

Microsoft takes a small step to carbon negativity

Climeworks is among the climate-focused firms receiving investment from Microsoft, supporting the technology giant's efforts to hit its 2030 target to become carbon negative. The investment will aid Climeworks' plans to increase deployment of its carbon-removing technology. Microsoft also announced two more investments from its \$1bn Climate Innovation Fund - Congruent Ventures and the Southeast Asia Clean Energy Facility. (Axios)

Among technologies increasingly explored to address climate change are those that take CO₂ out of the atmosphere. There is, however, work to do to develop this technology so it can be deployed at scale.

Going beyond net zero

Many businesses have made pledges to eliminate their contribution to climate change by getting to "net-zero emissions" at some point in the future.

Microsoft announced plans in January 2020 to go one better, stating it would become "carbon negative" by 2030. It plans to continue to erase its entire carbon footprint as a company - by removing the same amount of CO₂ from the atmosphere as it has ever emitted - by 2050.

At the same time, Microsoft also pledged to invest \$1B over four years in companies focused on removing CO₂ from the atmosphere. The Swiss firm Climeworks was earmarked at the time as a potential investee. Microsoft has also invested in CarbonCure, a company that has developed a concrete that can absorb CO₂, and has become a technology partner in a large-scale CO₂ sequestration project offshore Norway.

Pulling carbon from the air

Climeworks' direct air capture (DAC) technology, which has been reported as costing (for the time being) around \$600 per tonne of CO₂, takes carbon from the atmosphere which can then be sequestered underground or used for a variety of industrial purposes. If the CO₂ is designated for permanent storage, the firm's "CarbFix" system mixes the captured CO₂ with water and injects it underground where it reacts with basaltic rock and forms minerals.

The firm has also used CO₂ captured from the atmosphere as a fertiliser in greenhouses, and has partnered with other technology companies to use it to synthesise fuel. Audi is another firm backing what will be Climeworks' first large-scale DAC plant in Iceland. The facility will be capable of removing and storing 4,000 tonnes of CO₂ from the atmosphere each year.

Are we going to have to rely on these types of technologies? It's likely. Intergovernmental Panel on Climate Change scenarios that keep temperature increases below 1.5C all rely to some extent on negative-emissions technologies to take CO₂ out of the atmosphere.

The problem? These don't yet exist at scale - hence the need for large firms like Microsoft to step in and provide funding if they are serious about their climate-change commitments.

Can't we just plant trees? Large-scale afforestation projects and a general drive to protect existing forests and provide environmental stewardship will also be critical to tackling climate change. In order to reach the pace of emissions reductions needed to stop dangerous temperature rises, however, CO₂ needs to be drawn down via technologies like DAC to complement this.

Lateral thought

A further negative-emission technology involves combining bioenergy with carbon capture and storage, otherwise known as BECCS. This sees a theoretically carbon-neutral fuel - biomass - burned in a power station but the emissions are captured and then stored underground, thus drawing CO₂ from the atmosphere and locking it away.

However, as a good demonstration of some of the trade-offs that exist when tackling climate change, it's important the risks of using this technology are properly taken into account. Significant land use requirements to grow the biomass could result in ecosystem damage, while water use requirements for both BECCS and DAC could potentially increase crop prices in the Global South by a factor of five.

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