Large global potential for negative CO2 emissions through biomass linked with carbon dioxide capture and storage

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Feeding biomass to energy conversion processes for electricity or biofuel production with subsequent capture and storage of CO_2 from these sources -- Bio-CCS in short -- results in a negative greenhouse gas balance. "The combination actually removes CO_2 from the atmosphere," says Joris Koornneef from Ecofys. "The biomass extracts CO_2 from the atmosphere during photosynthesis and the CCS takes out the CO_2 released in the energy conversion process."

The study identifies the global sustainable biomass potential and the CO_2 storage potential. "One prerequisite is sustainable biomass production," Koornneef says. "In most regions, the sustainable supply of biomass, rather than CO_2 storage potential, is likely to be the limiting factor. But worldwide, there is ample sustainable biomass available to achieve negative emissions."

Ecofys identifies six promising technology routes in the power and transport sectors, including biomass combustion and gasification for power production, and biomass conversion to bio-ethanol and biodiesel. Taking only technical limitations into account, the maximum annual potential is approximately either 10 gigatonnes (billion metric tonnes) of negative emissions in the power sector or 6 gigatonnes in the biofuel sector. In the short term, bio-ethanol production is the most promising option as it allows CO_2 capture at relatively low cost.

Currently, a major hindrance is the lack of a clear economic incentive to store CO_2 from biomass and create negative emissions. Without such an incentive, the huge potential for negative emissions will not be deployed. In the near term, useful preparatory work would involve a more detailed look at the most promising regions where sustainable biomass production and conversion can be combined with CCS.

SOURCE [1]

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