



## How plausible is a rapid global increase in the deployment of Bioenergy with Carbon Capture and Storage (BECCS)?

Most future scenarios of the energy systems needed to avoid dangerous climate change involve the removal of atmospheric carbon dioxide later this century (referred to as a ‘negative emissions’ technology). BECCS is currently the only technology with the potential to remove carbon from the atmosphere at a global scale, whilst meeting future rising energy needs of a growing global population. However, experts are concerned about how quickly BECCS can be scaled up from demonstration projects and there are still considerable technical, social and environmental challenges that must be overcome before it is considered a reliable solution to global warming.

BECCS involves planting forests, agricultural crops and bioenergy crops, burning these to produce electricity and capturing and storing the subsequent carbon emissions, resulting in a net reduction in atmospheric carbon dioxide. The process therefore requires natural resources (land, water), technological capability and the right political and financial conditions in order to take place successfully, even at the local scale.

### Experts are concerned about the assumptions made in modelling studies that implement BECCS

AVOID 2 consulted experts regarding the level of confidence they have in nine different assumptions about BECCS deployment, which are built into modelled 2°C scenarios. According to the experts, six of these assumptions hold a strong influence over projections of the effectiveness of BECCS yet also remain poorly supported by the available observed data and other evidence (Table 1). This gives an idea of just how uncertain the model-generated projections of future BECCS potential are.

Past modelling studies, which achieve successful avoidance of dangerous climate change through substantial future global deployment of BECCS should therefore be treated with a degree of caution. **It would be ill-advised to interpret such studies as meaning that BECCS is a substitute for early action on cutting emissions.**

**Table 1: How experts rated nine different assumptions about BECCS deployment in past studies.**

	Assumption	Influence on results	Expert confidence
Bioenergy	Available land	High	Low
	Future yields	High	Low
	Proportion of energy supplied by biomass	High	Low
CCS	Storage capacity	Medium	Medium
	Technology uptake	Medium	High
	Capture rate	High	High
General	Policy framework	High	Low
	Social acceptability	High	Low
	Net negative emissions	High	Low

**Note:** Assumptions were rated in terms of both the influence over projections of the effectiveness of BECCS and overall expert confidence (this covers confidence in factors such as data availability, peer agreement and plausibility). Participants were primarily subject matter experts, selected for their expertise in bioenergy, CCS or BECCS, from across a variety of disciplines, working in sectors including business, policy, NGOs and academia.





## There are several constraints to a rapid global increase in BECCS deployment

As well as assessing nine different assumptions about BECCS deployment (Table 1), the experts also highlighted four main issues and constraints affecting the feasibility of a rapid global increase in BECCS. Further details on these are provided in Figure 1.

The issues and constraints identified by relevant experts would need to be overcome to achieve the level of BECCS deployment assumed in many of the models that limit global warming to below 2°C.

**Figure 1: Issues and constraints to the rapid scale-up of BECCS according to experts surveyed by the AVOID 2 team.**



### Read more

AVOID 2 report D1a: *Synthesising existing knowledge on the feasibility of BECCS*, and AVOID 2 report D1b: *Synthesising existing knowledge on feasibility of BECCS: workshop report* available on our website [www.avoid.uk.net](http://www.avoid.uk.net).