

## Carbon Dioxide Removal from the atmosphere is vital path for limiting global warming to 1.5°C

- Climate researchers deem Carbon Dioxide Removal (CDR) necessary to achieve the 1.5 °C goal. Direct Air Capture and Storage (DACs) of CO<sub>2</sub> is thereby seen as a key technology
- CarbFix project: after a successful one year pilot phase in Iceland, Reykjavik Energy, ON Power and Climeworks are planning scale-up in Iceland
- Remove CO<sub>2</sub> emissions from the atmosphere and achieve true carbon neutrality. Registration now open for anyone interested at [www.climeworks.com](http://www.climeworks.com)

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The capture and long-term storage of atmospheric CO<sub>2</sub> will be necessary if we are to protect humanity against the consequences of global warming. All scenarios for achieving the 1.5°C goal require ‘Carbon Dioxide Removal’ – i.e. the removal of CO<sub>2</sub> from the atmosphere through long-term sequestration. The CarbFix consortium, including Icelandic utility Reykjavik Energy and Swiss company Climeworks, has successfully tested Direct Air Capture and Storage (DACs) technology in Iceland, especially suited to this, and will now start the project-planning phase for expanding their DACs capacity. This will give everyone the opportunity to have their emissions removed from the atmosphere via Direct Air Capture, for the first time in the world.

With Direct Air Capture being the latest disruptive Negative Emissions Technology, climate scientists needed a “proof of concept” for the promising DACs technology – a milestone that Climeworks and Reykjavik Energy, the pioneers in capturing CO<sub>2</sub> from air and storing it underground, have now achieved with its successful year-long demonstration within the CarbFix2 project. “Today, we have a clear message for climate science and the rest of the world: Direct Air Capture and Storage not only works but it’s safe, permanent and achievable on an industrial scale,” said Christoph Gebald, co-founder of Climeworks. “From 2019, we will offer individuals, countries, businesses and institutions from all over the world the unique opportunity to reverse their past, present or future emissions permanently and safely with Direct Air Capture.”

### DACS as a favorable Carbon Dioxide Removal technology

As the IPCC makes clear once more, it is now necessary to reduce worldwide emissions fast, whilst at the same time *actively* remove CO<sub>2</sub> from our atmosphere. The global potential of DACs technology for the permanent removal of atmospheric CO<sub>2</sub> is enormous. Not only is the land and water-use very low for DACs, but Climeworks plants can be implemented anywhere where basalt rock (or other CO<sub>2</sub> storage possibilities) and renewable energy sources are available. More importantly, DACs plants do not require any fertile land for operation creating no strain on ecosystems.

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The geological conditions for safe and permanent sequestration also exist outside of Iceland in regions of the world such as the USA, the Middle East and Africa. "The storage capacity is such that, in theory, basalts could permanently hold the entire bulk of CO<sub>2</sub> emissions derived from burning *all* fossil fuel on Earth," says Dr. Sandra Snaebjornsdottir, a geologist working for CarbFix.

## Successful pilot plant in Iceland

Around 25 kilometers from Reykjavik, the CarbFix consortium including Climeworks and its partner Reykjavik Energy has, over the past year, proved that the combination of capturing CO<sub>2</sub> from air and subterranean sequestration works - even in complicated climatic conditions. As part of the CarbFix2 Horizon 2020 project, the partners called on local engineering expertise to overcome challenging conditions like freezing temperatures combined with high humidity, or the high concentration of sulphur in the air. "After an initially steep learning curve, we eventually ran the plant without failures for several months," reported co-founder Jan Wurzbacher.

CO<sub>2</sub> captured during the pilot phase was mixed with water, using the CarbFix process, and pumped into 700-metre-deep layers of basalt rock. There, the CO<sub>2</sub> solution reacts with the underground basalt and turns into white, calcareous and harmless calcite, which fills the pores of the rock. Within two years, the CO<sub>2</sub> is thus permanently and safely sequestered.

## Expansion of DACS capacity

Thanks to its successful "proof of concept" with the CarbFix2 pilot plant, Reykjavik Energy, ON Power and Climeworks are now planning an expansion of their DACS capacity. "At sites like ON Power's Geothermal Park in Hellisheidi we have the potential to remove several hundred thousand to even millions of tons of CO<sub>2</sub> annually from the atmosphere," said Dr. Edda Sif Aradóttir, Deputy Managing Director at Reykjavik Energy. "Together with ON Power and Climeworks we are currently planning the next scale-up steps for further increase DACS capacity at our site."

## Reverse emissions, join a movement, bring alive the Climeworks community

Climeworks will make Carbon Dioxide Removal available for everyone. This will enable us all, even countries and businesses to reverse their past, present or future emissions. With this, Climeworks hopes to open to other visionaries out there the possibility to unite and join us in the quest for a safe future of our climate and planet. The pre-registration for the purchase is as of today possible via the [Climeworks website](https://www.climeworks.com).

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## About CarbFix2 project

CarbFix2 has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 764760 and is led by Iceland's multi-utility company Reykjavik Energy. Further partners are the University of Iceland, CNRS (Toulouse, France) and Amphos 21 (Barcelona, Spain).

## About Reykjavik Energy and ON Power

Reykjavik Energy is a public utility company providing; electricity, geothermal water for heating, cold water for consumption and firefighting, sewage services and fibre-optic data connections. The service area extends to 20 municipalities, covering 67% of the Icelandic population. Reykjavik Energy's principal owner is the City of Reykjavik, and it provides its services through three subsidiaries; Veitur Utilities, ON Power and Reykjavik Fibre Network.

ON Power is a leading power company that produces electricity, mainly by harnessing geothermal energy, to more than half of the population of Iceland. The company is a world leader in the utilization of geothermal energy and produces electricity and geothermal water for heating.

## About Climeworks

Climeworks captures CO<sub>2</sub> from ambient air with the world's first commercial carbon dioxide removal technology. The Climeworks direct air capture plants capture CO<sub>2</sub> with a patented filter and are powered by either waste or renewable energy.

Climeworks air-captured CO<sub>2</sub> is sold to customers in the Food, Beverage & Agriculture; and Renewable Fuels & Materials markets. Climeworks also offers Emissions Reversal, enabling customers to realize their climate goals by safely and permanently storing air-captured CO<sub>2</sub> underground, and thereby ultimately stopping climate change from reaching dangerous levels.

Founded by engineers Christoph Gebald and Jan Wurzbacher, Climeworks has assembled the world's largest team of experts in the field and has a goal of capturing one per cent of global emissions by 2025.

Further information: [www.climeworks.com](http://www.climeworks.com)

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