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*MCC press release*

# How to capture and use atmospheric $CO_2$

A new study quantifies the potential and costs of the ten most important applications, e.g. in industry, construction, and agriculture.

**07/11/2019 Berlin.** Carbon dioxide ($CO_2$), the main greenhouse gas responsible for global warming, can also be used as a raw material, for example for the production of chemicals, building materials, novel fuels, or even as fertilizer in algae farming, i.e. input for future food production. $CO_2$ can also be bound to land areas and increase agricultural yields. An overview study now quantifies the potential in this regard up to the year 2050. It was conducted by research institutions in England, the USA, the Netherlands and Germany, among them the Berlin climate research institute MCC (Mercator Institute on Global Commons and Climate Change). The study was now published in the renowned journal *Nature*.

Using research synthesis methods, the authors assessed the relevant scientific literature on the use of atmospheric $CO_2$, comprising over 11,000 peer-reviewed papers. Based on this information, in combination with the results of an expert survey, utilisation potentials for the year 2050 and breakeven prices were calculated. The global potential for the ten most important $CO_2$ utilisation options is quite impressive: in the long term, each option would make it possible to bind at least half a gigatonne of atmospheric $CO_2$ per year. However, the applications are in part mutually limiting – and while $CO_2$ can remain bound in building materials for centuries, for example, storage is limited to only a few weeks in methanol as a fuel.

"The potential uses of atmospheric $CO_2$ need to be systematically analysed", says Jan Minx, one of the authors of the study and head of the MCC working group Applied Sustainability Science. "The potential for most industrial applications may be limited, but $CO_2$ utilization can provide an important boost on the path to greenhouse gas neutrality. For example, it could accelerate the development of removal technologies through new business models and niche markets. This could also cause the total costs for climate mitigation to drop in the long run."

However, climate change mitigation through reducing emissions remains as the number one priority. The study puts a widespread misunderstanding to rest with a solid argument: "If we capture one tonne of $CO_2$ for industrial use at one point, it doesn't compensate for blowing one tonne into the atmosphere at another point", emphasises Sabine Fuss, head of the MCC working group Sustainable Resource Management and Global Change and also co-author of the study. "This is because $CO_2$ utilisation goes hand in hand with considerable energy consumption and therefore additional emissions. It's important to look at lifecycle emissions and substitution effects more closely and distinguish between different options. Our study makes an important contribution in that regard."

Professor Cameron Hepburn, Director of Oxford's Smith School of Enterprise and the Environment and lead author of the study, explains: "Greenhouse gas removal is essential to achieve net zero carbon emissions and stabilise the climate because we haven't reduced our emissions fast enough." He points out: "Even though $CO_2$ utilisation could act as an incentive for carbon removal, we do not advocate subsidies for utilization. Rather, carbon pricing as a means of targeting emissions would support $CO_2$ utilization in cases in which it is beneficial for the climate."

**About the MCC**

The MCC explores sustainable management as well as the use of common goods such as global environmental systems and social infrastructures against the background of climate change. Our seven working groups are active in the fields of economic growth and development, resources and international trade, cities and infrastructure, governance and scientific policy advice. The MCC was co-founded by the Mercator Foundation and the Potsdam Institute for Climate Impact Research (PIK).

**Reference of the cited article:**

Hepburn, C., Adlen, E., Beddington, J., Carter, E., Fuss, S., Mac Dowell, N., Minx, J., Smith, P., Williams, C., The technological and economic prospects for $CO_2$ utilisation and removal, 2019, *Nature* https://www.nature.com/articles/s41586-019-1681-6

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