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POLICY BRIEF
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A "Storage Climate Club": An Innovative Way to Promote Underground Carbon Storage[1]

Source: ©Shutterstock/Rangsarit Chaiyakun.
Note: The equipment of oil refining.

Storing Carbon Underground Can Advance Climate Goals, but Faces Barriers

Carbon capture and storage (CCS) is essential for reducing CO_2 emissions from industrial sectors with hard-to-abate emissions, such as steel, cement, and chemicals. It is a process that involves capturing CO_2 from industrial and energy sources and compressing and transporting it to geological sites for storage. Underground storage occurs in deep geological formations and is the key end stage of the process (Figure 1), Deployed on a large scale, underground storage can help countries meet international climate goals to limit the rise in global temperatures to below 1.5 - 2˚C , in line with the recommendations of the United Nations Intergovernmental Panel on Climate Change (IPCC).

Yet CCS technology faces major barriers to deployment, including a lack of financial incentives, high up-front costs, and protracted development timeframes. The proposed "storage climate club" (SCC) is an innovative idea that can help overcome these barriers by supporting the scaling-up of CO_2 geological storage and the use of CCS technologies worldwide.

The Bottom Line

- A KAUST[2] researcher and his colleague propose creating a "storage climate club," involving a coalition of countries, to promote geological storage of CO_2 and carbon capture and storage (CCS) technologies on a large scale and help limit global warming.
- The proposed club would help operationalize a novel class of investment assets, "carbon storage units", that could be traded globally under the market mechanisms of the Paris Agreement.[3]
- The club would support and incentivize countries' efforts to develop geological storage of CO_2 and undertake CCS projects to meet international climate goals.
- This initiative would make deploying CCS technologies more accessible and appealing to lower-income countries, which currently are underrepresented in global deployment.

The Storage Carbon Club Would Promote Adoption of CCS

The SCC could be set up as a new international organization aimed at promoting underground CO2 storage and at incentivizing member countries to invest in CCS projects to meet international climate goals.

Members of the club can buy and sell stored carbon

The market mechanisms in Article 6 of the Paris Agreement[3] establish a framework for a global carbon market, enabling countries to collaborate in achieving climate goals more cost-effectively. With these mechanisms in place, stocks of geologically stored carbon can be marketed internationally using "carbon storage units" (CSUs), a novel concept first introduced by researchers in 2019.[4] CSUs represent the removal or storage and sequestration of carbon: one CSU corresponds to one ton of geologically stored carbon. Trading CSUs under Article 6 can boost all types of CCS technologies by allowing countries to buy and sell credits for storing CO2 as international climate contributions.

The club would also strengthen carbon-storage policy and regulation

In addition, the club would provide an organizational framework, supporting policies such as effective national strategies and incentives as well as the development of emissions trading for CCS. It would support high-integrity certification of CSUs that would be tradable on global carbon markets. The framework would also help address key issues such as the monitoring of carbon storage and long-term legal and financial guarantees.

The club would provide greater certainty for investors with concerns about the high up-front costs and long timeframes of these projects. It would foster financial collaboration and provide technical expertise to drive large-scale joint initiatives, with a focus on developing nations in the Southern Hemisphere. It would also support capacity-building such as mapping out the potential for CO2 underground storage. Finally, a club would help raise the visibility and address public perceptions of geological storage of CO2 as a critical mitigation technology.

Fig. 1 Underground CO2 Storage Is the End Stage in the Carbon Capture and Storage Process

Source: ©Shutterstock/Wasanajai.
Note: CCS process: Burning fossil fuels followed by CO2 capture, transportation, and storage in a geological formation.

Membership Would Address Inequities in CCS Deployment and Support Developing Countries

Currently, CCS technology is concentrated in a few geographic areas, mainly in higher-income countries in the Northern Hemisphere and the Middle East.

The club's market would expand the global use of carbon storage

Carbon markets can correct the geographic imbalances in CO2 underground storage by connecting the geological storage capacity of developing countries with global demand for storage. This approach would establish a more equitable landscape for CCS and revenue generation globally.

Member countries can transfer or jointly develop CCS technology

Countries newly deploying CCS technology would need support from technology transfers. Transfers can take place through existing mechanisms under the Paris Agreement or new joint development ventures among club members. Financing projects would require investment strategies that minimize risk as well as continued support from multilateral and international organizations.

The Club Would Tap into Substantial Unused CO2 Geological Storage Capacity

Expanding the community of countries using CCS technology would leverage the world's large available capacity to store CO2 underground. Promising sites for carbon storage include depleted oil and gas reservoirs and deep saline aquifers. Depleted oil and gas reservoirs, for example, have an estimated storage capacity of 675–900 gigatons of carbon dioxide (GtCO2); by comparison, the United States emitted 5.960 GtCO2 in 2023. Deep saline aquifers may have a storage capacity of another 1,000 GtCO2 or more. The immense scale of underground storage resources shows that the world possesses the physical capacity to store carbon underground, provided the technology is deployed at scale.

Summing Up

The researchers propose the creation of a storage climate club, an international organization that would help member countries scale-up geological storage of CO2 and CCS technology globally. The club would be led by a group of "enthusiastic" or "first mover" countries and could sit under the Clean Energy Ministerial (CEM).[5] By standardizing CO2 storage through CSUs, the club would incentivize investment in CCS technologies, address global carbon storage inequalities and accelerate progress toward international climate goals.

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1. This Policy Brief summarizes findings from Al Juaied, Mohammed, and Elizabeth Carey. 2025. "Unlocking the Potential of Geological Storage of CO2: What Role for a Storage Climate Club?" *Frontiers in Sustainable Energy Policy* 4 (1524409). https://doi.org/10.3389/fsuep.2025.1524409. All rights and any third-party permissions remain with the respective rightsholders.
2. King Abdullah University of Science and Technology (KAUST).
3. The Paris Agreement is an internationally binding agreement signed by 195 parties in 2015. See, United Nations, "The Paris Agreement," at https://unfccc.int/process-and-meetings/the-paris-agreement.
4. For the original concept of CSUs, see Zakkour, Paul, and Wolgang Heidug. 2019. A Mechanism for CCS in the Post Paris Era. KAPSARC. https://devtws.kapsarc.org/our-offerings/publications/a-mechanism-for-ccs-in-the-post-paris-era/.
5. The CEM describes itself as "a high-level global forum to promote policies and programmes that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy. Initiatives are based on areas of common interest among participating governments and other stakeholders" intended to "…bring together a community of the world's largest and leading countries, companies and international experts to achieve one mission –accelerate clean energy transitions." See Clean Energy Ministerial, "Who We Are," at https://www.cleanenergyministerial.org/who-we-are/, as of April 3, 2026.