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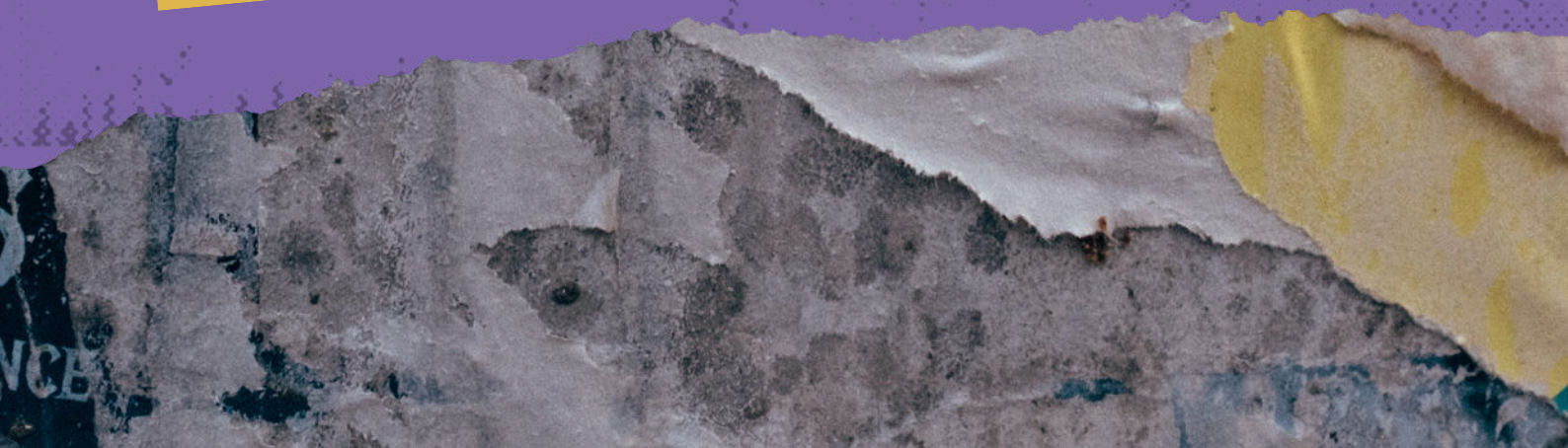
The Proposed EU Carbon Removal Certification Framework Promotes

Risky, Unproven Technofixes



Direct Air Carbon Capture and Storage & Bioenergy with Carbon Capture and Storage

The proposed EU Carbon Removal Certification Framework promotes risky, unproven technofixes

In November 2022, the European Commission presented a proposal for a Carbon Removal Certification Framework that sets out a legal process to quantify the carbon stored through unproven carbon capture and storage technologies: Direct Air Carbon Capture and Storage (DACCS) and Bioenergy Combustion with Carbon Capture and Storage (BECCS). It also paves the way for temporary carbon storage in agricultural soils, trees and wood products in order to generate carbon credits that may be used, among other things, to offset fossil carbon emissions (see RZE Briefing 2 and RZE Briefing 3 for more about carbon farming and carbon offsetting).

The proposed certification framework turns its back on the precautionary principle by giving a legislative stamp of approval to a contested approach that hopes to quantify carbon removals at DACCS and BECCS facilities. At scale, neither of these approaches works in practice, and proceeding down this path opens a Pandora's box of unforeseeable, potentially disastrous consequences. Carbon credits (the units resulting from the proposed quantification) might be used to increase funding available for yet more expensive experimentation with these risky and unproven technological approaches. They are a thinly veiled attempt to maintain the fossil fuel economy and delay meaningful action on climate change.

Globally, roughly three-quarters of the carbon captured by carbon capture technologies is currently used to extract oil and gas that could not otherwise be recovered, referred to as enhanced or secondary oil and gas recovery (EOR), which is then burned. For the climate, it would be better to not engage in this activity at all.

What do DACCS and BECCS stand for?

DACCS and BECCS are the two main technological approaches that the European Commission promotes in its proposed Carbon Removal Certification Framework (CRCF). Both are unproven, not-yet scalable, extremely costly and tremendously risky.

Direct Air Capture is in its infancy. It refers to a range of technologies, largely untested at scale, which purport to scrub carbon dioxide (CO_2) directly from the air. For example, massive fans blow air over a mix of chemicals that trap carbon molecules. The machines connected with the fans use vast amounts of energy and heat to separate the CO_2. The captured CO_2 then needs to be transported and stored – which turns DAC into DACCS or DACCUS, if the captured CO_2 is used before storage.

BECCS is based on the false assumption that large amounts of biomass are available for burning and that the emissions from burning this biomass can be buried underground. It involves four steps:

1. the production of biomass (mainly wood);
2. the production of electricity (occasionally the heat is also used) from refining biofuels or burning biomass, sometimes together with coal;
3. the capture of carbon from the refinery or power plant; and
4. the storage of captured carbon in underground geological reservoirs.

What's wrong with DACCS and BECCS?

Even considering only limited capture and storage rates and extremely high energy use underscores that BECCS and DACCS are not feasible at scale, nor are they likely to become so in the foreseeable future. For example, the world's only operating industrial scale BECCS project, Decatur in the U.S., captures just 12% of the site's CO_2 emissions.

In addition, large-scale deployment of BECCS would result in unacceptable negative impacts on food security, land use rights and biodiversity, given its land, water and resource requirements: "Negating" one-third of today's fossil fuel emissions would require land equivalent to up to half of the world's total crop-growing area. The sheer quantities of biomass (i.e., mainly wood) needed to fuel BECCS facilities would inevitably entail more destructive logging, devastating clearcuts and degradation of forests, and land-grabbing for monocultures. The harmful impacts of European demand for biofuels and wood biomass on already overtaxed forests, land and biodiversity are widely documented and would further intensify with BECCS: hundreds of millions of hectares of land would need to be converted to energy crop production.

DACCS, too, is very costly and energy intensive, with severe doubts about its effectiveness. Research revealed that for DAC removal in the U.S. of about 850 Mt CO_2 (2% of global energy-related CO_2 emissions annually), the equivalent of almost all current global wind power would be needed. Beyond the massive energy demand, scaled-up DAC would also consume vast amounts of water and use large quantities of toxic chemicals, exacerbating the risk of both water scarcity and chemical hazards, especially for communities in the vicinity of DAC facilities.

A colossal waste of scarce (renewable) energy

Even if the technical hurdles of BECCS could be overcome, burning biomass in this way would incur colossal losses of energy: one of the two commercial power plants with CCUS in operation, the Boundary Dam coal plant owned by the Canadian Province of Saskatchewan, has failed to capture the promised rates of CO_2 due to frequent breakdowns and shutdowns, whilst requiring far more energy than predicted to run the carbon capture process. It uses 30 – 31% of its energy merely to capture the carbon produced from burning the coal for its own activities.

Despite dire experiences (see below), companies such as RWE in the Netherlands are using the elusive promise of BECCS to procure permits and new subsidies for burning further millions of tonnes of wood pellets. RWE is already burning large quantities of wood pellets produced from clearcutting biodiverse forests in the southeastern U.S. and the Baltic States.

DACCS is still more energy intensive. If a DAC facility were powered by fossil gas, burning that gas would release CO_2 equivalent to about 90% of the CO_2 captured – without even considering the energy needed to store carbon underground, the methane emissions from leaking gas wells and pipelines or the water and unsafe chemicals used in the process. Especially at scale, their use would pose significant risks. A recent article in Nature calculates that building 30,000 DAC facilities by 2100 to capture 30 Gigatonnes of CO_2 per year would require around 50 Exajoules of electricity each year – more than half of what the entire world produces today; this does not include energy needed for storage. If a DAC facility were wind-, solar- or geothermal-powered, it would divert huge amounts of renewable energy that could otherwise help to phase out fossil fuel burning. Notably, the energy required for large-scale DAC is much greater than the renewable energy capacity likely to be installed by 2050.

Promoting these technologies is difficult to reconcile with the precautionary principle, enshrined in Article 191(2) of the Treaty on the Functioning of the European Union (TFEU). The precautionary principle is "an approach to risk management, where, if it is possible that a given policy or action might cause harm to the public or the environment and if there is still no scientific agreement on the issue, the policy or action in question should not be carried out."

The European Commission, however, presents DACCS and BECCS as important components of its wider strategy to address industrial greenhouse gas emissions with CCS technologies and for a "sustainable bioeconomy" (in the case of BECCS). This willingness to gamble forests, land and climate chaos on technologies that do not exist at a scale that comes remotely close to that of the actual problem, flies in the face of the precautionary principle and must be challenged.

Public subsidies prolong corporate profiteering from burning fossil fuel

The EU's push for DACCS and BECCS is also harmful from an economic point of view: After wasting decades of research and billions of euros, polluting industries have not succeeded in developing a less complex, less expensive CCS technology for capturing and storing carbon at source. A case in point is Drax Group's power plant in the U.K. The company operates the world's largest biomass power station and burns millions of tonnes of imported wood pellets linked to forest destruction. Drax keeps promising to capture and store the carbon released from burning the biomass in future. The promise secures lucrative subsidies that would otherwise end in 2027.

No evidence suggests that DACCS will perform any better and one day safely capture meaningful quantities of CO_2 without using large amounts of energy.

That has not stopped the marketing from suggesting otherwise: Two geological carbon storage projects, both in Norway, have been advertised as technically successful. In reality, at one facility, large amounts of CO_2 began migrating, unexpectedly, into an upper geological layer – an unforeseen consequence that will lead to further impacts. Within 18 months of starting operations, the second facility's target storage area proved incapable of storing the projected amount of CO_2; the oil company had to find new CO_2 storage areas, and in 2016 invested in another injection site. The total "capture" capacity of both operations is also very small at 1.7 million tonnes per year – equivalent to the CO_2 emissions from just one medium-size 500 MW gas-powered station. Furthermore, the Institute for Energy Economics and Financial Analysis (IEEFA) points to the risk of CO_2 leaking from underground storage sites.

When the small quantities of carbon stored are held up against the significant potential for creating disturbingly unforeseeable problems, such as CO_2 leaks, the point of the entire undertaking must be challenged.

And the endeavour is counterproductive for preventing climate breakdown

Globally, roughly three-quarters of total carbon captured is used to get oil out of the ground that could not otherwise be recovered and burned (Enhanced Oil Recovery), increasing corporate profits while worsening prospects to avert climate breakdown.

In the EU, €587 million in subsidies went to CCS initiatives between 2007 and 2016 but did not result in even a single demonstration plant. In both the energy and industry sector, the Intergovernmental Panel on Climate Change (IPCC) notes that CCS is among the highest cost options with the lowest potential to reduce emissions by 2030 – when it matters most to avoid overshooting 1.5°C and the irreversible harms that would be unleashed. It puts the net lifetime costs for CCS at 100 – 200 USD per tonne of CO_2-eq (Figure 7, SPM).

The EU funding spree continues anyway. In November 2022, for example, the European Commission doubled the finance for the EU Innovation Fund's call for large-scale proposals to decarbonise Europe, to approximately €3 billion. Much of this is expected to fund more CCS initiatives, as did the first call for proposals. Whether the large new CCS subsidies announced by the EU and Member States will yield different results remains to be seen.

The fossil fuel industry wins from CCS plans, regardless of their success. The U.K. offers a blatant illustration. In July 2023, Prime Minister Sunak announced more than 100 new oil and gas drilling licences, and £1 billion in CCS subsidies, claiming that carbon capture, including BECCS, would bring about "net zero" by 2050.

Banking on risky and speculative technologies is not a path to Real Zero emissions

BECCS and DACCS are extremely expensive, high-risk, unproven at scale and counterproductive approaches that lend legitimacy to continued burning of fossil fuels. BECCS technology also is premised on continued large-scale forest destruction, thus aggravating the biodiversity and species extinction crises.

Instead of advancing DACCS and BECCS through the Carbon Removal Certification Framework, the EU must, for all our sakes, focus on what the IPCC has made abundantly clear: Proven and readily available solutions exist and must be taken up now. These include phasing out fossil fuels, reducing energy and material demand, scaling up energy efficiency, changing high-energy and material consumption and production patterns, rolling out sustainable renewable energies equitably and at scale, and protecting and restoring ecosystems.

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Scrap the European Union's carbon removal certification proposal!

Real solutions, not "Net Zero"!

Further reading

Carbon capture from biomass and waste incineration: Hype versus reality. Biofuelwatch. https://www.biofuelwatch.org.uk/2022/biomass-and-msw-ccs-report/

The deadly climate gamble. Dirty energy bets on unproven 'carbon removals' to keep fossil fuels flowing. Corporate Europe Observatory et al. https://corporateeurope.org/en/DeadlyClimateGamble

The carbon capture crux: Lessons learned. IEEFA. https://ieefa.org/resources/carbon-capture-crux-lessons-learned

Norway's Sleipner and Snøhvit CCS: Industry models or cautionary tales? IEEFA. https://ieefa.org/resources/norways-sleipner-and-snohvit-ccs-industry-models-or-cautionary-tales

Direct Air Capture: Technology Briefing. Geoengineering Monitor. https://www.geoengineeringmonitor.org/2021/02/direct-air-capture-technology-briefing

Direct Air Capture: Big Oil's Latest Smokescreen. Center for International Environmental Law. https://www.ciel.org/reports/direct-air-capture-big-oils-latest-smokescreen-november-2023/

More in the Carbon Removal Certification Framework series

2 Carbon Farming
A dangerous gamble: Carbon farming in the proposed EU Carbon Removal Certification Framework

3 Carbon Offsetting
EU Carbon Removal Certification Framework proposal lends legitimacy to a discredited approach

Find out more at
RealZeroEurope.org