



Institute for
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FOR IMMEDIATE RELEASE – July 31, 2024

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NEW STUDY CLARIFIES EXPERT CONSENSUS ON THE FUTURE OF CARBON DIOXIDE REMOVAL

NYU’s Institute for Policy Integrity surveyed hundreds of CDR researchers and practitioners on the likely costs, scale, and policy challenges for numerous carbon removal approaches, yielding some surprising findings.

Governmental and corporate climate strategies increasingly rely on carbon dioxide removal (CDR)—a variety of approaches that can remove CO₂ from the atmosphere, including afforestation and direct air capture. But concerns about costs, land-use and technological constraints, safety, environmental justice impacts, moral hazard, and other issues contribute to tremendous uncertainty about the future of CDR. New York University’s Institute for Policy Integrity conducted the [largest-ever expert elicitation study on CDR](#), surveying an interdisciplinary group of 699 researchers who have published articles on CDR in leading academic journals. The study revealed consensus on several key issues.

Experts identify numerous major barriers to widespread CDR, yet they predict multi-gigaton-scale removal to occur by 2050, with major additional growth through 2100.

- Respondents predict that a long, diverse list of issues will inhibit widespread CDR. They identify market costs and insufficient demand (due to government policy gaps) as particularly significant challenges, along with incomplete regulatory regimes.
- Despite these barriers, the experts predict a median of 2.3 gigatons (Gt) of CDR in 2050, 5 Gt in 2075, and 10 Gt in 2100.
- Respondents predict that Bioenergy Carbon Capture and Storage (BECCS) will provide the largest share of CDR in 2075 (just over 20% of total removal), followed closely by forest-based CDR.

Respondents expect that cost and technology barriers can likely be overcome for most CDR approaches, including direct air capture (DAC).

- Respondents estimate lower costs for DAC than most analysts predict, with an expected mean cost of \$163/tonne in 2075. (Forest-based carbon removal is estimated to be the cheapest CDR approach in 2075, with a mean cost of \$49/tonne.) The respondents expect DAC to provide 15-20% of total removal by 2075.
- Experts who have studied a particular CDR approach almost uniformly predict that their known approach can be carried out more cheaply than competing options, suggesting that those with

particularized knowledge believe that perceived CDR cost barriers can be overcome in the coming decades.

- Respondents believe that ambitious R&D funding can play a major role in accelerating technology deployment timelines. In a scenario where heavy R&D funding is added to ambitious climate policy, respondents estimate that *net-negative* global emissions could potentially be feasible before 2050.

Concerns about moral hazard and policy gaps still cloud the future of CDR.

- Nearly 48% of respondents believe that emissions-mitigation efforts would be significantly greater if widespread CDR does not become viable by 2075. This finding suggests a belief that society has the capacity to expand decarbonization efforts, and that the promise of CDR offsets is either a moral hazard limiting some emissions reductions or a lower-cost pathway that could make some less-desirable mitigation efforts unnecessary.
- Despite bullish projections about CDR growth, cost reductions, and technological progress, respondents do not expect removal to occur at a scale consistent with net-zero-emissions goals or the 2°C warming limit. They identify a long list of policy gaps that hinder safe, efficient CDR expansion.

The study includes additional findings on the likely mix of CDR approaches and storage/utilization options, the role of CDR in net-zero-emissions scenarios, and many other topics.

Derek Sylvan and Peter Howard, the authors of the [study](#), are available for interviews.

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