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Carbfix: CO_2 storage through carbon mineralisation

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Carbon capture and storage (CCS) plays a fundamental role in achieving the goals of the Paris agreement to limit global warming to 1.5-2°C, with estimated 115 $GtCO_2$ needed to be captured and safely stored by 2060 [1]. Most ongoing CCS projects inject CO_2 into saline aquifers or depleted oil or gas reservoirs where an impermeable cap rock prevents it from migrating to the surface. As a safe and low-cost alternative, dissolved CO_2 can be injected into reactive rocks such as mafic or ultra-mafic rocks, promoting carbon mineralisation for CO_2 mineral storage [2]. By mineralising the injected CO_2, it is permanently fixed and there is a negligible risk of it returning to the atmosphere.

Mineral CO_2 storage offers a vast storage potential and unlocks large regions in the world where CCS has until now not been considered possible. The largest potential lies offshore within the sub-marine basaltic crust, but suitable formations are also widespread onshore, including volcanic formations, mine tailings and unconventional petroleum reservoirs (fig 1, [3]).

Carbfix has since 2014 injected over 70,000 tonnes of CO_2 from the Hellisheidi geothermal plant in SW-Iceland into the basaltic reservoir for mineral CO_2 storage. Emphasis is currently being placed on making this technology more cost effective and exploring its limits in terms of potential sites and injection methods, including injection of CO_2 captured directly from the atmosphere.

[1] IEA (2020). Special Report on Carbon Capture Utilisation and Storage. Energy Technology Perspectives, 169.

[2] Snæbjörnsdóttir et al. (2020). Carbon dioxide storage through mineral carbonation, Nature Reviews Earth & Environment.

[3] https://www.carbfix.com/atlas