November 5, 2021

JOINT MISSION STATEMENT FOR THE CARBON DIOXIDE REMOVAL MISSION

The Mission

The Challenge: Many global modeling scenarios suggest that limiting emissions to meet the 1.5°C climate target will require transformational approaches in many sectors and industries. The Intergovernmental Panel on Climate Change (IPCC) noted in its "Special Report: Global Warming of 1.5°C"[1] that all pathways that avoid or limit overshoot of 1.5°C include carbon dioxide removal (CDR) on the order of 100-1000 gigatonnes (Gt) of CO_2 this century. Further, the U.S. National Academies of Sciences, Engineering, and Medicine (NASEM) found that negative emissions technologies (NETs) or CDR would likely need to play a large role in mitigating climate change by removing approximately 10 Gt/year of CO_2 globally by mid-century and approximately 20 Gt/year CO_2 globally by the century's end, if climate and economic growth goals are to be achieved.[2]

CDR technologies are best viewed as part of a mitigation portfolio – as a way to decrease atmospheric concentrations of CO_2 that remain despite ongoing mitigation efforts. Presently, however, CDR approaches are varied, many mechanisms of removal are not well understood, and quantification of actual removal and economics are needed. Rapid cost reductions in CDR technologies are also essential to accelerate carbon removals on the scale needed.

The Goal: Enable CDR technologies to achieve net reduction of 100 million metric tons of CO_2 per year globally by 2030.

The Mission: Mission Innovation (MI) members are launching a Mission on technological CDR approaches, including direct air capture (DAC), biomass with carbon removal and storage (BiCRS), and enhanced mineralization, as a complement to broader emissions reduction efforts. The focus of the Mission is to enhance the systems that lead to negative emissions through an emphasis on secure carbon dioxide storage and conversion into long-lived products.

We will catalyse a global CDR industry by increasing research and development for CDR approaches, harmonizing lifecycle analyses (LCAs) and technoeconomic analyses (TEAs), and facilitating near-term pilot-scale tests and deployment.

By coordinating our efforts and sharing lessons learned, the Mission will help governments, industry, and the public gain a better understanding of the value that CDR technologies can provide and help to inform domestic policies and resources to achieve emission reductions ambitions. Growth in evaluation methodologies and knowledge sharing, specifically data sets used for benchmarking LCA, enable more accurate assessments of all carbon mitigation technologies. Through research, development, and deployment (RD&D), the Mission will improve near-term understanding of CDR technologies so that industry has the confidence to make further investments to mature and commercialize them.

[1] Intergovernmental Panel on Climate Change, *Special Report: Global Warming of 1.5°C*, https://www.ipcc.ch/sr15/.
[2] The National Academies of Sciences, Engineering, Medicine "Developing a Research Agenda for Carbon Dioxide Removal and Reliable Sequestration," https://www.nationalacademies.org/our-work/developing-a-research-agenda-for-carbon-dioxide-removal-and-reliable-sequestration.

Mission Ambition

Co-leads and core members of the Mission commit to:

1) Demonstrating domestic leadership and investment in one or more of the CDR approaches prioritized for this Mission (i.e. DAC, BiCRS, enhanced mineralization, or LCAs/TEAs), either by:
    a. Funding RD&D projects and activities over the next five years, with a suggested minimum investment of $5 million/year, OR
    b. Demonstrating prior investments in CDR RD&D (e.g. continued operation of dedicated test facilities) that can be leveraged to support Mission objectives; AND

2) Actively participating in the Mission by:
    a. Dedicating at least one staff member to facilitate Mission coordination within their respective country;
    b. Leading or co-leading at least one workstream or function within the Mission;
    c. Inviting their research community, private industry, academia, and other relevant stakeholders to actively participate in Mission activities;
    d. Developing collaborative projects with other Mission members that focus on the barriers identified and priority research directions defined by the Mission and its work teams; AND
    e. Developing a roadmap that identifies innovation gaps and an action plan for the Mission that defines the national and international effort needed over the next decade to achieve the Mission goal.

Expectations around FTE contributions to support the delivery of the Mission will be higher for co-leads than for core members.

Supporting members of the Mission commit to:

- Contributing time and/or resources to the development of reports, workshops, and/or collaborative RD&D projects; AND
- Inviting their research community, private industry, academia, and other relevant stakeholders to participate in Mission activities.

All members of the Mission will advance this work by adhering to the following principles:

- **Cooperation**: Members will engage and work with other countries, the private sector, and other international and national initiatives (including other MI Missions).
- **Respect**: Members will respect each other and their differing views and opinions, always keeping focus on the Mission goal and objectives.
- **Accountability**: Members will be committed to the Mission and hold themselves and each other accountable to fellow members.
- **Participation**: Members will share the workload and actively participate. It is expected that core members will either lead or co-lead one or more work function, technology area, etc.
- **Communication**: Members will communicate openly and freely both internally (with each other) and externally (to the public). Open, transparent communication is critical and vital to addressing any issues, challenges, and ensuring input to the Mission.

The Mission will report to the MI community annually on Mission progress.

This joint statement builds on the Mission Innovation 2.0 Launch Statement and does not constitute a legally binding commitment. This Joint Mission Statement will commence on November 5, 2021 and will continue in effect for five years, with the option to be amended by Mission members. After this period, the Mission may be extended for a further five years to support the delivery of the Mission goal by 2030, subject to a review of Mission achievements.

Members

The Mission will bring together a dynamic, ambitious, and delivery-focused alliance of governments, corporations, investors, and research institutes to accelerate innovation on carbon dioxide removal.

The following governments commit to advancing the Mission goal:

- Co-leads:
  - United States of America, Department of Energy
  - Kingdom of Saudi Arabia, Ministry of Energy
  - Canada, Natural Resources Canada

- Core Members:
  - Norway, Gassnova

- Supporting Members:
  - Australia, national Commonwealth Scientific and Industrial Research Organisation (CSIRO)
  - European Commission, Directorate-General for Research & Innovation
  - Japan, Ministry of Economy, Trade and Industry
  - India, Ministry of Science and Technology (DBT and DST)

The following governments are observers to the Mission and may consider membership in the future:

- Germany, Federal Ministry for Economic Affairs and Energy

The list of members is subject to change, as the Mission engages investors, industry stakeholders, research institutes, other collaborative initiatives, and other governments to expand the coalition and stretch our impact.