XPRIZE Milestone Award Winners — A First Look at Their Commercial Prospects

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Abstract

Recent estimates show that carbon capture and storage (CCS) technologies can reduce up to 7 billion metric tons per year to 10 billion metric tons of carbon emissions. The XPRIZE Foundation's (XPRIZE) 2021 Carbon Removal global competition looks at innovative carbon removal and sequestration solutions that can pull carbon dioxide (CO_2) directly from the atmosphere and oceans and sequester it durably and sustainably. The competition requires the participating teams to demonstrate a carbon dioxide removal (CDR) solution at a scale of 1,000 metric tons per year and model their costs to a scale of 1 million metric tons per year (MMt/y) [9]. Finally, the teams must show a pathway to achieve a gigaton scale of CO_2 removed each year in the future [9]. This review summarizes the CDR technologies of the 15 winners of the XPRIZE milestone phase and documents each winner's technology, raw material requirements, operational soundness, etc. from publicly available literature. Unlike other Process Economics Program (PEP) reviews, this review is not techno-economic in nature and does not provide a detailed analysis of the technologies. It covers a background of the CDR technologies at the XPRIZE Carbon Removal competition from publicly available sources, understanding that the early stages of development of some of these technologies render their detailed analyses unfeasible at this point.

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