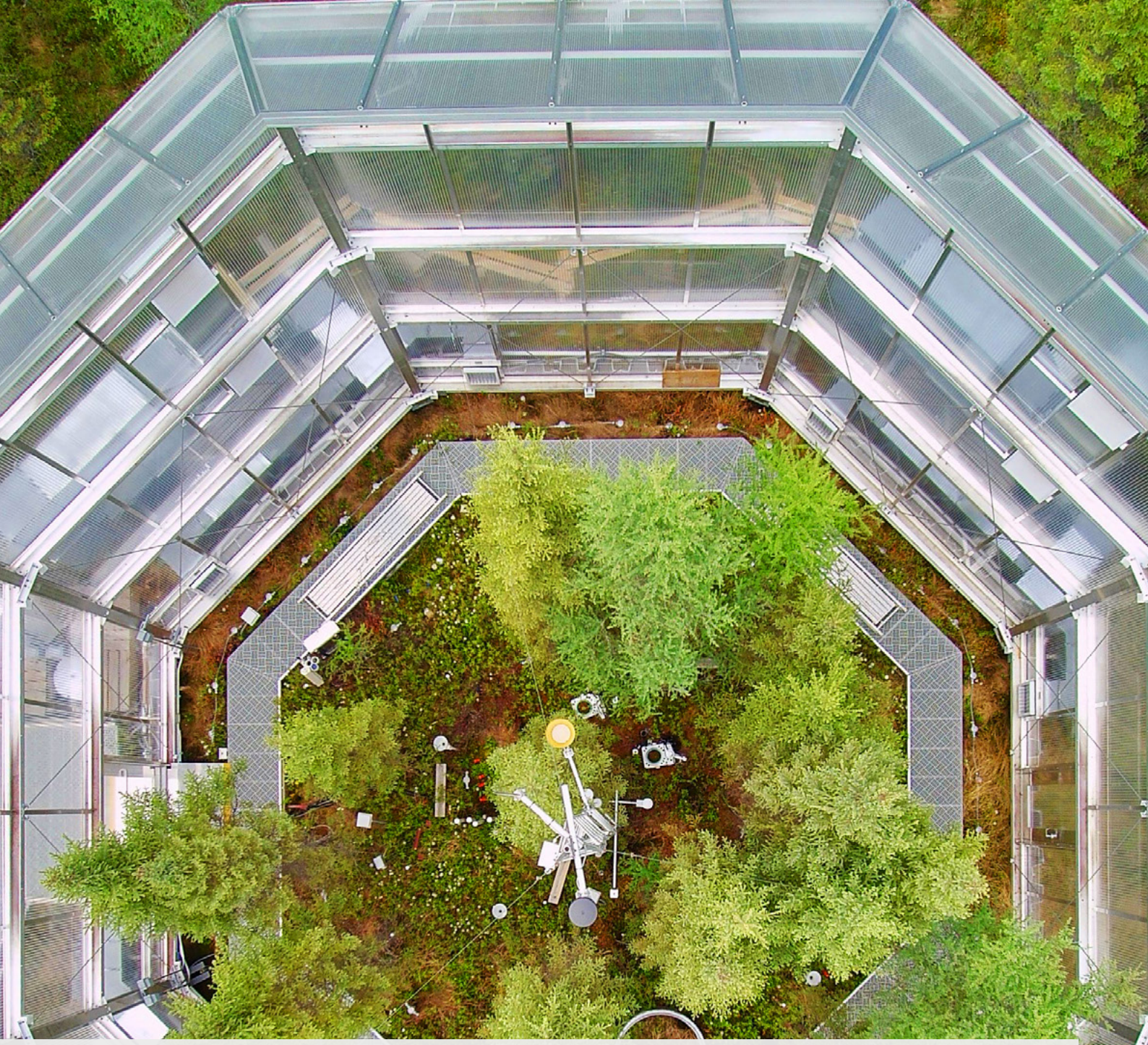

Technical appendix

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Spruce and Peatland Responses Under Changing Environments. Credit: ORNL, U.S. Dept. of Energy

Technical appendix | Chapter 3

A3.1 Data

We provide an inventory of Research, Development, and Demonstration (RD&D) funding programs across countries.

We differentiate funding focused broadly on CCS RD&D, CDR RD&D, and specifically CDR demonstration funding (meaning, funding to build pilot or demonstration facilities, rather than lab-scale projects). This inventory is an attempt to comprehensively gather details on CDR RD&D funding and RD&D funding relevant to CDR (such as CCS infrastructure), but there is no single source for this data, so it should not be considered complete. Rather, it provides details on some programs and allows us to estimate the total amount of funding available.

In section 3.1, we include estimates for CDR RD&D. We find this estimate by summing the country programs that are marked "Carbon Dioxide Removal RD&D" and "Carbon Dioxide Removal Demonstration" in the "Type of Funding" column. We find estimates for CDR Demonstration funding by summing country programs that are marked "Carbon Dioxide Demonstration" in the same column.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
Australia	Carbon Capture Use and Storage Development Fund	1.7E+07	CCUS RD&D	*Fund Details*	Australia funds carbon capture use and storage through the Carbon Capture Use and Storage Development Fund. This includes funding for up to $25million per project for pilot and pre-commercial projects (demonstrations). This is not specific to CDR, but projects may include CDR.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
Australia	Pilot DACCUS Plant	2.7E+06	CDR Demonstration	*Project Details* *Press Release*	The Australia Carbon Capture Use and Storage Development Fund provided $4 million to a pilot DACCUS project, operated by AspiraDAC (a subsidiary of Corporate Carbon).
Australia	Carbon Capture Technologies Program	4.4E+07	CCUS RD&D	*Funding Details* *CCUS Development Fund* *Current Funding Round*	This funding is for $65 million over eight years from 2023-24 through 2030-31.
Australia	National Soil Carbon Innovation Challenge	2.7E+07	CDR RD&D	*Program details*	Natural carbon solutions: $40 million national soil carbon innovation challenge, including $1 million for 17 feasibility studies and $39 million for 13 development and demonstration projects. This is focused on measuring carbon sequestration.
Australia	LoamBio Investment	1.0E+07	CDR RD&D	*Project details*	Funded at $15 million AU from Australia green bank.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
Canada	Energy Innovation Program CCUS	2.4E+08	CCUS RD&D	*Appendix B of Carbon Management Strategy*	Canadian government is investing $319 million over seven years through the Energy Innovation program. This is focused on CCUS technologies but includes activities related to CDR (CO2 transport and sequestration). Applications are currently closed and finalists have submitted full project proposals which are being evaluated.
Canada	BECCS Demonstration Plant	1.9E+06	CDR Demonstration	*Project Details*	The Hinton BECCS demonstration project received $2.5 million in funding from Emissions Reduction Alberta, funded by the Technology Innovation Emissions Reduction Fund in Alberta.
Canada	DAC Demonstration Air to Fuel	1.5E+06	CDR Demonstration	*Press Release*	British Columbia Government's Innovative Clean Energy Fund provided $2 million for engineering and design of direct air capture (to fuels, not DACCS) plant in Canada.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
Canada	Newport Innovation Centre	1.9E+07	CDR Demonstration	*Press Release*	Canadian government has funded Carbon Engineering with CAN$25 million and use that funding to design, construct, and operate the Newport Innovation Centre in British Columbia (4.5 tonnes of CO2 removed each day) through the Strategic Innovation Fund.
Canada	CARBONITY Biochar Plant	7.9E+06	CDR Demonstration	*Press Release*	The CARBONITY Biochar plant received public funding of $11 million CAN. This funding is from Natural Resources Canada Investments in Forest Industry Transformation and Canada Economic Development for Quebec Regions.
European Union	EU Innovation Fund	4.4E+10	Other Funding	*EU Innovation Fund*	The European Commission's EU Innovation Fund is funded by revenues from the emissions trading system (ETS) which includes CDR projects. The fund began in 2020 with a goal to invest 38 billion euros for climate neutrality by 2030. It is not yet known how much of this funding will go toward CDR projects.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
European Union	First Round of EU Innovation Funding		CCUS RD&D	*Progress Report*	The progress report for this funding shows that in the first round of funding for large-scale projects, seven were selected. This includes a ship for CO2 transport (KairosC), CO2 capture in cement (technically avoided emissions but could be used for CDR in the future), 4 CO2 geologic storage, and one fully CDR project - a BECCS plant in Stockholm. The amount per project is not included here.
European Union	BECCS Plant in Stockholm	2.0E+08	CDR Demonstration	*EU Funding for BECCS Plant*	The BECCS plant in Stockholm EUR 180 million in EU funding.
Germany	CDRMare	2.9E+07	CDR RD&D	*CDRMare*	CDRmare is funded by German Federal Ministry of Education and Research (BMBF) for three years with about 26 million euros.
Germany	CDRTerra	2.3E+07	CDR RD&D	*CDRTerra*	CDRTerra (BMBF) is funded in a 3-year phase starting in November 2021 for 21 million euros. CDRSynTra analyzes these findings across the research program.
Iceland	Coda CO2 Storage Project	1.3E+07	CCUS RD&D	*Project Information*	The Coda Terminal (focused on CO2 storage) has been funded EUR 115 million by the EU Innovation fund.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
India	CCUS Funding	6.0E+06	CCUS RD&D	*Funding Announcement* *Funding Opportunity Announcement* *CCUS RD&D*	In 2023, India's Department of Science and Technology within the Ministry of Science and Technology issued a funding announcement for CCUS. This may be beneficial for the RD&D for CDR. It also includes DAC and enhanced mineralization as eligible technologies. Delineating how much of this funding will be allocated for CCUS and CDR is not possible until awards are announced. It is expected that 12 projects will be funded for a total of approximately $6 million USD.
Ireland	Marine Research Programme	2.9E+06	CDR RD&D	*Funding Call* *News Release*	The Marine Institute launched the Blue Carbon call under the Marine Research Programme starting in 2021 for a maximum of 1.6 million Euros which can include ocean carbon dioxide removal (two projects, BlueC and Quest, have received grant funding for a total of 2.6 million euros).

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
Ireland	Peatland Restoration	5.5E+05	CDR RD&D	*Funding Details* *Funding Amount*	Ireland has also invested in peatland restoration as a carbon management project through the Peatlands Community Engagement Scheme Funding.
Japan	Moonshot Program Goal 4	3.5E+08	Other Funding	*CCS Funding* *NEDO Funding*	The Moonshot program (goal 4) includes 50 billion yen in grant funding on climate technologies from 2020 to 2030. The projects selected include three on DAC systems, two on enhanced weathering, and two broadly focused on utilization of captured CO2. The amount funded specifically for CDR has not yet been announced.
Japan	Mikawa Demonstration Plant		CDR Demonstration	*Press Release* *Mikawa Public Funding*	There is a demonstration plant called the Mikawa Demonstration Plant for BECCS that the Ministry of Environment has funded. Details about the amount of funding from the Ministry of the Environment has not been announced.
Japan	Development of Negative Emissions Technologies in Agriculture, Forestry, and Fisheries Industries	1.1E+08	CDR RD&D	*Information Page*	Japan Ministry of Agriculture, Forestry and Fisheries is funding an R&D measure focused on biochar, wood-based carbon sequestration, and blue carbon. In total, this funding is up to 15.92 billion yen.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
	Netherlands CCS Projects	7.4E+09	CCUS RD&D	*Program Website* *Press Release*	Netherlands has funded CCS projects at high levels, but not specifically CDR RD&D. This includes through the Demonstration Energy and Climate Innovation subsidies for pilot projects, but does not specify CDR in this funding. A total of 6.7 billion euros have been allocated to CCS projects.
Norway	CLIMIT Program		CCUS RD&D	*Longship CCS Project* *CLIMIT Programme Description*	Norway has a dedicated national program related to carbon capture and storage RD&D (called CLIMIT). A highlight of this program in Norway is the Longship CCS project, which has three parts (two capture facilities and a transportation/ storage element called Northern Lights). The latter part may be relevant for CDR.
Norway	Bionova Program		CDR RD&D	*Bionova Program*	Innovation Norway's Bionova program was established in 2023 and may finance RD&D related to conventional, nature-based carbon dioxide removal. The amount of funding available for CDR research and demonstration has not yet been announced.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
Norway	Enova Removr DAC Project	3.6E+06	CDR Demonstration	*Press Release* *Enova Project* *Removr Company*	Pilot demonstration plant will capture 300 t CO2 from 2024 – innovation grant from Norway (Enova – Norway Ministry of Climate and Environment). Company name is Removr. Received $3.51 million in grant funding from Norway RD&D funding.
Norway	Norsk Hydro	3.5E+05	CDR RD&D	*Information page*	50% of funding for the Norsk Hydro and Climeworks collaboration came from CLIMIT funding of a 7 million NOK collaboration (3.5 million is 50%).
Saudi Arabia	DAC Test Unit		CDR Demonstration	*Press Release*	Aramco, the state-owned oil company, is working with Siemens Energy to develop a DAC test unit in Saudi Arabia (capacity of 12 tons CO2 per year, to be completed by 2024) with a goal of expanding to a capture capacity of 1,250 tons per year later on. There is not an estimate of the amount of public funding for this test unit, but it is included because Aramco is a state-owned oil company.
Singapore	CCUS and Hydrogen Funding	5.5E+07	CCUS RD&D	*Funding Details*	12 projects, ranging from CCUS and hydrogen, have been funded at $55 million in Singapore to support climate goals.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
Switzerland		3.1E+06	CCUS RD&D	*DemoUpCARMA Program* *Program Listing*	The DemoUpCARMA program focuses on demonstrating CCUS projects. This includes a focus on storing carbon in cement and the transport of CO2 for storage in geologic reservoirs abroad. The program is funded by the Swiss Federal Office of Energy and Federal Office for the Environment.
Switzerland		5.9E+05	CCUS RD&D		The other half of the Swiss project is DemoUp Storage, with an aim of transporting 1000 tons of Swiss biogenic CO2 to Iceland for long-term storage. This project received 497,710.00 CHF.
United Arab Emirates	44.01 Mineralization Project		CDR Demonstration	*Project Details*	44.01 is a company working on the first mineralization project in the UAE. It is a partnership by ADNOC (owned by the Abu Dhabi government. No funding amount is given because of this structure.
United Arab Emirates	ADNOC CCUS Activities		CCUS RD&D	*CCUS Project Announcement*	ADNOC has funded CCUS activities, including a 1.5MT capture project on a natural gas plant, and began in 2016 with a plant that captures 800,000 tons of CO2 at a steel plant.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
United Kingdom	Land-Based GGR MRV	1.1E+06	CDR RD&D	*Phase 1 details* *Phase 2 details*	The Small Business Research Initiative competition (funded by Innovate UK) is a two-phase competition. The aim of this funding is focused on tools and techniques for measurement, reporting, and verification for land based GGR. The first phase totals 375,000 pounds. If successful in the first phase, projects can apply for the second phase for a total of 625,000 pounds.
United Kingdom	Greenhouse Gas Removal	4.0E+07	CDR Demonstration	*Greenhouse Gas Removal Projects Demonstration*	Greenhouse Gas Removal Demonstrators (GGR-D) Programme includes a budget of £31.5 million led by Biotechnology and Biological Sciences Research Council office of the UK Research and Innovation and five demonstrator projects on a variety of methods: biochar, enhanced rock weathering, peatland restoration, perennial biomass crops, and woodland creation and management.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
United Kingdom	Net Zero Innovation Portfolio	8.9E+07	CDR Demonstration	*Progress Report (2021-2022)* *Phase 2 Details*	The two part competition has a total funding of about 70 million pounds. The first phase is desk-based feasibility studies with 23 funded projects, completed in 2020. The second phase, beginning in 2022, is focused on demonstration projects. 15 projects have been funded. Demonstrations will begin in 2025.
United Kingdom	CCUS Infrastructure Funding	2.5E+07	CCUS RD&D	*CCUS Innovation Fund*	Besides CDR funding, the UK has funded millions for CCUS - including 20 million pounds for the CCUS infrastructure fund in a single round and a total of 1 billion pounds beginning in 2020.
United Kingdom	Nature Carbon Capture Projects	5.5E+06	CDR RD&D	*Nature-Based Carbon Capture Funding*	An additional 4 million pounds has recently funded nature-based CDR initiatives across six projects starting in 2023.
United Kingdom	Hydrogen BECCS Innovation Programme Funding	3.3E+07	CDR Demonstration	*Notice*	This announcement is specifically for hydrogen BECCS technologies from the ESNZ and DEBIS.
United States	DAC Hubs	3.5E+09	CDR Demonstration	*Project Selections* *DAC Day* *DAC Hubs*	DAC Hubs program was authorized to grant $3.5 billion USD over five years through the Infrastructure Investment and Jobs Act and the Inflation Reduction Act.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
United States	Federal Government Removal Credit Purchase	3.5E+07	Other Funding	*DOE Press Release*	From DOE Fossil Energy and Carbon Management (FECM) purchasing carbon that has been captured in which the federal government purchases high-quality carbon removal credits. Not included in totaling because it is a demand-pull program, not necessarily CDR RD&D.
United States	DAC Demonstration Project: Project Monarch	8.0E+06	CDR Demonstration	*Capture6 Grant Project Details*	Carbon6: Project Monarch Pure Water Antelope Valley Demonstration Facility – 8 million grant from California Energy Commission.
United States	Carbon Negative Shot RD&D		CDR RD&D	*Funding Announcement*	Carbon Negative Shot projects anticipated areas of interest for: small BECCS pilots (up to five), enhanced mineralization pilots (up to ten), CDR 'testbed' facilities (up to five), and marine carbon dioxide removal plants (in lab - up to five). Funding is not yet open but has been announced.

Country	Project Title	Amount (USD)	Type of Funding	Links	Details
United States	Marine CDR Research	2.4E+07	CDR RD&D	*Marine CDR Research*	Department of Commerce and NOAA: $24 million for researching marine CDR ($14 million from IRA and $10 million from NOAA). In the US's Ocean Climate Action Plan, marine carbon dioxide removal is a goal by 2030 to understand trade-offs of different methods; including launching a U.S. marine CDR initiatives.
United States	US DOE Storage and Transport Funding	2.3E+09	CCUS RD&D	*Press Release*	Beyond CDR funding, the US Department of Energy has also funded 2.25 billion over five years to support storage and transport of CO2 emissions, from both industrial/ power point sources as well as CO2 removal from the atmosphere.
United States	Marine CDR MRV Research	3.6E+07	CDR RD&D	*Press Release*	The Department of Energy is funding 11 projects for a total of $36 million to develop marine CDR capture and storage projects focused on MRV of these technologies.
United States	NETL/FECM Feasibility/ FEED Studies	1.7E+07	CDR RD&D	*Press release*	NETL/FECM (through DOE) is funding 10 projects at 17 US colleges and universities to support novel, early-stage research.