2021-IP17 – Nature Comment on 'Microsoft's $MtCO_2$ removal purchase – lessons for net zero'

On 29 September 2021, a team of Microsoft staff and research scientists published a comment in Nature about lessons learnt from Microsoft's and Stripe's recent carbon dioxide removal (CDR) purchase efforts.

In January 2021, Microsoft announced that it had purchased CDR of about 1.3 $MtCO_2$ from various sources, such as forest expansion, soil management and direct air carbon capture and storage (DACCS). The amount is equivalent to about 11% of Microsoft's annual value chain emissions and is the largest corporate procurement of CDR so far. Microsoft has formulated strong commitments to combat climate change, which include:

- Introducing an internal carbon tax on all greenhouse gases (GHGs)
- $1bn fund to invest in CDR and CO_2 reductions
- By 2030: become carbon negative
- By 2050: have removed all its historic emissions since its foundation in 1975

Financial services company Stripe purchased CDR worth $9m in 2020 and 2021. During their purchase efforts, both companies ran into the following issues related to the submitted proposals:

- Inconsistent definitions of net zero,
- Poor measurement, reporting and verification (MRV) and accounting of the carbon,
- Immature market for removals and offsets,
- Permanence of the carbon storage (in general, biosphere-based solutions have shorter CO_2 storage than geosphere-based ones, see also Figure 1),
- Certain positive and negative externalities not being accounted for (such as above-mentioned permanence but also water use, land use, biodiversity etc.).

For Microsoft, out of the 189 CDR proposals offering 154 $MtCO_2$, only 2 $MtCO_2$ met their criteria for high-quality CDR. Similar for Stripe, out of the 16 $MtCO_2$ offered, only 0.024 $MtCO_2$ met their criterium for long-term carbon storage (at least 1,000 years). Nature-based CDR projects with carbon storage for less than 100 years made up the majority of the submitted projects (more than 95% in terms of CO_2 capacity in Microsoft's case). Figure 1 gives an overview of the CDR proposals received, in terms of permanence, capacity and type of project (biosphere or geosphere storage).

After taking stock, the authors of the article then go on to highlight aspects that need urgent attention for the development of science, technology and markets of successful CDR:

- Companies need standards to gauge whether their carbon commitments are consistent with global net zero. (Efforts in this area include e.g. the Oxford Principles, see 2021-IP10: The Oxford Principles for Net Zero Aligned Carbon Offsetting.)
- Many organisations assume that there is no limit to CDR but there is, for both nature-based and engineered solutions. (We are starting to explore this area with our ongoing and soon to be published study 2021-05 Global Assessment of DACCS Costs, Scale and Potential.)
- Current accounting systems do not distinguish between short- and long-term CO_2 storage, thus discouraging long-term solutions such as geological storage.
- The most effective CDR measures may become oversubscribed, making net zero commitments impossible to fulfil.
- Researchers need to define a global budget for CDR and assess the future demand for CDR driven by net zero.

- Companies need more accurate, automated and consistent MRV means, such as platforms for automated carbon accounting. Standards need to internalise the difference in quality/durability of the carbon storage.
- Suppliers need to disclose their GHG emissions and GHG reduction/removal plans.
- Companies need better economic incentives to promote the most effective forms of CDR. Today's per-tonne pricing encourages companies to buy lower quality offsets because certain aspects like permanence, social equity and other environmental impacts are not included in the pricing. (This is an area where IEAGHG can contribute with future studies on BECCS, DACCS and mineralisation.)
- Companies are urged to make commitments now but there is little economic modelling available to predict how CDR markets might change over the next decades.

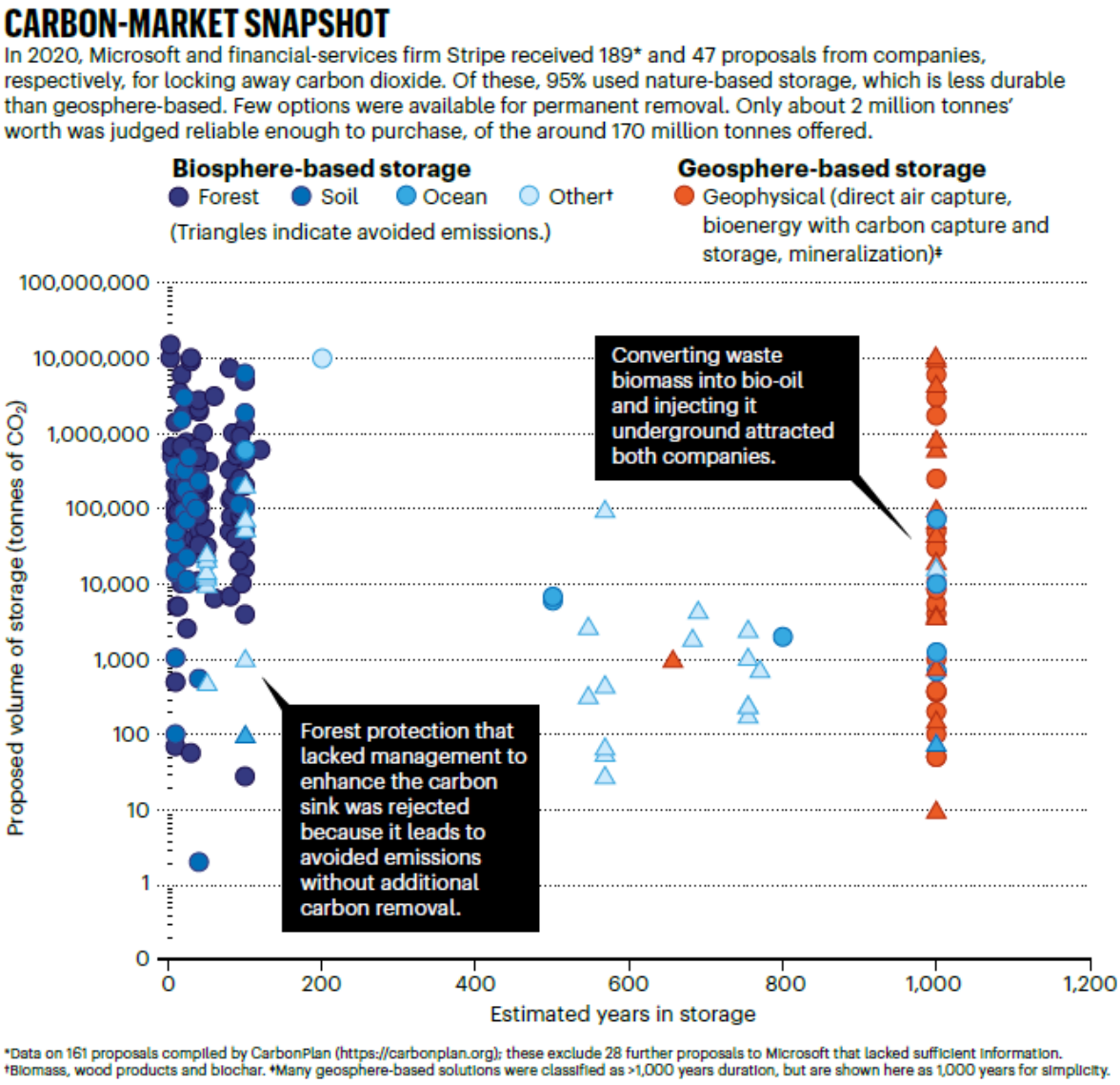

Figure 1 Overview of CDR proposals submitted to Microsoft and Stripe (Joppa et al., 2021, Nature.)

The full Nature article is available here:

https://www.nature.com/articles/d41586-021-02606-3

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