Press release: EMBARGO: Monday 7 December, 17.00 Central European Time (Paris)

Climate stabilization gambles on the unprecedented removal of carbon from the atmosphere

Greenhouse gas emissions must be reduced aggressively and immediately rather than relying on large-scale deployment of negative emissions technologies in the future, says a new study led by Professor Pete Smith from the University of Aberdeen.

The review article, which is published today in the journal *Nature Climate Change*, demonstrates the potential environmental, economic and energy impacts of negative emission technologies for addressing climate change.

Nearly all the emission scenarios assessed by the Intergovernmental Panel on Climate Change (IPCC) that keep global average temperatures below 2°C assume the large-scale removal of CO_2 from the atmosphere.

“Negative emission technologies aim to remove carbon dioxide (CO_2), the major driver of climate change, from the atmosphere. They include technologically simple options like planting more trees to soak up CO_2 as they grow, capturing and storing carbon after the combustion of biomass, or crushing rocks that naturally absorb CO_2 and spreading them on soils so that they remove CO_2 more rapidly”, says Asbjørn Torvanger a scientist from CICERO Centre for climate research and co-author of the article.

The main technology that models use to remove carbon from the atmosphere is burning biomass for energy and capturing the CO_2 that would otherwise be released, then storing it permanently deep below the ground. This technology is known as bioenergy with carbon capture and storage (BECCS).

The review article considers the impacts of negative emission technologies on land use, greenhouse gas emissions, water use, earth’s reflectivity, and soil nutrient depletion, as well as the energy and cost requirements for each technology.

As the deployment of these technologies will likely be limited due to any combination of the environmental, economic or energy constraints examined in the study, “Plan A” must be to reduce GHG emissions aggressively now. A failure to initiate such aggressive emissions cuts may leave us with no “Plan B” to stabilise the climate within the 2°C target.

“We find that all negative emissions technologies have significant limitations and while we need to invest in research and development to try and overcome these limitations, the key message from our study is that we should not rely on these as-yet unproven technologies to save us in the future”, says Robbie Andrew, scientist from CICERO and co-author of the article. “Rather, swift and aggressive cuts in greenhouse gas emissions are needed to avoid a risky dependence on these technologies in the future”

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"The heavy reliance on negative emissions technologies to offset emissions from continued use of fossil fuels is likely to lock us into a temperature increase well above 2°C if these technologies cannot be implemented at scale", says Glen Peters, a scientist at CICERO and co-author of the article.

"Many stakeholders do not realise the required scale of negative emission technologies to keep global average temperatures below 2°C, and this means that policy makers and investors are likely to make the wrong mitigation choices in the short-term", adds Peters.

The work was carried out by a team of 40 collaborators as a contribution to the Global Carbon Project, http://www.globalcarbonproject.org/

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- Facebook https://www.facebook.com/globalcarbonproject
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Press Conference: Monday 7th December 1115 (CICERO Pavilion, Paris, astrid.arnslett@cicero.oslo.no)

Side Event: Monday 8th December 1130 (Observer Room 03, Paris, astrid.arnslett@cicero.oslo.no)

Papers:

- Smith et al., Biophysical and economic limits to negative CO_2 emissions, *Nature Climate Change*
- Jackson et al., Reaching peak emissions, *Nature Climate Change* (separate press release)
- Le Quéré et al., Global Carbon Budget 2015, *Earth System Science Data*

Access:

- Data and figures: http://www.globalcarbonproject.org/carbonbudget
- Data interface for exploring data: http://www.globalcarbonatlas.org
- Prior to embargo: Nature papers can be requested for media purposes press@nature.com
- After embargo papers are free for one month for registered uses at www.nature.com