Carbon capture and storage (CCS) technologies could make valuable contributions to climate change mitigation on century-long time scales, even when accounting for continuing, low level leakage, according to new research. The researchers say leakage from storage sites is likely to be minimal.

Storage of carbon dioxide in geological formations or the ocean could help achieve emissions targets. Despite recent research which shows that carbon dioxide can be safely stored in natural systems for millions of years, concerns over leakage can cast a shadow over plans for artificially created storage sites. Besides posing local safety hazards, leakage could reduce the overall effectiveness of CCS as a climate change mitigation strategy in the long term.

The researchers, funded under the EU TranSust.Scan project, used a computer model called DEMETER, which has been used previously in modelling the effects of different climate change policies, to try to understand the extent to which CCS’s contribution to climate change mitigation efforts would be compromised on various leakage scenarios. They find that as long as sites are carefully selected, CCS will be effective. However, leakage rates must stay below 1 per cent a year.

Carbon storage was not considered in isolation in this project, but as a strategy complementing increased use of renewable technologies. According to the researchers, CCS can only help to achieve climate stabilisation by the year 2100 if half of all energy needs are supplied from renewable sources. As such, CCS may be seen either as an option for delaying the widespread use of renewable energies, or a means of buying time for their development.

DEMETER models carbon economies on a worldwide scale. In employing the model, the researchers assume that governments introduce taxes on carbon emissions and other policies that help to stimulate the use of CCS as well as reducing reliance on fossil fuels.

Despite the favourable findings for deep carbon dioxide storage, the researchers stress that there are other social and political factors that must be considered in implementing long term storage strategies, notably, safety risks to populations living close to selected storage sites. The researchers comment that there are currently no regulations for monitoring geologically stored carbon dioxide, but this has since been superseded by the adoption of Directive 2009/31/EC on the geological storage of carbon dioxide.

2. TranSust.Scan (Scanning Policy Scenarios for the Transition to Sustainable Economic Structures) was supported by the European Commission under the Sixth Framework Programme. www.transust.org/transust.scan.htm


Contact: vanderzwaan@ecn.nl

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