Combining bioenergy and carbon dioxide (CO₂) capture and storage (CCS) technologies (BECCS) has the potential to remove CO₂ from the atmosphere while producing useful energy. BECCS has played a central role in scenarios that reduce climate forcing to low levels such as 2.6Wm⁻². This presentation considers whether BECCS is essential to limiting radiative forcing (RF) to 2.6Wm⁻² by the end of the 21st century using the Global Change Assessment Model, a closely coupled model of biogeophysical and human Earth systems. Analysis shows that BECCS can potentially reduce the cost of limiting RF to 2.6Wm⁻² by the end of the 21st century but that a variety of technology combinations that do not include BECCS can also achieve this goal, under appropriate emissions mitigation policies. With appropriate supporting land-use policies terrestrial sequestration could deliver carbon storage ranging from 200 to 700 PgCO₂-equivalent over the 21st century. Substantial delays in participation by some geopolitical regions imply an enhanced value of BECCS and higher transient RF and climate change. However, when major regions postponed mitigation indefinitely, it was impossible to return RF to 2.6Wm⁻² by the end of the 21st century. Neither finite land resources nor finite potential geologic storage capacity represented a meaningful technical limit on the ability of BECCS to contribute to emissions mitigation in the numerical experiments reported in this paper.

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