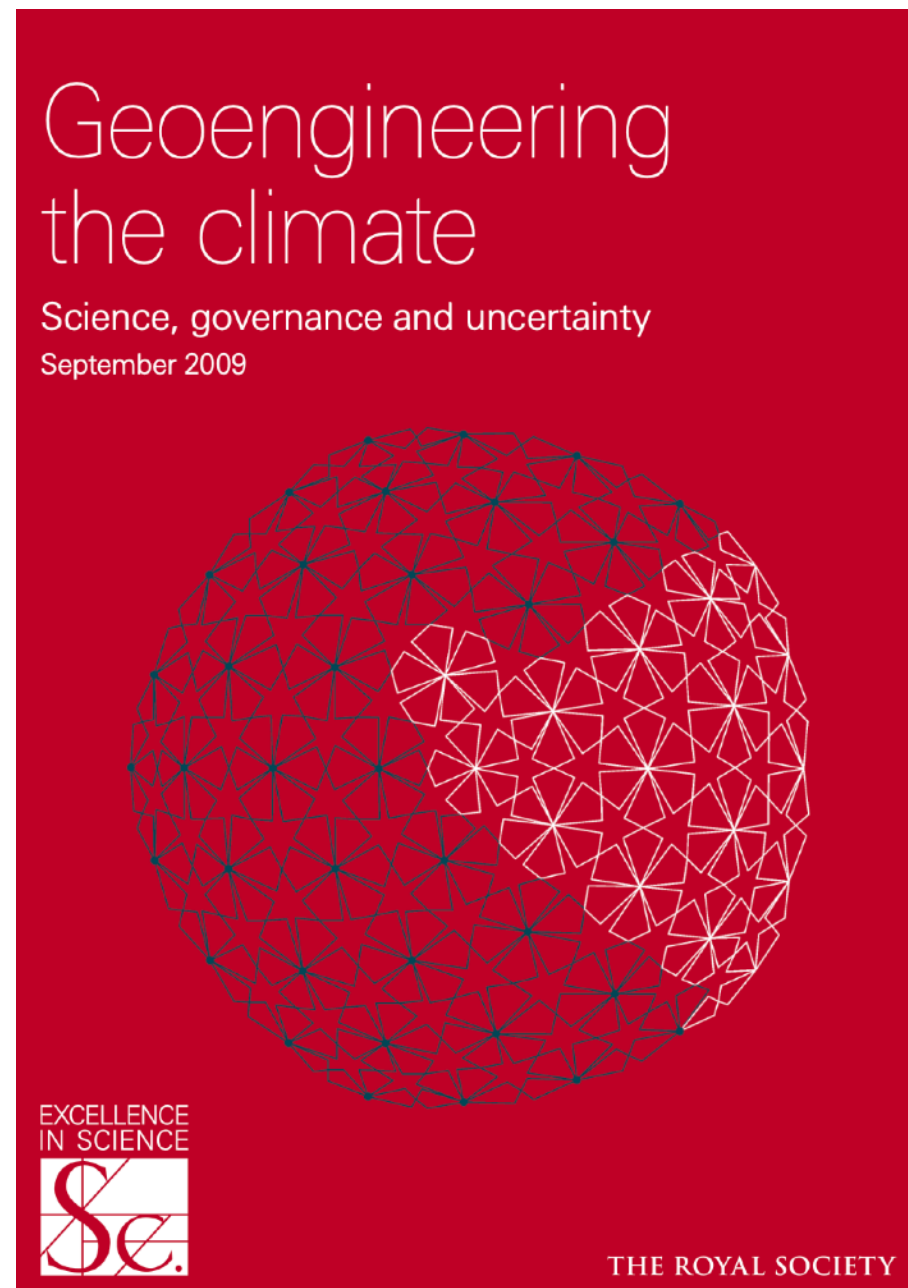




Climate intervention: Social dimensions

ICEF / Oct. 9, 2024 / Holly Jean Buck, Ph.D.

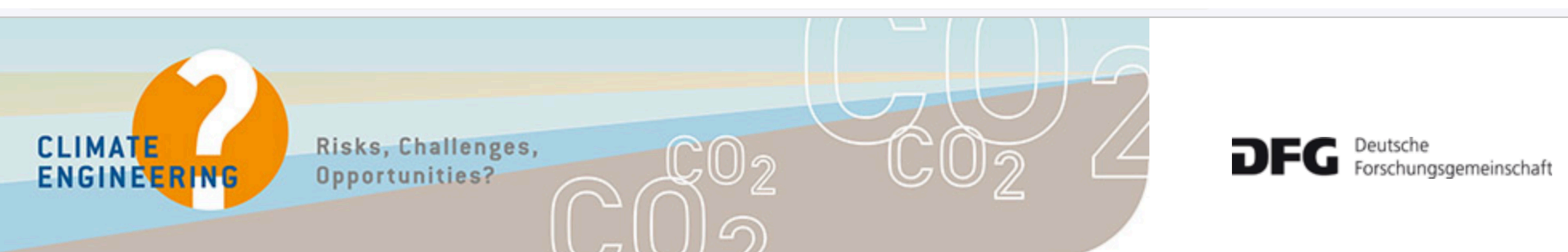
2010s: Interdisciplinary, assessment-focused research paradigm for both carbon removal and solar radiation modification



UK Research Councils: "Integrated Assessment of Geoengineering Proposals", 2010 - 2015, GBP 1.7 million

German Research Foundation: "Climate Engineering – Risks, Challenges, Opportunities?" SPP 1689, 2013 - 2019, EUR 10 million

European Union: "European Transdisciplinary Assessment of Climate Engineering", 2012 - 2014, EUR 1.3 million



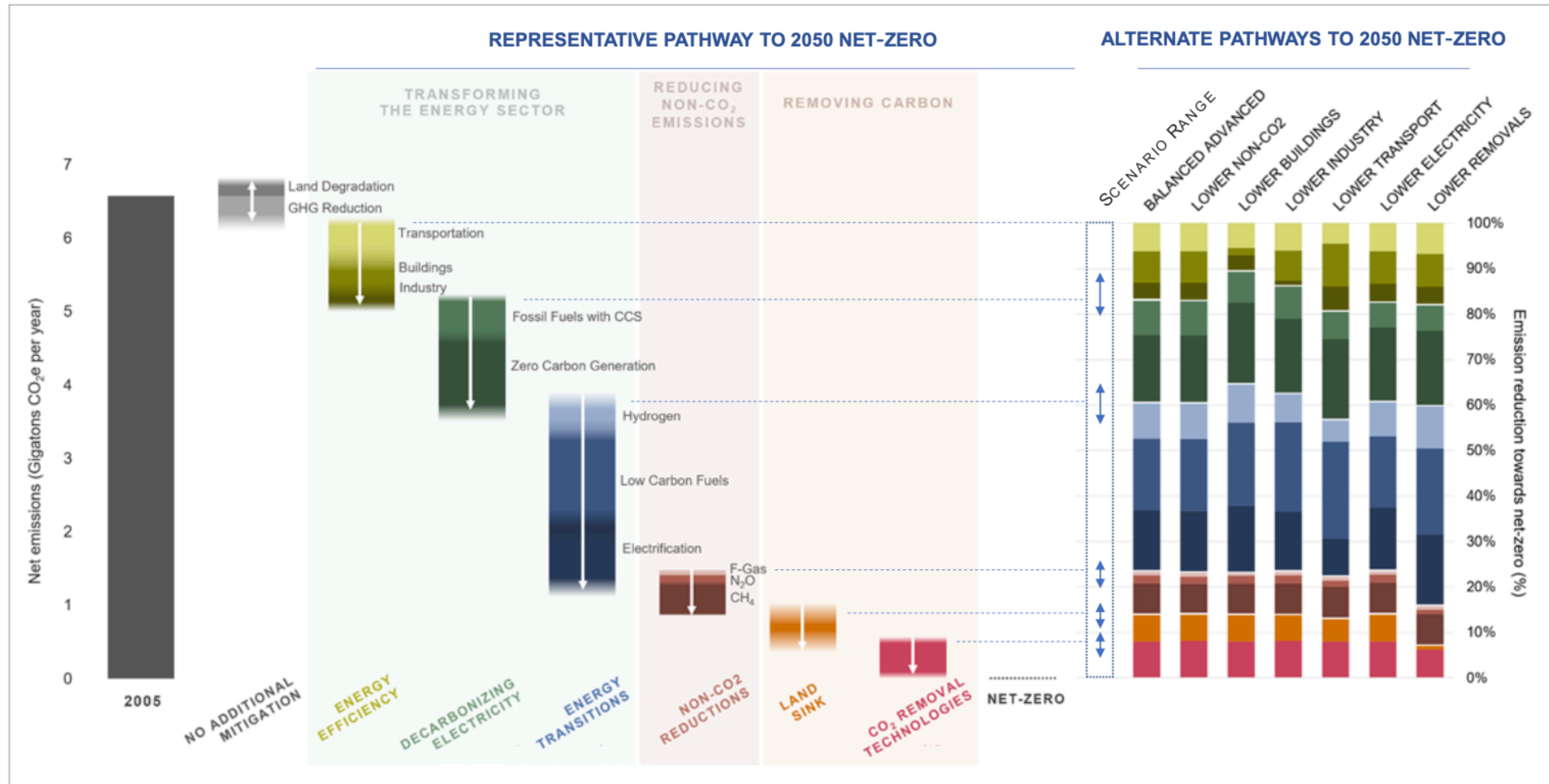
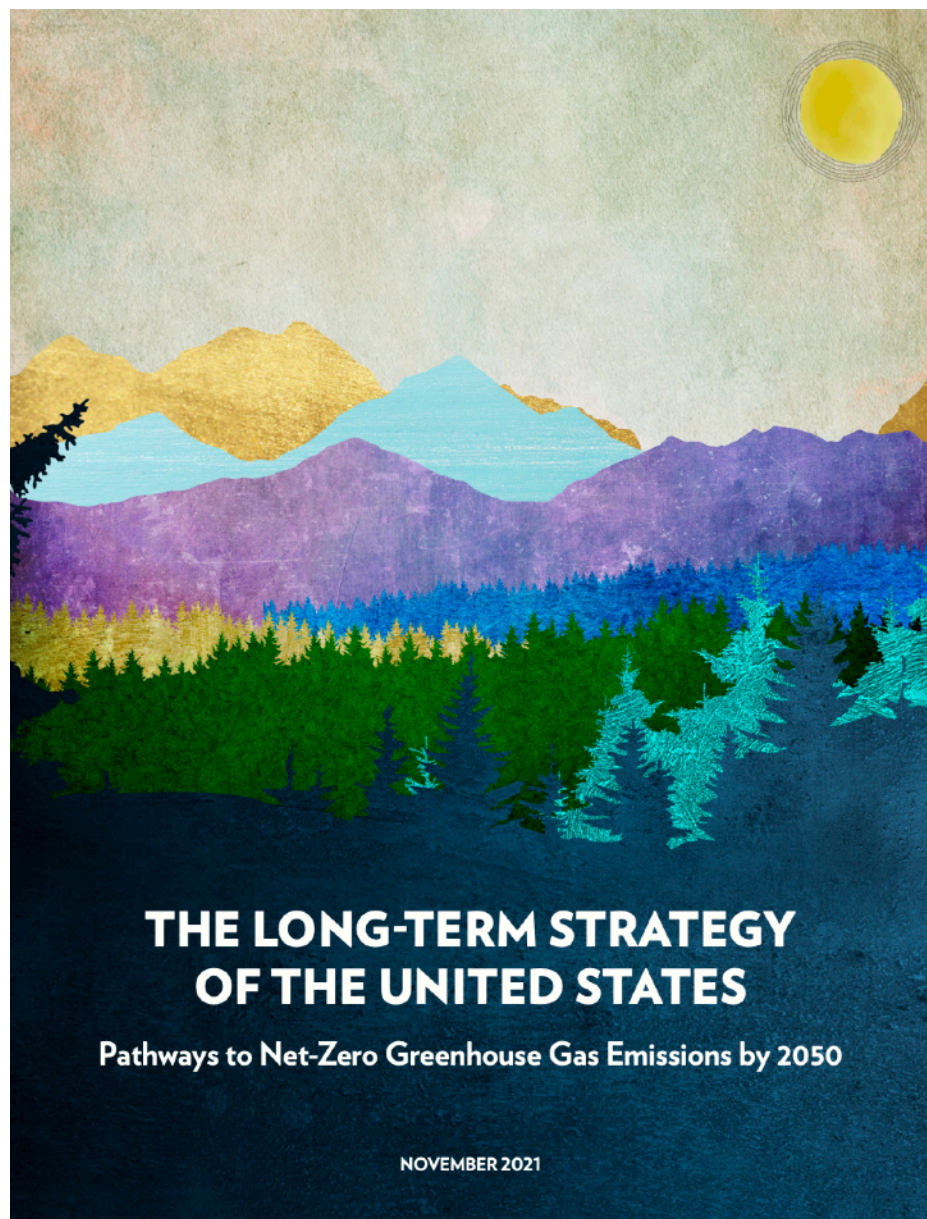
Integrating physical, engineering and social sciences to construct a framework for assessing effectiveness and side effects of geoengineering proposals.

The IAGP project was funded from October 2010 to February 2015.

IAGP Research: What have we learned?



Example from the US: US Long-Term Strategy includes carbon dioxide removal



To advance the development of this emerging but necessary industry, the U.S. Department of Energy launched Carbon Negative Shot—an all-hands-on-deck call for innovation in carbon dioxide removal pathways that will capture carbon dioxide from the atmosphere and store it at gigaton scales for less than \$100/net metric ton of carbon dioxide-equivalent.


<100 Dollars


1 Ton

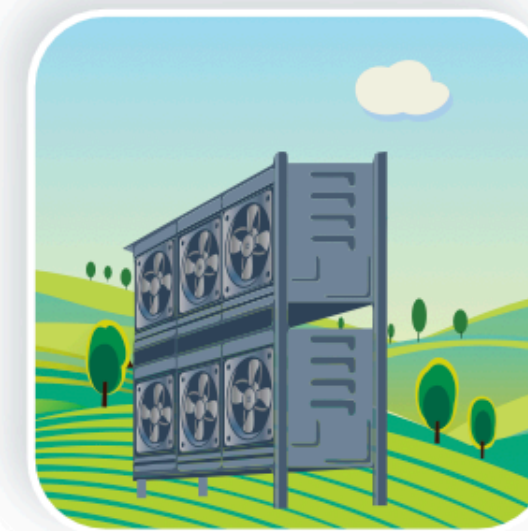

1 Decade

Enabling Scale

Carbon Negative Shot requires that multiple CDR approaches be enabled at scale to support the U.S. Government in meeting its net-zero emissions goal by 2050.

A few of these approaches include, but are not limited to, the following:

Carbon Negative Shot



Direct Air Capture with Storage



Soil Carbon Sequestration



Biomass Carbon Removal and Storage



Enhanced Mineralization



Ocean-Based CDR



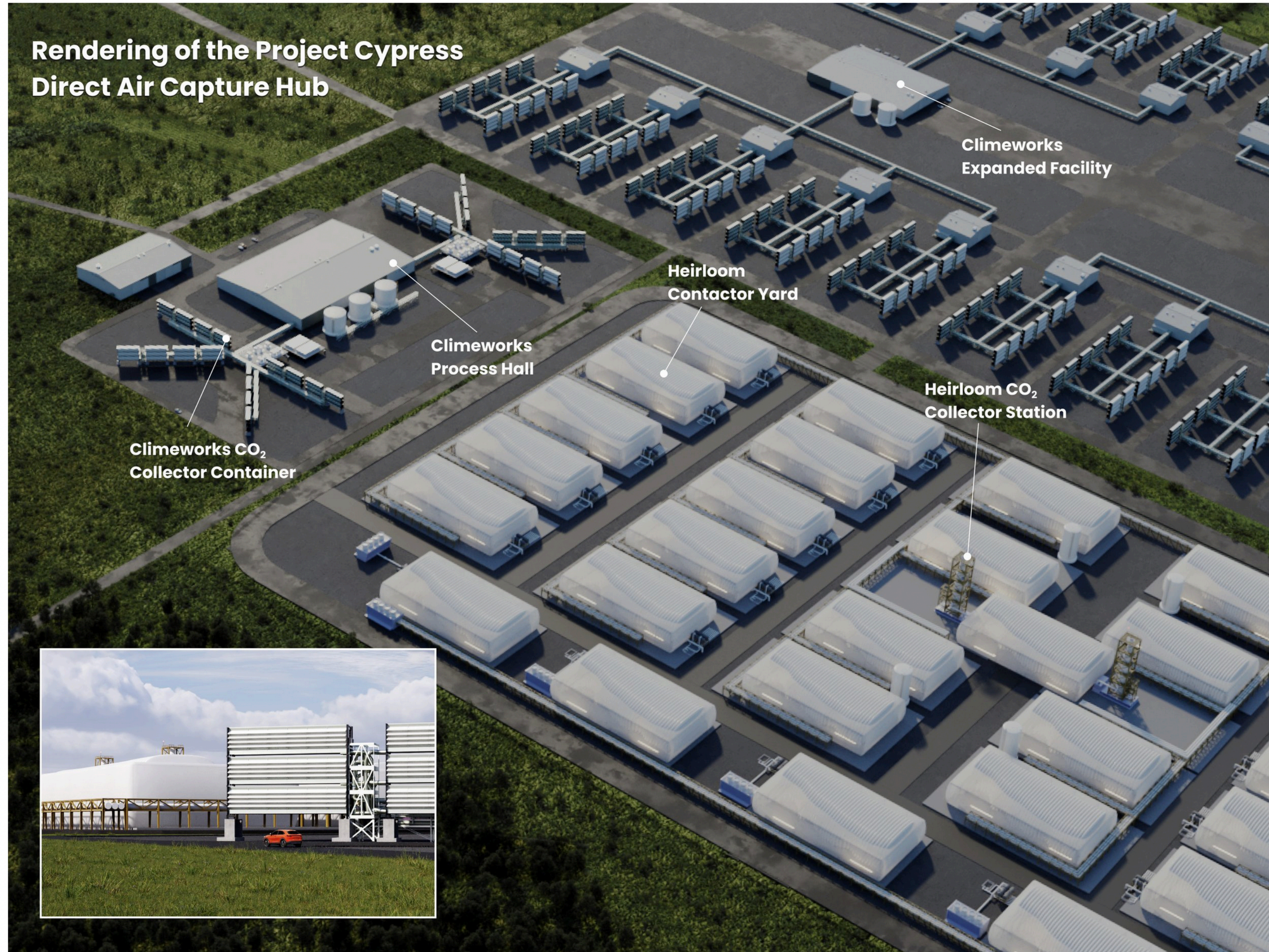
Afforestation/Reforestation

Direct air capture hubs: \$3.5 billion program

Example: Project Cypress in Louisiana



Rendering of the Project Cypress Direct Air Capture Hub



PROJECT CYPRESS

Community Benefits Commitments Summary



This Community Benefits Commitments fact sheet describes how Project Cypress will engage community and labor stakeholders during the initial planning and development phase of the project. These commitments will be updated at the end of each phase to reflect key learnings and developments as the project continues to grow in complexity.



Deemmeris Debra'e Burns shows the spot on a rural road in Satartia, Miss., where he lost consciousness when a carbon dioxide pipeline ruptured, an experience he thinks is a warning for America.

Julia Simon/NPR

2020 CO2 pipeline rupture in Mississippi has created public concern around the US about the risks of CO2 transport



Thelma Brown's sons and nephew were on their way to come get her from her Satartia home when they lost consciousness. Unsure where they were, she gathered her grandkid and great-grandkids — ages 9 years, 2 years, and 3 months — under the quilt in her bedroom, and waited.

Julia Simon/NPR



SCIENCE HEALTH ENERGY

Go read the harrowing story of the world's first CO2 pipeline explosion

Watch out for a new generation of pipelines

By [Justine Calma](#) | [@justcalma](#) | Aug 26, 2021, 2:17pm EDT

The 24-inch Denbury Gulf Coast CO2 pipeline ruptured just outside of the small village of Satartia, Mississippi, on February 22, 2020. Weeks of heavy rains resulted in a landslide that caused what the industry calls a “guillotine” failure.

'We don't want this' | Tensions rise as residents, officials voice opposition to proposed carbon capture hubs from Oxy, Air Products

David Gray | The News Sep 28, 2022 Updated May 3, 2023 0



E&E NEWS CLIMATEWIRE Publications Subscription About Events LOGIN GET ACCESS

<< BACK TO CLIMATEWIRE

'Down your throat': Biden pushes CCS on polluted places

By Jean Chemnick | 08/22/2023 06:21 AM EDT



EPA Administrator Michael Regan (left) and others applaud after President Joe Biden signed an executive order creating the White House Office of Environmental Justice in April. Susan Walsh/AP Photo

Social challenges for carbon removal

- Carbon removal is conflated with carbon capture and storage projects that have been poorly implemented. People are concerned that poor communities and communities of color will bear negative impacts from these projects.
- Social backlash to these technologies may threaten the US's industrial decarbonization goals.
- There are important lessons here for other countries about the importance of early, public engagement.
 - Could this have been avoided by **demonstrably assessing risks**, and **integrating social dimensions research** into the RD&D of carbon removal?

Recent solar radiation modification research efforts

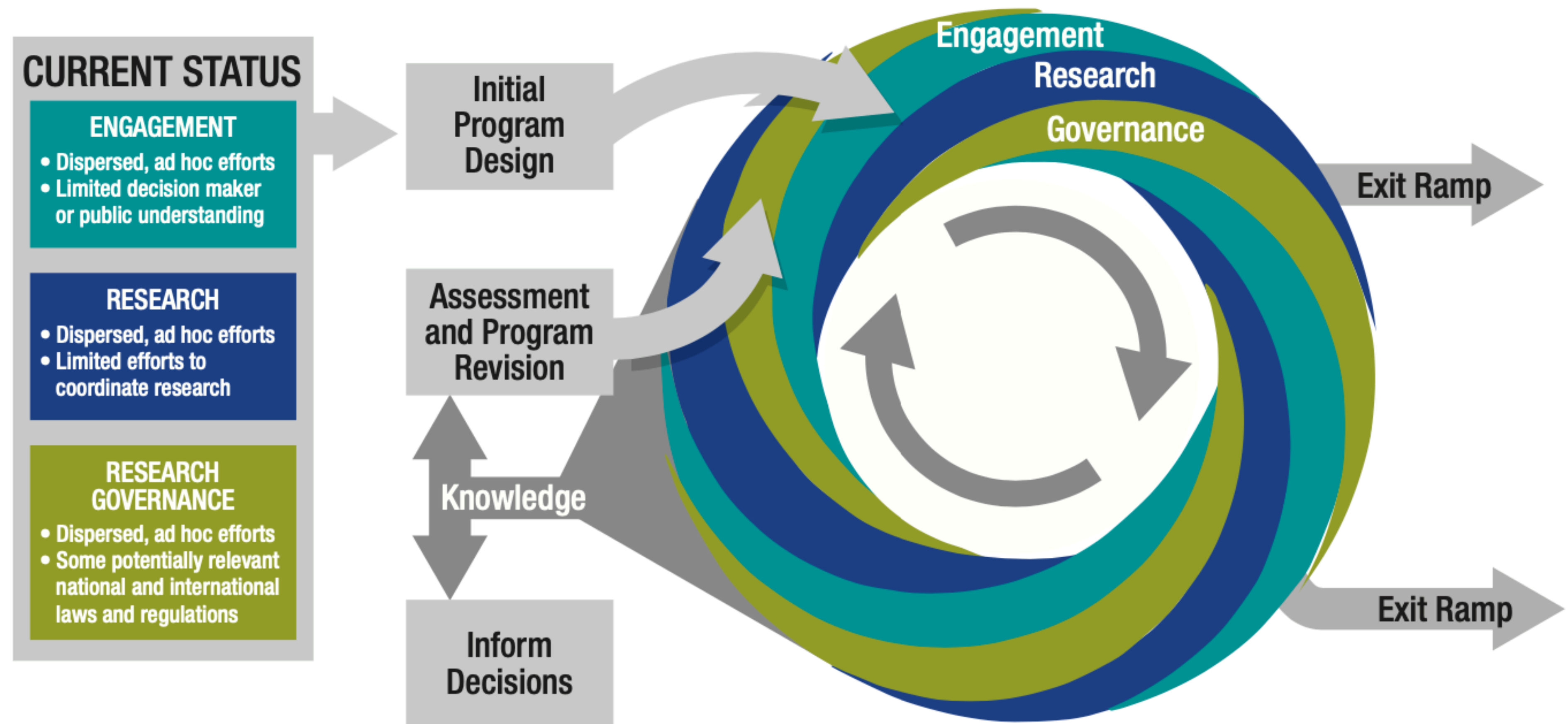
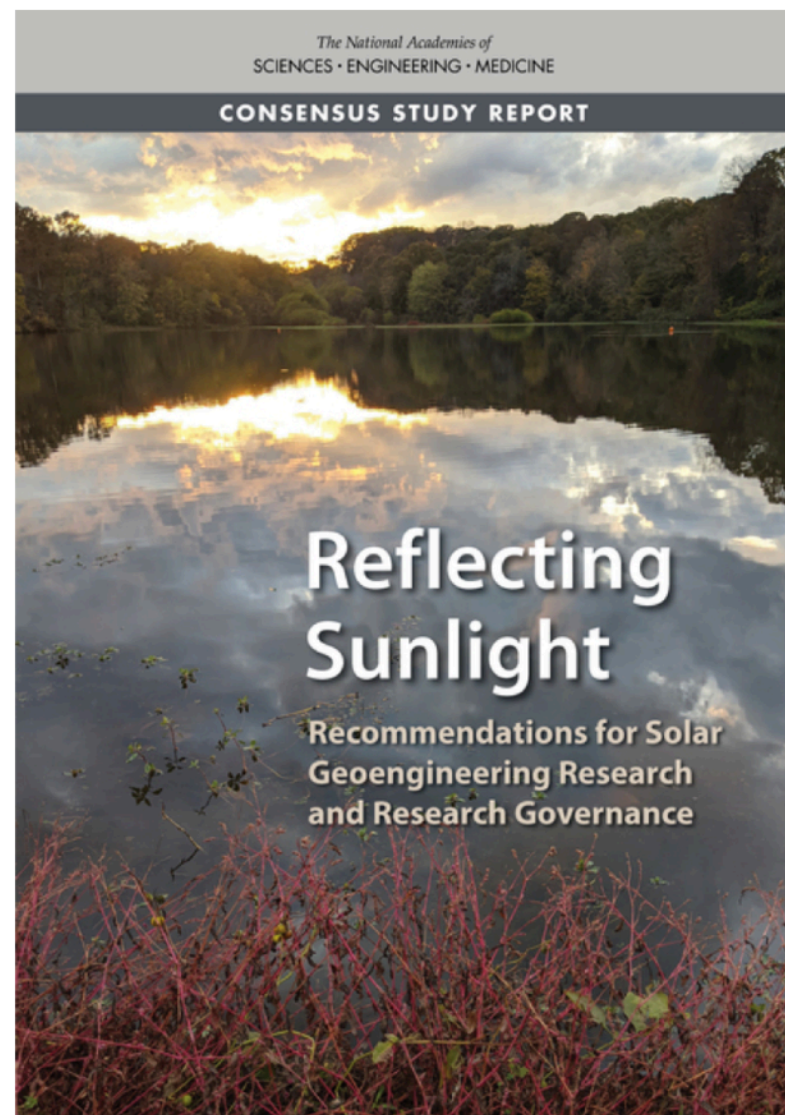
Previously — government research funding to assess risks:

- €10.5m Germany (-2019); €2m China (2015-19); UK: €1.7m SPICE(2010-14) and €1.5m Climate Geoengineering Governance project (2012-14); EU FP7 €1.3m Implications and Risks of Engineering Solar Radiation to Limit Climate Change programme (IMPLICC) (2009-2012) and European Transdisciplinary Assessment of Climate Engineering (EuTRACE) (2012-2014)

New funding:

- Increase in **private funding** (e.g. \$50 million USD - Simons Foundation; \$40m Quadrature; \$20.5m SilverLining) — mostly for biophysical research
- Specific government funding (in Australia, part of AUS\$100m Reef Restoration and Adaptation, in US, \$4m “Earth Radiation Budget”)
- ARIA program, UK — £56.8 million — “Exploring options for actively cooling the earth”

Recommended program design from the US National Academies (2021): Engagement, research, and governance together



White House report, 2023

Emphasizes social and scientific research together — and international cooperation

The report cautions that any potential comprehensive research program must encompass the societal as well as the scientific dimensions of solar radiation modification and highlights several key priority areas for further solar radiation modification research, including:

1. Determining climate and environmental impacts of solar radiation modification deployment
2. Assessing potential societal outcomes and ecological consequences
3. Examining how research might be done in cooperation among international partners

The report also acknowledges that research on solar radiation modification impacts to date has been ad hoc and fragmented, rather than being the product of a comprehensive strategy. As a result, substantial knowledge gaps and uncertainties exist in many critical areas.



[Administration](#) [Priorit](#)

JUNE 30, 2023

Congressionally-Mandated Report on Solar Radiation Modification

[OSTP](#) [NEWS & UPDATES](#) [REPORTS AND DOCUMENTS](#)

The White House Office of Science and Technology Policy (OSTP) is releasing a report **in response to a Congressional mandate** in the Consolidated Appropriations Act 2022 related to solar radiation modification, also known as solar geoengineering. The report, which was developed in coordination with the National Oceanic and Atmospheric Administration and other key federal agencies, identifies critical knowledge gaps and scopes potential research areas that could improve understanding of risks and benefits posed by solar radiation modification.

Importantly, this report does not signify any change in policy or activity by the Biden-Harris Administration, which remains focused on reducing emissions, increasing resilience, advancing environmental justice, and achieving true energy security. Release of this report fulfills a Congressional mandate, and there are no plans underway to establish a comprehensive research program focused on solar radiation modification.

The social science research to date suggests ambivalence about solar radiation modification — sometimes “reluctant acceptance” of the need for research, but also concerns

- Public awareness of solar radiation modification is low
- Support is often ambivalent, with concern about environmental risks and governance challenges
- Support in surveys is higher in the Global South, potentially because of age, disposition towards technology, or concern about climate change
- Public perceptions could rapidly change when people become more familiar

Article | [Open access](#) | Published: 06 March 2024

Public perceptions and support of climate intervention technologies across the Global North and Global South

[Chad M. Baum](#) , [Livia Fritz](#), [Sean Low](#) & [Benjamin K. Sovacool](#)

[Nature Communications](#) **15**, Article number: 2060 (2024) | [Cite this article](#)

8461 Accesses | **11** Citations | **58** Altmetric | [Metrics](#)

[Home](#) > [Sustainability Science](#) > Article

Public attitude toward solar radiation modification: results of a two-scenario online survey on perception in four Asia–Pacific countries

Special Feature: Original Article

Citizens' Attitudes, Preferences, Willingness-to-pay for Climate Change Mitigation Options in Asia | [Open access](#)
Published: 25 June 2024

(2024) [Cite this article](#)

[Download PDF](#) 

 You have full access to this [open access](#) article

[Masahiro Sugiyama](#) , [Shinichiro Asayama](#), [Takanobu Kosugi](#), [Atsushi Ishii](#) & [Shingo Watanabe](#)

Solar radiation modification governance is limited, but informal collaboration and coordination on research can help build bridges

- Proposals led by the Swiss government to the UN Environment Assembly (UNEA) in 2019 and 2024 to establish an expert group on solar radiation modification were divisive and not successful
- There is a “Lighthouse Activity” by the World Climate Research Program on climate intervention, focused on scientific assessment
- The Degrees Initiative focuses on building capacity in developing countries to evaluate solar radiation modification
- It is critical to have more collaboration not just on the biophysical science, but also on the social science and governance research