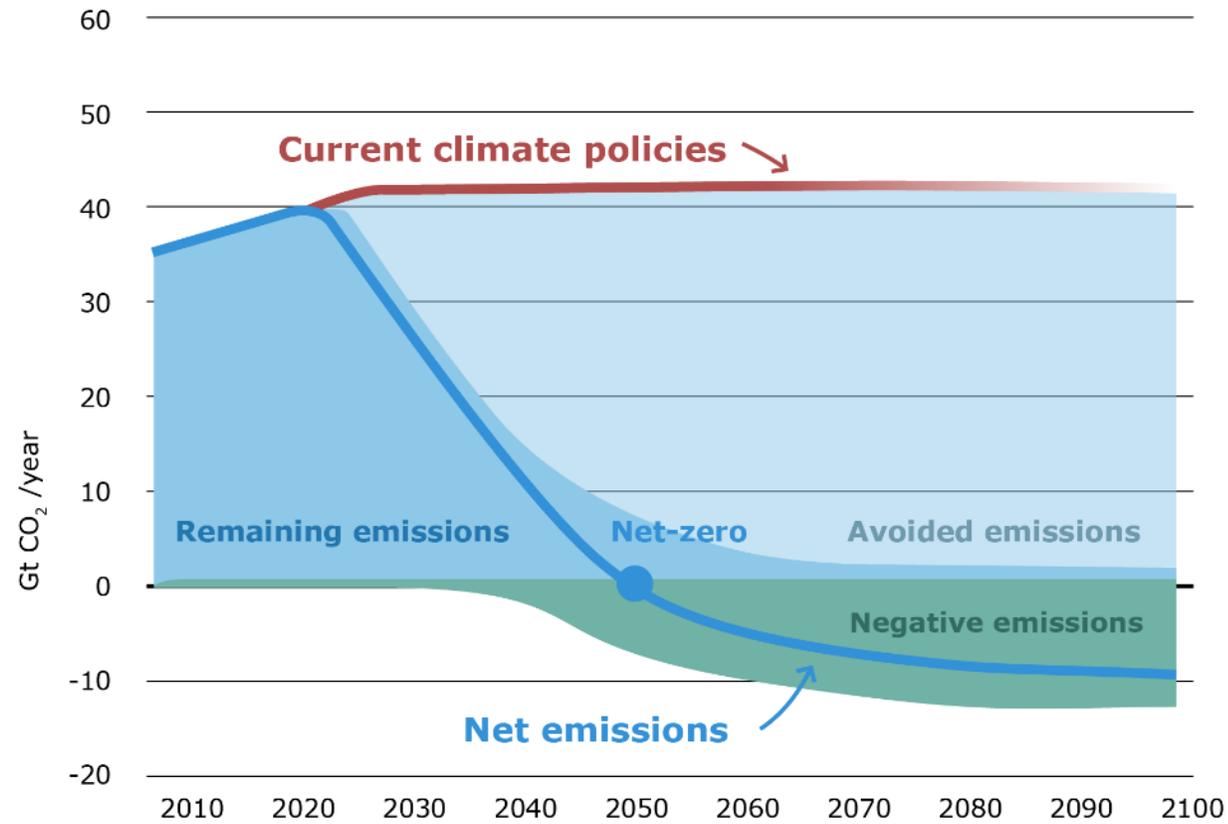


## How to keep global warming below 1.5°C

**Defossilize**

Neutralize **unavoidable emissions**

Realize **negative emissions**



**Reduce as much as possible**  
Conventional mitigation technologies

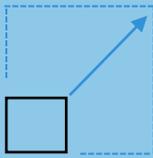


**Remove unavoidable emissions**  
Carbon removal solutions



# Nature-based and technological removals



	Storage permanence	Sustainability impacts	Scalability
 <b>Forests and soil</b>	 1-100 y	 Food security risk  Albedo  Water intensive	 low
 <b>Biochar</b>	 100-1000 y	 Food security risk  Albedo  Water intensive	 medium
 <b>Enhanced weathering</b>	 10'000+ y	 River/ ocean chemistry  Mining and extraction	 medium
 <b>BECCS</b>	 10'000+ y	 Food security risk  Albedo  Water intensive	 medium
 <b>Direct air capture and storage (DAC+S)</b>	 10'000+ y	 Renewable energy and heat needed	 high

# Climeworks' Orca collector container





**190+**  
**Climeworkers**  
dedicated to stop climate change

**\$ 160 million**  
raised

**> 100'000**  
hours operational  
experience

**< 10%**  
life cycle emissions  
renewable energy  
powered

# What we do

## Technology

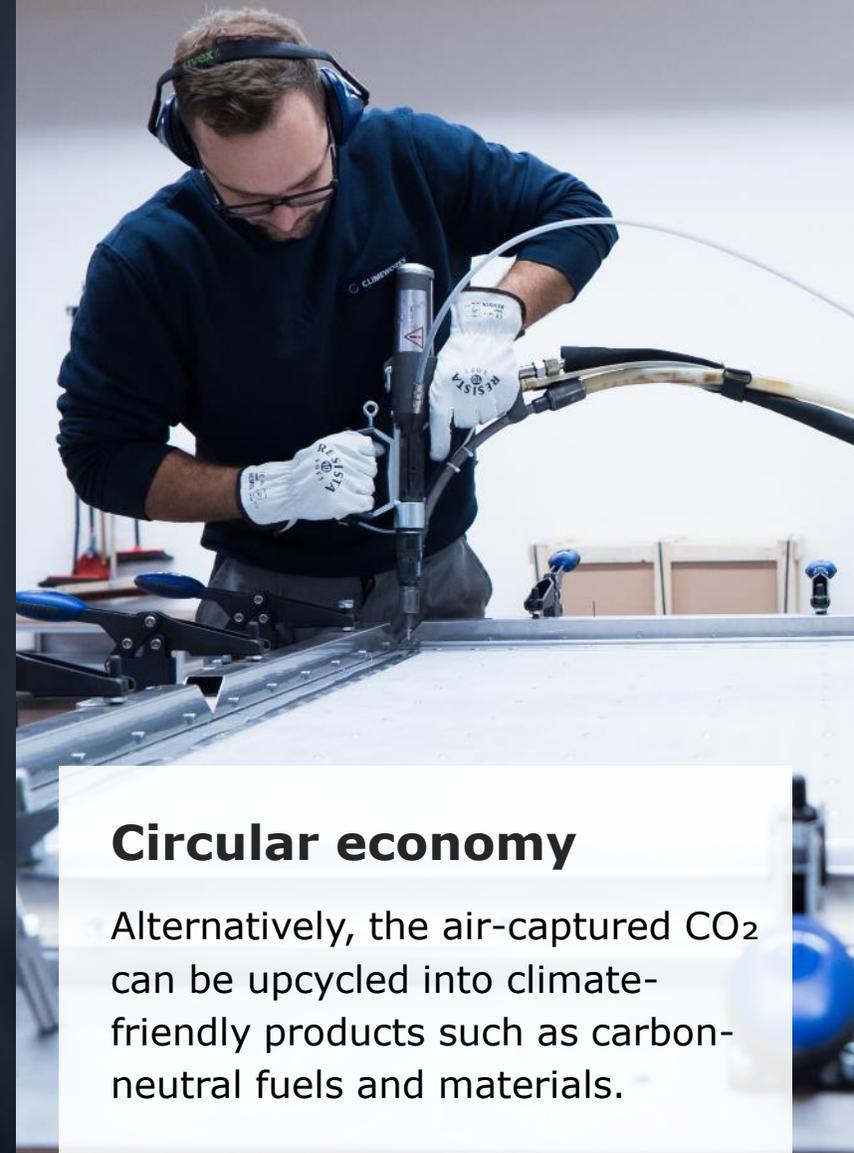
We develop, build and operate direct air capture machines that remove CO<sub>2</sub> from the air.

## Carbon dioxide removal

We return the air-captured CO<sub>2</sub> to earth by safely and permanently storing it for thousands of years.

## Circular economy

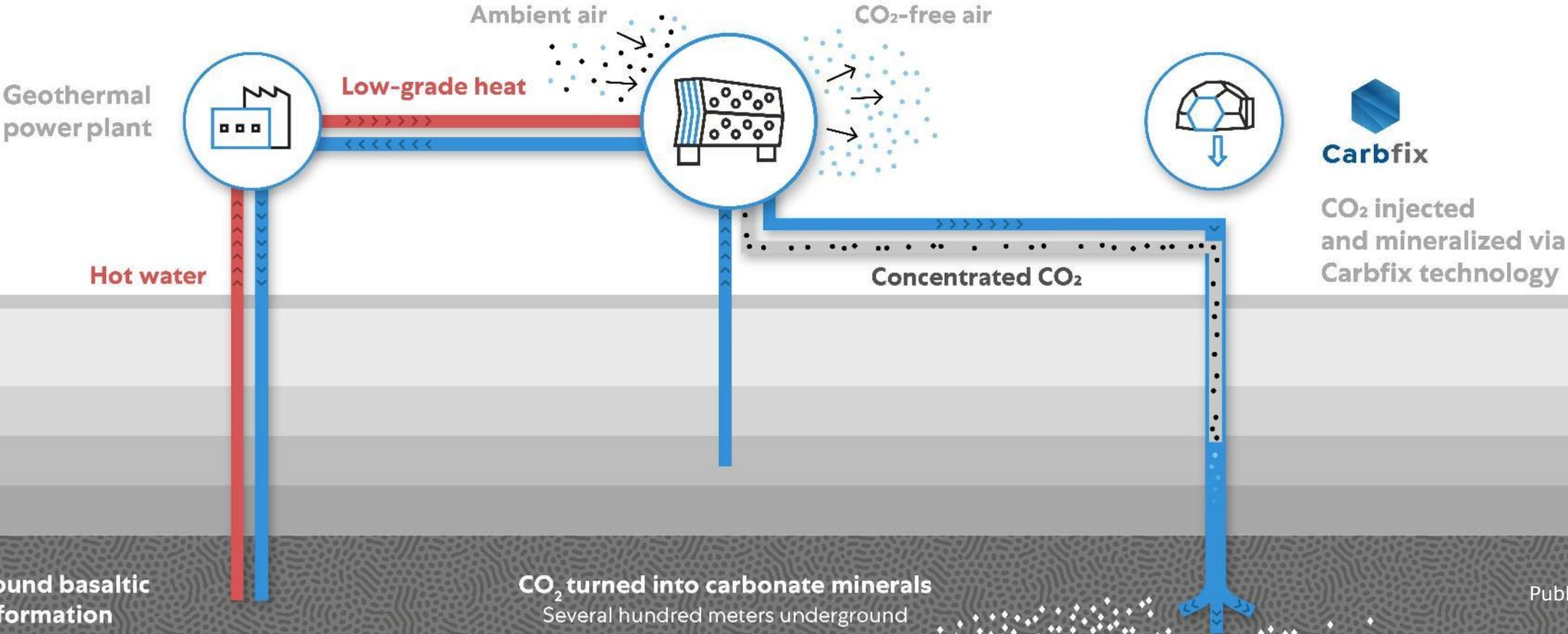
Alternatively, the air-captured CO<sub>2</sub> can be upcycled into climate-friendly products such as carbon-neutral fuels and materials.



# The most permanent carbon removal solution: direct air capture and mineralization



Energy supply, direct air capture and storage with Climeworks' Orca



# Climeworks plans continuous capacity increase



 **Iceland**  
Hellisheiði



**Orca - 4'000 tons**  
per year

**10x**  
scale-up

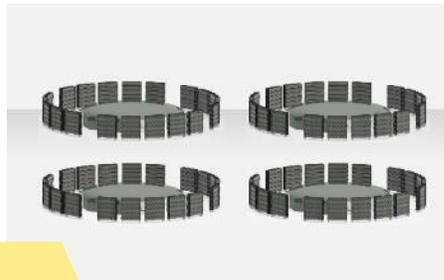
 **Global**



**> 40'000 tons**  
per year

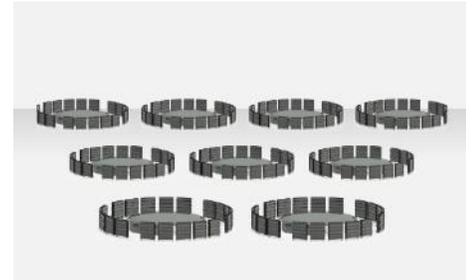
**10x**  
scale-up

 **Global**



**> 400'000 tons**  
per year

 **Global**



**Multi-mega ton range**

2021

**Enable scale-up**

Capacity sold out

2024

**Volume production**

Capacity available\*  
(2027)

2027

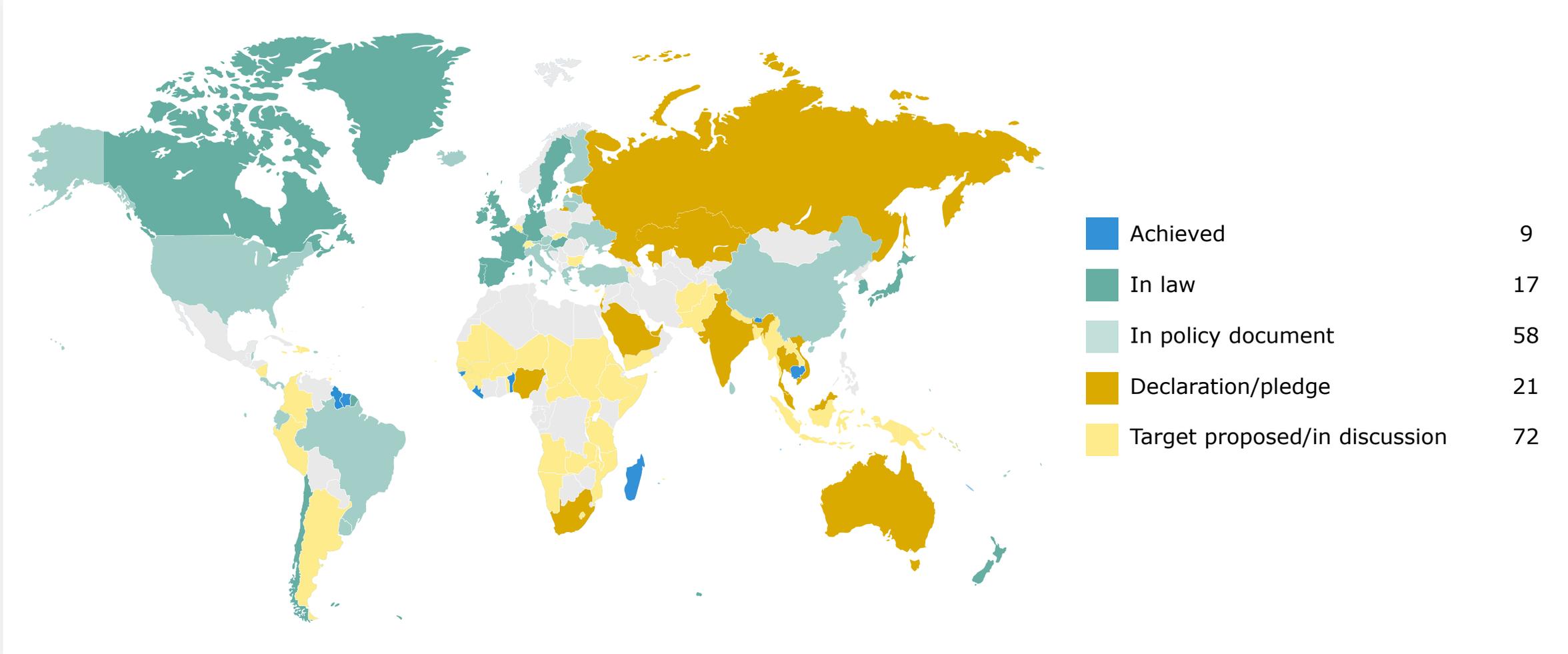
**Global roll-out**

2030

**Global roll-out**

\* Serves as an example and is subject to changes.

# Countries net zero commitments



# Corporate science-based target commitments



SCIENCE  
BASED  
TARGETS

**2'600+**

companies work  
with SBT

**1200+**

Companies set  
1.5°C-aligned SBT

**\$23+**  
**trillion**

in market  
capitalization\*

*\*more than the GDP of the United States*

Source: Data figures as of March 2022



«Net-zero emissions: do our best, remove the rest.»



«Microsoft will be carbon negative by 2030.»

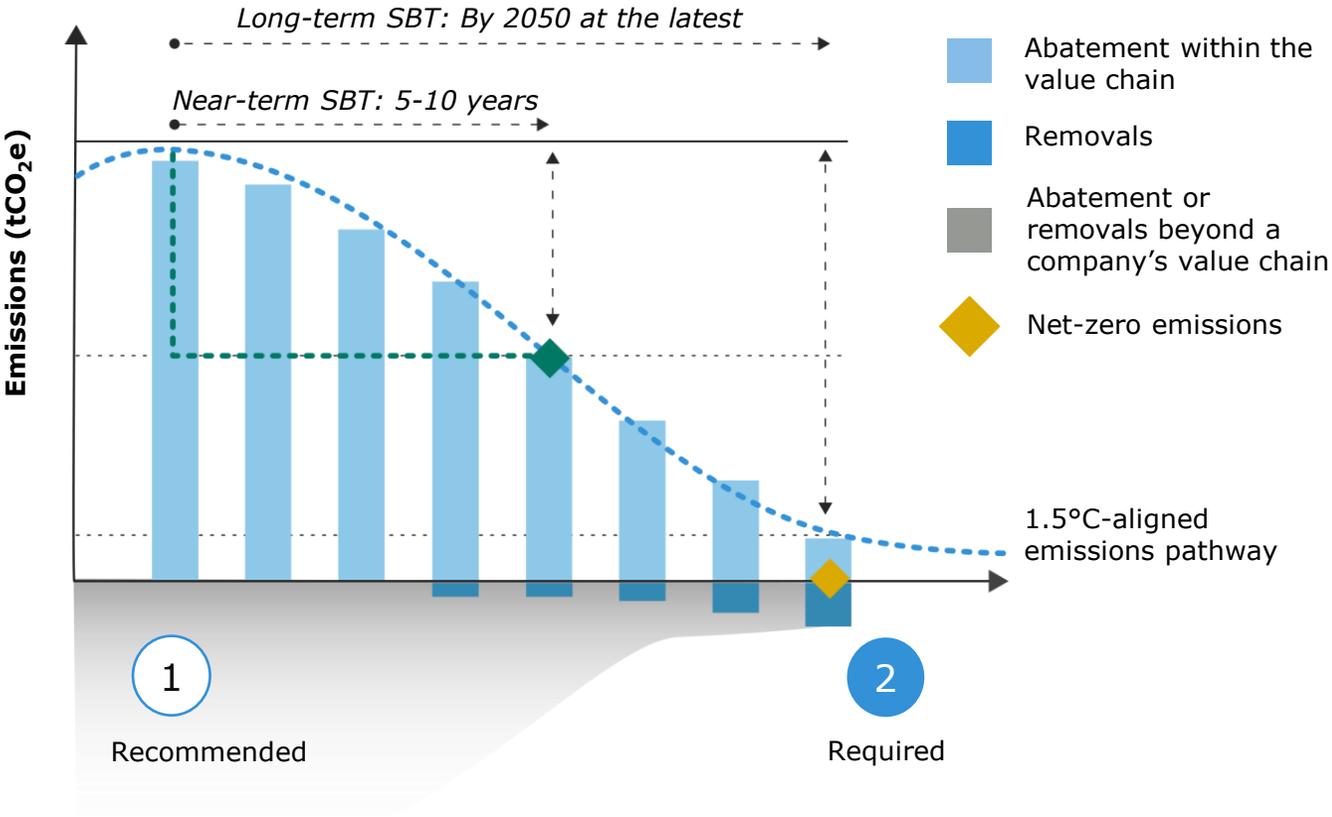


«Nestlé accelerates action to tackle climate change and commits to zero net emissions by 2050.»



«Our path to net-zero and a carbon neutral cloud: Avoid, reduce, mitigate.»

# SBTi requires permanent carbon removal



SBTi Net-Zero Standard requires **steep emission reductions** for short- and long-term SBT and only **permanent removals to reach net zero**

- 1 Beyond value chain mitigation purchasing high-quality carbon removal credits like DAC +S
- 2 Neutralization of residual emissions with permanent removal and storage

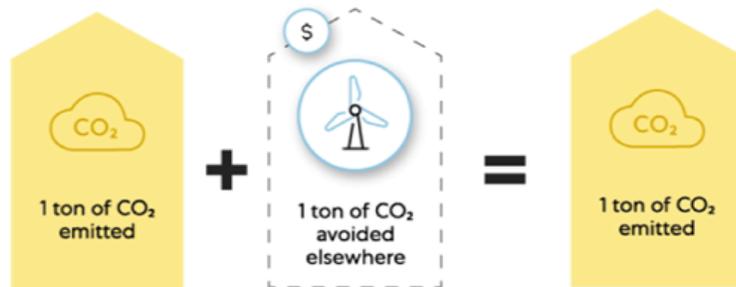
Source: [The SBTi Net-Zero Criteria 2021](#)

# Are carbon emissions actually removed?



## Carbon offset

I purchase offset credits to neutralize my emissions.  
The current level of emissions **is maintained**.

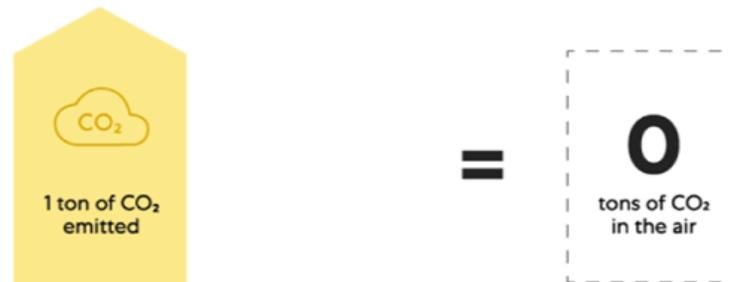


My corporate carbon emissions

Carbon neutral

## Carbon removal

I purchase removal credits to remove my emissions.  
The current level of emissions **is reduced to zero**.



My corporate carbon emissions

Net-zero carbon



- ✗ Not net-zero goal compatible
- ✗ Your emitted CO<sub>2</sub> remains in the air

- ✓ Additionality guaranteed
- ✓ Your emitted CO<sub>2</sub> is removed again from the air

# The “known unknown” – increasing recognition of climate risks



*"...we are asking companies to disclose a plan for how their business model will be compatible with a net-zero economy."*

*"We are asking you to disclose how this plan is incorporated into your long-term strategy and reviewed by your board of directors."<sup>1</sup>*

## Review of investment and lending activities is required to fund a climate-secure, zero-carbon future

- Potentially additional 10% loss in global GDP by mid-century<sup>2</sup>
- For banks in EU, up to 15% of the balance sheet is at risk<sup>3</sup>
- Inevitable Policy Response (IPR) is on the horizon

**21.5%** GHG emissions under [carbon pricing initiatives](#) (in % of total); trend increasing<sup>4</sup>

Sources: 1) Blackrock, [Larry Fink's 2021 letter to CEOs](#); 2) SwissRe report (2021), "[The economics of climate change: no action not an option](#)", 10% loss as delta under the baseline 2–2.6°C temperature-rise scenario compared to if Paris Agreement and net-zero emissions targets are achieved; 3) McKinsey report (2020), "[Banking imperatives for managing climate risk](#)", based on analysis of 46 sample EU banks and their portfolio composition in industries and geographies likely affected by physical and transition risks; 4) World Bank, [Carbon Pricing Dashboard](#), as of August 2021.

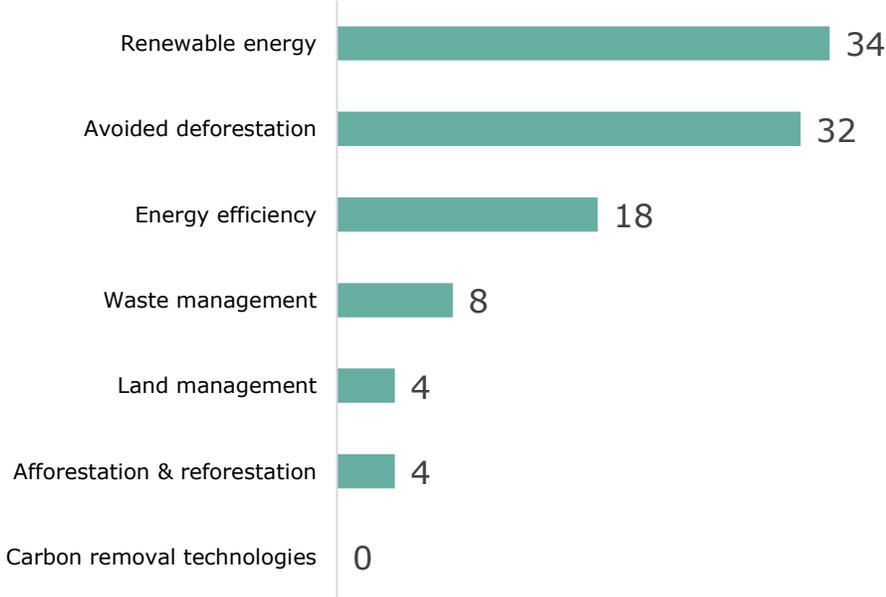
# Traditional offsets vs. removals



## Paltry offering

Less than 5% of offsets actually remove carbon dioxide from the atmosphere\*

■ Share of total %



# 96%

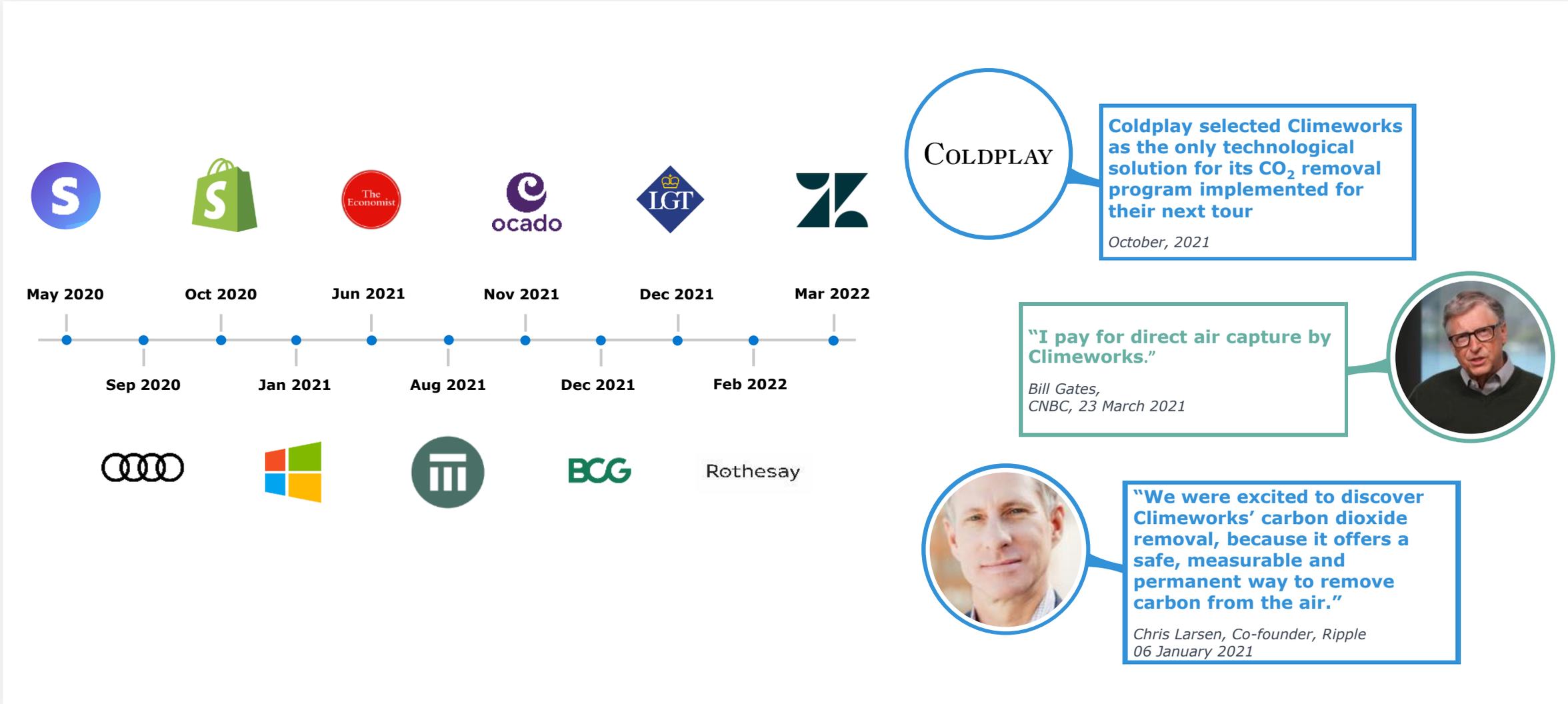
of offset contracts were made of avoided emissions in 2020

# \$400M with no effect

[CarbonPlan](#) discovered \$400 million worth of forest offsets had been sold in California without absorbing a single ton of CO<sub>2</sub>.

\*Source: TSVCM inventory analysis for 2020, Note: Avoided emissions credits prevent hypothetical pollution activity

# High-quality carbon removal in high demand

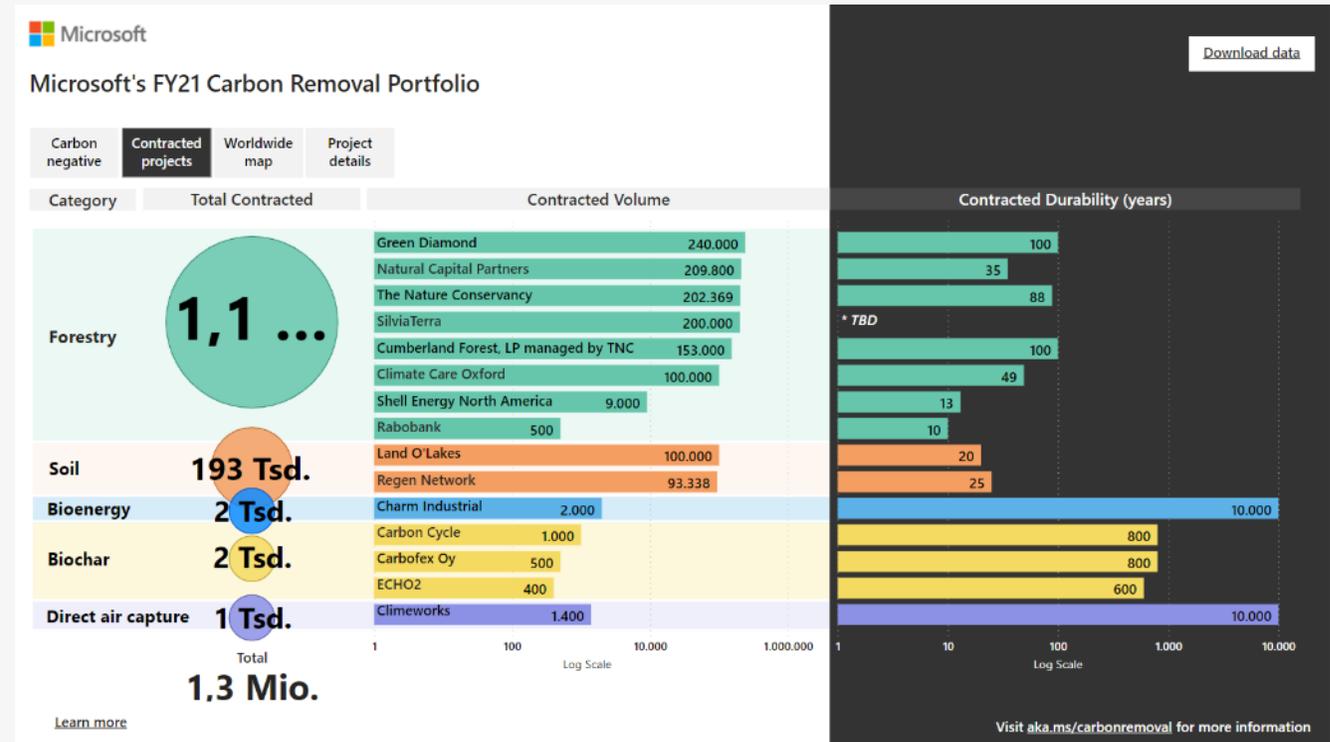


# Microsoft's exemplary carbon removal strategy



Microsoft aims to be carbon negative by 2030 by reducing emissions and using a portfolio of carbon removal solutions.

- Their portfolio starts with a share of 1% permanent high-quality carbon removals today and scales this up over time
- 1400 tons of permanent and measurable Climeworks CDR purchased



# A climate-positive gift for your employees

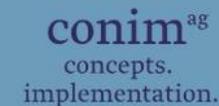
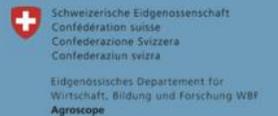
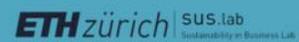
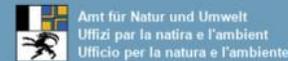
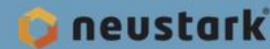
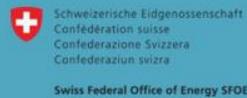
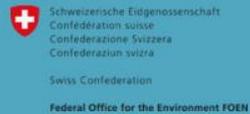
Inspire and engage your employees by giving them permanent and direct climate action.

This unique climate-positive gift will permanently remove carbon dioxide from the air in your employees' names.



# Swiss Carbon Removal Plattform

You can join via - [www.carbon-removal.ch](http://www.carbon-removal.ch)





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