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How will BECCS benefit China's emission reduction

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Three straw supplying scenarios are designed in this research. Based on the local conditions, three deliver scenarios are compared with their environmental performance. A combined heat and power plant (CHP) is targeted, which is a unique point in this study because most kinds of literature conducting LCA on BECCS projects seldom focus on a combined heat CHP plant. The application of carbon capture and storage technology downstream in this project is a fundamental section which maintains the negative emission of the whole system. With 1kWh electricity generated in this BECCS project, 1.15-1.17kg of negative emission is produced with a 90% carbon capture rate assumed as the result shows, which is similar to the results IEAGHG which also assumed 90% efficiency in carbon removal. Climate change impact is dominated by straw cultivation due to the CO₂ acquisition through photosynthesis from the atmosphere. The global warming potential (GWP) of this system reaches -1.7×10^6 t CO₂ equivalent over its lifetime (30 years). Power and heat generation is the biggest contributor to greenhouse emission. For transportation, the environmental effect of scenario 3 is approximately the most serious performance a biomass plant can achieve in China. The GWP of Scenario 2 is 0.36×10^{-3} higher than scenario 1 with 1kWh electricity generated. During a lifetime, the difference reaches 560kt CO₂ equivalent.



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