

## LAND USE IMPLICATIONS OF NEGATIVE EMISSIONS FROM BECCS

Sabine Fuss, Mercator Research Institute on Global Commons and Climate Change  
fuss@mcc-berlin.net

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Even though current emissions still seem to be in a range consistent with many pathways stabilizing global temperature increase at 2°C, a look at the budgets left over to maintain warming well below 2°C or even 1.5°C reveals that the amount of greenhouse gases that is believed to still be safely accommodated in the atmosphere is being rapidly depleted. 2016 saw the disposal of another 36.4 Gt CO<sub>2</sub> into the atmosphere only through burning of fossil fuels and industry (Le Quéré et al. 2016).

In addition, those 2°C pathways feature large-scale deployment of certain technologies soon - something which we do not see materializing (e.g. van Noorden 2013). Amongst these technologies, one features especially importantly and that is carbon capture and storage (CCS), often combined with low-carbon bioenergy (BECCS) in order to enable removal of CO<sub>2</sub> from the atmosphere (Fuss et al. 2014, 2016) and thus offset other emissions in the system that are difficult to quickly eliminate such as non-CO<sub>2</sub> GHGs from agriculture.

A vast literature has emerged on BECCS by now and is increasing exponentially (Minx et al., under review). This knowledge will need to be synthesized and made accessible for the IPCC's special report on 1.5°C in order to inform the implementation of the Paris Agreement.

The Integrated Assessment Models (IAMs), which have created the IPCC's Fifth Assessment Report's (AR5) stabilization pathways (Clarke et al. 2014), contain different BECCS technologies and different assumptions on the supply chains, e.g. where the biomass for the bioenergy is sourced from. Many do reach quite substantial shares of BECCS in primary energy though and this has led to concern that the land areas required to grow the additional biomass will be huge and that this might represent an impediment to fulfilling other sustainable development goals, e.g. eliminating hunger in the face of a growing population or safeguarding terrestrial ecosystems (e.g. Williamson 2016).

This talk will shed light on the magnitudes of BECCS in the IPCC's Fifth Assessment Report's (AR5) scenarios and take stock of what we know and do not currently know about BECCS. It will specifically be focused on the land use implications (Smith et al. 2016) and discuss bioenergy potentials in the context of other demands on land. Finally, it will discuss possible entry points like the combination with CO<sub>2</sub> utilization and close with a set of action items – for researchers and policy-makers.

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