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As of 2021, atmospheric carbon dioxide (CO_2) levels have reached historically unprecedented levels, higher than at any time in the past 800,000 years. The increase in concentrations is largely due to anthropogenic CO_2 emissions from activities such as fossil fuel burning, deforestation, and historical land-use change. The current level of human emissions greatly exceeds the ability of nature to remove CO_2 —simply reducing the levels of human emissions may not be enough to stabilize the climate. Carbon dioxide removal (CDR), sometimes referred to as negative emissions technologies, may prove valuable, in conjunction with reduced emissions, to limit the planet's projected warming to well below 2°C, comparable to preindustrial levels, as established by the Paris Agreement.¹

The 2019 National Academies report, *Climate Mitigation: Carbon Dioxide Removal and Sustainable Forests*, concluded that to continue to combat climate change mitigation, CDR approaches would need to be scaled up rapidly and that it is critical to begin research now to increase the viability and affordability of existing or new approaches to CDR. In response, the National Academies released a report in 2019 to provide a research agenda for advancing CDR and, specifically, examining the benefits, risks, and sustainable-scale potential for a variety of land- and ocean-based CDR approaches. The study found that, to meet climate goals, some form of CDR will likely be needed to remove roughly 10 Gt of CO_2 /yr by mid-century and 90 Gt of CO_2 /yr by the end of the century. To help meet this goal, four land-based CDR approaches are ready for large-scale deployment: afforestation/reforestation, changes in forest management, uptake and storage by agricultural soils and biomass with carbon capture and storage, based on the potential to remove carbon at rates between 0.10 and 4.0 Gt. The 2019 report did not examine the more global ocean-based approaches but did examine the potential for ocean-based CDR and the need for a research strategy to explore these options.

To address this gap in understanding and the need for further exploration into CDR options, the could feasibly contribute to a larger climate mitigation strategy, with sponsoring from the ClimateWorks Foundation, the National Academies convened the Committee on a Research Strategy