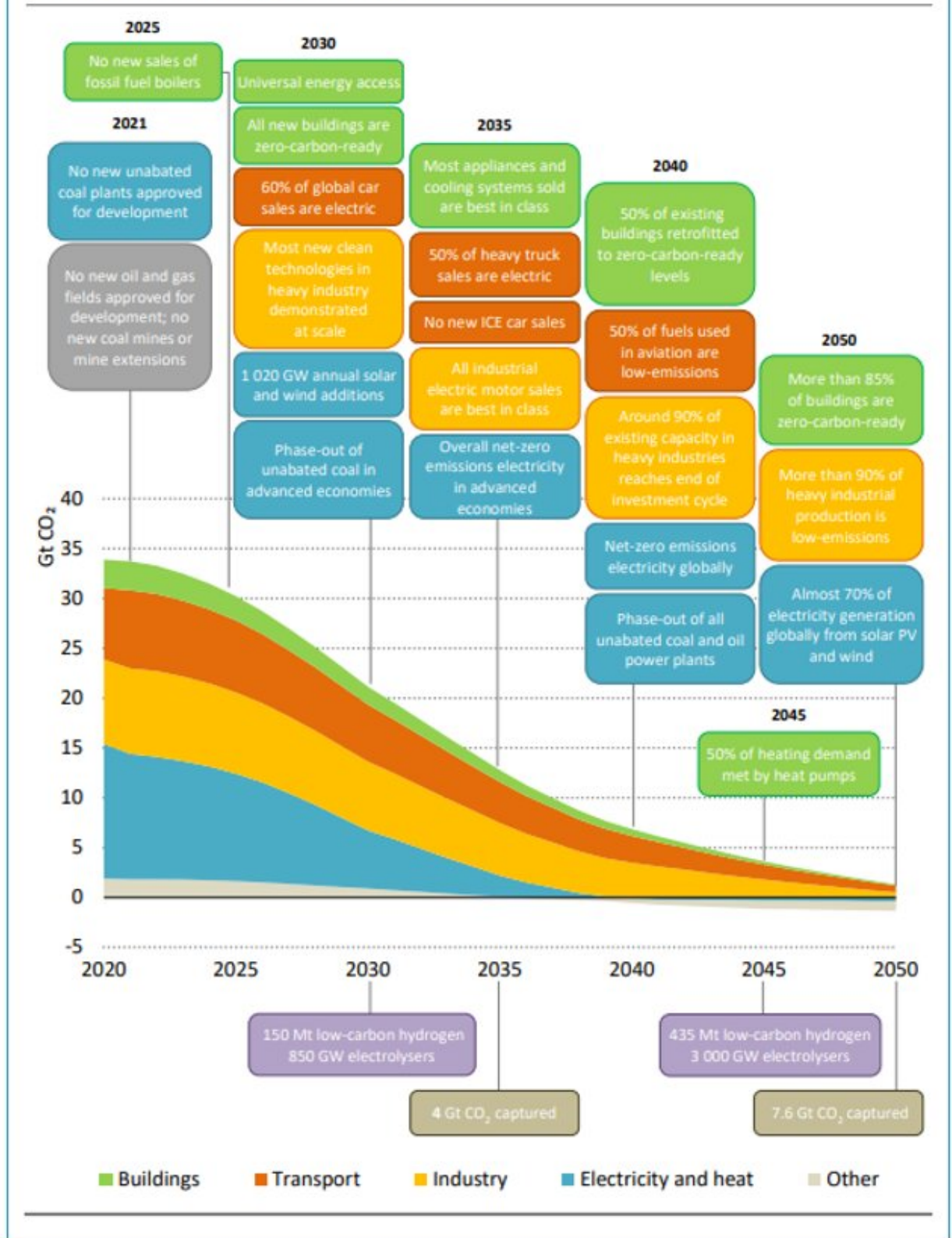


# **Company seeks to capture 1 million tons of CO2 from the air per year**

September 1 2022, by Silje Grytli Tveten

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## Key milestones in the pathway to net zero



The graph shows the many actions we must take to cut emissions to a minimum in the years up to 2050. Credit: Net Zero by 2050, A Roadmap for the Global Energy Sector, International Energy Agency, 2021

We are releasing more and more CO<sub>2</sub> into the atmosphere. Now we need to find technologies that can remove what has already been released—in addition to dramatically reducing the emissions. Removing existing CO<sub>2</sub> from the atmosphere, known as historical CO<sub>2</sub>, will be a necessary solution if we are to achieve the climate goals, according to the UN Intergovernmental Panel on Climate Change.

If we succeed in creating a large industry based on CO<sub>2</sub> capture, also called "climate-positive technology," Norway can take a leading role.

"The value chain will be able to create new jobs, in addition to having major ripple effects in the districts where the facilities are established. We need to put in place the framework so we can develop this in a way that safeguards the sustainability goals in the UN," says Einar Tyssen, CEO of the industrial company Removr.

In collaboration with SINTEF as a research partner and the technology partner GreenCap Solutions, Removr is now putting in place a large-scale CO<sub>2</sub> capture facility from air.

The solution in development is called Direct Air Capture (DAC) technology. According to the partners, Norway can take on a world-leading role within DAC by using [renewable energy sources](#) in combination with cost-effective capture technology.

## **Pilot in Iceland**

Removr is already developing a pilot for DAC technology in Iceland.

Today, Iceland leads the way on CO<sub>2</sub> capture from air. The country uses its naturally good conditions related to clean energy and storage in the basalt formations in the subsurface.

"In Iceland, we get access to both renewable power and storage that makes it possible to demonstrate the technology quickly. At the moment, only in Iceland a full [value chain](#) can be realized. This means that the country has become the world's display window for [carbon capture](#) from air," says Tyssen.

## **Zeolite as core technology**

The core of the DAC technology is the material zeolites. Zeolites are porous and attract carbon dioxide from gas mixtures in the small pores of the material. In this way, the CO<sub>2</sub> molecules are separated out of the air.

SINTEF has many years of experience with zeolites and the development of technologies that use microporous absorbents.

"Zeolites are found naturally as minerals, but for use in the industry they are most often produced synthetically," says Jasmina Hafizovic Cavka, research leader at SINTEF.

"The material is used in several separation processes, such as purification of water and separation of oxygen from air for use in hospitals. In the context of DAC technology, the extensive use of zeolites is positive in that the materials are not toxic and that they are commercially available on a large scale, which is crucial for the implementation of DAC technology," says Cavka.

## Vacuuming the air

With DAC, CO<sub>2</sub> is "vacuumed" directly from the atmosphere, so that the CO<sub>2</sub> concentration and greenhouse effect is reduced. However, the CO<sub>2</sub> concentration in the air is only around 0.04 percent. This is about 300 times lower than what comes from the exhaust gas in a coal-fired power station.

In other words, the concentration of CO<sub>2</sub> must be increased to more than 95 percent. In addition, the greenhouse gas must be stored under ground. This will be done by mixing the CO<sub>2</sub> with water and then storing it in the geological layer under the island: basal formations. After 1-2 years, the mixture will be mineralized, that is converted into stone.

"We build capture facilities that blow large amounts of dried and refrigerated air through a microporous material that captures the CO<sub>2</sub> molecule in the pores. However, since the CO<sub>2</sub> concentration in the air is low, the plants must be large before they will have a significant effect. Our goal is to reach a capacity of 1 million tons of CO<sub>2</sub> per year," says Einar Tyssen.

## Large-scale benefits crucial for the economy

The fact that DAC-plants must process large amounts of air, requires a lot of [clean energy](#) and large facilities. The biggest challenge in today's DAC technologies is therefore high investment and operating costs.

"To reduce the [energy demand](#) and footprint, more research is needed, both on the CO<sub>2</sub> capture materials and optimization of the capture process itself. In addition, standardized life cycle analyses and techno-economic analyses are crucial," says Jasmina Cavka.

## Modeling of full-scale rigs

The research team will now start modeling the capture process that will form the basis for the design of a full-scale capture facility. More knowledge about dimensions, the amount of zeolite and the energy consumption is particularly needed.

**More information:** Net Zero by 2050, A Roadmap for the Global Energy Sector, International Energy Agency, 2021.

[iea.blob.core.windows.net/assets/2021/09/NetZeroBy2050ARoadmapfortheGlobalEnergySector\\_CORR.pdf](https://iea.blob.core.windows.net/assets/2021/09/NetZeroBy2050ARoadmapfortheGlobalEnergySector_CORR.pdf)

Intergovernmental Panel on Climate Change (IPCC). 2019. Climate change and land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems.

[www.ipcc.ch/srocc/](http://www.ipcc.ch/srocc/)

Provided by Norwegian University of Science and Technology

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