# Stanford Sustainability Accelerator

## Request for Proposals

## Fall 2025

## Section 1: Overview

**September 15, 2025** - Request for Proposal issued

**November 3, 2025, 11:59 pm** - Letters of Intent due

**November 10, 2025** - Teams invited to submit proposals

**December 15, 2025, 11:59 pm** - Proposals due

**February - March 2026** - Panel review meetings (if required)

**By June 2026** - Target start date for projects

## I. Introduction

The Sustainability Accelerator speeds the translation of Stanford research into scalable technology and policy solutions that address urgent global sustainability challenges to improve the quality of human life and our planet.

The Accelerator differs from typical academic programming and funding. With the aim of "accelerating" the journey from research to impact, the Accelerator supports technical and policy solutions with near-term potential to move outside of Stanford and scale to meet real-world sustainability challenges.

## II. How does the Sustainability Accelerator work?

The Accelerator empowers promising projects and teams by providing:

- Catalytic grants
- Non-financial support, such as connections to potential partners and advisors, to help projects "externalize" (i.e. spin out of Stanford, positioned to scale)
- Community-building across cohorts of project teams and wider "solution communities" that engage allies from inside and outside Stanford to advance sustainability solutions in key areas.

PI-led teams apply for initial grants through the annual RFP process. Proposals are reviewed by external experts and the Accelerator's senior team. Successful projects are awarded funding

and supported for a one-year period with bespoke resources, including connections, access to training programs, market insights, financial modeling, piloting, and coaching.

At the end of Year 1, projects are re-assessed and may receive additional support. The same process is undertaken at the end of Year 2. Our intent is to help projects externalize from Stanford in three years or less, positioned for success.

## III. Our Flagships

To maintain our focus on solutions that can scale, the Accelerator is organized around “flagship destinations” — big, ambitious goals that guide our work. For example, our flagship destination for food and agriculture is to reduce gigatons per year of greenhouse gas emissions from food and agriculture systems by 2035 while supporting the global goals of ending hunger, supplying healthy diets, and ensuring sustainable food production. Of course, no single Accelerator-supported project will achieve such an ambitious outcome, but this “destination” points to what the world needs to create a prosperous and sustainable future, and it informs the proposals we receive and projects we select for support. In addition, two “flagship enablers”—biological solutions and planetary intelligence—help advance solutions across all our flagship destinations and reflect areas of strength at Stanford.

Please review the linked sections below for the specific scope of the eight flagships included in the RFP.  Project proposals must align with impact objectives set forth in at least one of the eight flagships. Some projects may align with more than one flagship. If so, teams are requested to identify all flagships that are relevant, and the Accelerator team will sort projects into cohorts based on the best fit.

- Biological Solutions
- Climate Adaptation
- Electricity and Grid Systems
- Food and Agriculture
- Greenhouse Gas Removal
- Industry
- Planetary Intelligence
- Water

## IV. What kinds of projects and activities are funded?

The Accelerator welcomes proposals that employ advanced or emerging technology, policy innovation, or other scalable solutions. Projects may be grounded in a specific geography, but should be replicable/scalable for greater impact. Examples of proposals that have been selected to date can be found under the focus areas tab on the Accelerator website.

Proposed activities should focus on those which are **highest-value in preparing a project to externalize from Stanford positioned for success**. Externalization might involve launching a startup, inspiring and informing new public policy, licensing technology to a partner who will take it to scale, forming a new NGO, or some other route to impact. In some instances, as is often the case with deep technology, the path to externalization will include achieving critical scientific milestones that de-risk the technology. In most cases, successful proposals will include business- or economic- or policy-relevant tasks that support the underlying impact thesis of the project team.

## V. How much funding is available to project teams*?

*New funding model implemented 2025

Starting this year, we are asking all projects to apply for Year 1 funding. Projects selected for Year 1 funding will be eligible for follow-on funding for Year 2 and potentially for Year 3, based on a formal review process and resource availability. It is expected that up to 5 new projects may be funded per flagship area as a result of this solicitation.

Year 1:

New project team grants are typically up to $150,000 for the first year of project funding. Additional funding may be requested for projects with essential equipment, travel, or other programmatic expenses critical to achieving first-year deliverables. Projects approved for funding beyond the $150,000 level are typically beyond the development of validated laboratory prototypes and demonstrate at least some engagement with external partners.

Budgets and budget justifications should clearly explain why the requested amount of funding is required. Other funding sources that have been secured or are proposed must also be noted.

Year 2:

Project teams will be eligible for continued Accelerator support, based on a formal review process and resource availability. Conversations about potential follow-on funding will typically begin during the 6-month check-in of Year 1 projects.

Year 3:

In some cases, teams may be eligible for a 3rd year of Accelerator funding. The level of Year 3 funding will depend on the remaining work needed for the project to externalize, and may be more or less than funding levels in previous years.

## VI. Eligibility for grant awards

The Accelerator team has found that teams are most successful when the faculty PI is strongly engaged and when the faculty lead/co-leads designate and support a post-doctoral scholar or student to hold primary responsibility for driving the Accelerator project.

- To be eligible for a Sustainability Accelerator grant award, teams must be led by a Stanford faculty or Stanford and SLAC researchers who qualify as a Principal Investigator (PI) according to Stanford University Policy.
- It is strongly recommended that the team include or plan to include a designated postdoc or student lead for the project (the postdoc/student lead may be on the team already or a planned addition). This student/postdoc will become the point of contact with the Accelerator for entrepreneurial development.

Teams must first submit a Letter of Intent (LOI); the Accelerator will confirm that the team is eligible to submit a full proposal based on the LOI.

Multiple LOIs from the same PI or team are allowed, provided they are for distinct projects. However, Accelerator projects are intended to progress with speed and will require a significant time commitment from the PI and team members, so the Accelerator is unlikely to fund more than one project per team, per year. Similarly, faculty are encouraged to serve as PI for no more than two projects, though they can serve as co-PI without limit.

**Projects currently being funded by the Accelerator will be considered for follow-on funding through a separate process; please do not submit a proposal for follow-on funding through this RFP.**

## VII. Evaluation criteria

All proposed projects will be evaluated against the following criteria:

Transformative Potential / Innovation**.** Accelerator projects should be novel and ambitious in scope. Reviewers will be familiar with target markets and will evaluate proposals in relation to existing solutions.

Impact**.** Impact goals are specific to the flagship and identified in each RFP. Assessment will be based on (1) clarity of description of potential impact, (2) intention and ability to quantify impact, (3) identification of beneficiaries.

Scalability**.** While the Accelerator recognizes the importance of small scale solutions, we seek to fund solutions that can scale rapidly, in keeping with the scale and urgency of global sustainability challenges. Evaluation will focus on the solution's potential to scale—whether through growth or replication—and its ability to deliver meaningful benefits for both people and the planet.

Feasibility**.** For a solution to scale successfully, it must first show evidence of traction. Feasibility assessment will consider (1) team constitution, (2) technical, economic, and political feasibility, (3) projected market demand and (4) any other key dynamics (e.g. recent market collapses, political instability in target regions).

## VIII. Application and evaluation process

Letter of Intent (LOI) stage

All teams are required to submit an LOI. LOIs are non-binding, and should be submitted with the understanding that proposals may evolve prior to the submission of a full proposal.

The Accelerator will review all submitted LoIs. Projects that meet the eligibility criteria and align with the mission and flagships of the Accelerator (see Sections I and VI) will be invited to submit a full proposal. We prioritize projects with the potential for large-scale impact (e.g., reducing greenhouse gas emissions by gigatons per year or improving the lives of one billion people) and speed (externalizing the solution from Stanford within 1–3 years).

Letters of intent are due on **November 3, 2025, 11:59 pm.**

Multiple LoIs from the same PI or team are allowed, provided they are for distinct projects, though it is unlikely that a PI will be awarded more than one award. It is strongly recommended that a lead PI has no more than 2 active accelerator projects at one time in any flagship due to the highly involved nature of accelerator projects that differs from more typical research projects funded at the University.

All materials must be submitted through the application portal. See a preview of LOI questions.

Proposal stage

Teams that are invited to submit a full proposal will have approximately five weeks from Accelerator approval of the LOI to submit a full proposal.

The proposal questions will be released when project teams are invited to submit a proposal.

Proposals due: **December 15, 2025, 11:59 pm.**

Evaluation Stage

Submitted proposals will be circulated to a team of external reviewers, drawn from relevant disciplines, including investment, industry, academia, policy, and other areas directly relevant to the proposal's subject matter. Reviewers will provide written reviews to the accelerator team as well as meet with the Accelerator team to evaluate proposals based on the above criteria. Some project teams may be asked to provide additional information in writing, and teams may be

invited for interviews with the Accelerator team and the reviewers. The purpose of the interviews will be to dive deeper into project proposals to answer questions that remain following review of written applications. Panel review meetings will be held in February - March 2026, with expectations to be provided to project teams in advance.

Owing to the high quality and general time demands of recruited reviewers, the review period may last for several months, depending on the number of proposals received.

The number of awards is not predetermined. Awards will be based on how well proposals meet the criteria set out in the RFP, the overall goals of the accelerator, and the overall availability of resources.

Once a team has been notified that their project has been selected for an award, they will meet with the Managing Director to review and finalize the Statement of Project Objectives (SOPO) project budget and period of performance. Once these are agreed, an official award letter will be issued. The target is for projects to begin by June 2026.

*Submission of project proposal to Office of Sponsored Research. A PDRF (previously a backed-in proposal) is now **required** as part of the application process. It must be approved according to the submitting department's approval process by the proposal deadline. Please note, this requirement is not subject to the five-day policy for proposal submissions. Please add Yolanda Banks and Andrea Gray to the PDRF as an FYI. Please note: the new requirement will populate the Current and Pending Report with this grant opportunity.

## IX. Expectations if selected

In addition to funding, the Accelerator team will provide tailored support based on the evolving needs of project teams. This may include, but is not limited to, advice and mentorship on project launch-related topics, such as legal advice, pitching to investors, strategies for corporate engagement, and partnership opportunities. The Accelerator team will curate flagship-related ecosystems and solutions communities to support the projects, foster collaborations, increase external visibility, and amplify impact.

The Accelerator approach requires collaboration between project teams and the Accelerator team. At minimum, project teams must commit to the following:

**Engagement**

- General responsiveness to the Accelerator team on topics relating to project, including informal check-ins
- Attendance at a "Flagship Kickoff Event." Your Project team will provide a poster and 7 to 15-minute presentation. (More details to be shared later.)
- Attendance at flagship and Accelerator community events

- Designation of a student or postdoc “lead” representative to serve as an ongoing point of contact with the Accelerator team and partner for externalization.
- Proactive engagement with external stakeholders to inform the development of the solution and launch and maximize its likelihood of adoption.

**Reporting**

- Completion and return of a mutually agreed Statement of Project Objectives (SOPO) within four weeks of award notification. Please refer to this template for reference.
- Participation in quarterly updates on project activities.
- Completion and return of a final report at project “exit” from the Accelerator.

## X. Project and activity examples

Project A proposes to commercialize a new form of environmentally sustainable fertilizer that has a significantly reduced carbon footprint compared to existing market alternatives. To date, the team has created a prototype of the fertilizer and conducted lab testing and some field testing. Accelerator project activities might include:

- Additional field testing with corporate partners to produce industry-relevant data to de-risk product adoption
- Completion of an industrialization and scale-up study with an industry expert
- Completion of a techno-economic assessment (TEA)
- Customer surveys and market-data collection toward the implementation of their solution
- Team formation towards the creation of a new startup to commercialize the technology

Project B proposes to encourage US government subsidies for new materials used in the sustainable textile industry, compared to existing materials which are known to cause significant water pollution and have a high carbon footprint. To date, the team has produced an academic manuscript and policy white paper on the relative impact value of the new materials. Accelerator project tasks might include:

- Market-sizing research exploring the economic value of new materials and subsidies
- Completion of a study to understand barriers to implementation (i.e. existing regulatory framework)
- Outreach to potential partners to develop a shared policy strategy
- Preparation of materials to educate stakeholders and policymakers

## XI. Contacts

For general questions about the RFP or application system, please contact the Accelerator team at **grants_accelerator@stanford.edu**.

For questions specific to the flagships, please contact the following:

**Biological Solutions** - Timothy Bouley (tbouley@stanford.edu) with cc to Trevor Cambron (tcambron@stanford.edu).

**Climate Adaptation** - Gemma Guilera (gemma99@stanford.edu), with cc to Katherine Li (qkl2@stanford.edu)

**Electricity and Grid Systems** - Albert Chan (alby@stanford.edu), with cc to Mana Iwata (miwata@stanford.edu)

**Food and Agriculture** - Timothy Bouley (tbouley@stanford.edu), with cc to Trevor Cambron (tcambron@stanford.edu).

**GHG Removal** - Jeff Brown (brown01@stanford.edu), with cc to Chubing Li (licbing@stanford.edu).

**Industry** - Albert Chan (alby@stanford.edu), with cc to Mana Iwata (miwata@stanford.edu)

**Planetary Intelligence** - Gemma Guilera (gemma99@stanford.edu), with cc to Katherine Li (qkl2@stanford.edu)

**Water** - Jeff Brown (brown01@stanford.edu), with cc to Daniel Gajardo (dgajardo@stanford.edu).

# Section 2: Individual Flagship RFP Scopes

## Biological Solutions Flagship RFP Scope

**The goal of this flagship enabler is to leverage biological solutions, including both "natural" and "synthetic" approaches, to generate game-changing sustainability outcomes to reach our Flagship Destinations.**

While this Flagship does not have a unique target of its own, it is designed to support innovations toward each of the Accelerator's six Flagship Destinations (climate adaptation, electricity and grid, food and agriculture, greenhouse gas removal, industry, and water). Each has a focus of reducing gigatons per year of greenhouse gas emissions and benefiting people, with biological solutions often presenting additional benefits for ecosystems and biodiversity, while featuring the critical role of living organisms.

### Biological Solutions Context and Motivations

Humans have long harnessed biological resources to provide for essential needs, like shelter, food, and medicine. Advancements in technology have enabled an increasingly deep understanding of biological resources, as well as a new era of synthetic biology that allows us to enhance solutions already found in nature or create new ones altogether to serve 21st century challenges. Solutions in this Flagship draw upon both natural and synthetic biology to meet humanity's current needs and ensure we can meet the needs of future generations sustainably and productively.

Biological solutions offer unique advantages and promising pathways toward a more sustainable and equitable future. Moreover, the underlying principles of biology, such as evolution, homeostasis, metabolism, structure, function and interdependence with the environment and other forms of life on Earth can inform the creation of scalable sustainability solutions.

### Biological Solutions Themes

The Accelerator invites proposals that address challenges within and across the following themes:

**Theme 1: Synthetic biological solutions.** Advancements in synthetic biology are enabling not only a new era for human health and medicine, but for all industries that involve living organisms, and increasingly, many that do not, like manufacturing and mining. Synthetic innovations also offer powerful tools to complement natural systems in addressing the urgency of environmental degradation and climate change. Those innovations with greatest potential for sustainability impact are of greatest interest to the Accelerator, examples of which include technologies and policies for:

- Biomanufacturing of building materials, fuels, and pharmaceuticals

- Genetically engineered microbes for plastic degradation
- Protein engineering for methanotrophic enzymes
- Genetic rescue and de-extinction of keystone species
- Synthetic pathways for nitrogen fixation
- Algae-engineered for biofuel production
- Gene-edited crops with higher climate resilience
- Synthetic enzymes for carbon capture
- Engineered yeast for biodegradable plastics
- Designer microbes for soil remediation

**Theme 2: Natural biological solutions.** Natural biological solutions have long been used to restore balance and resilience to ecosystems and are increasingly drawn upon to mitigate the impacts of and adapt to climate change. By working with nature rather than against it, natural biological solutions can provide cost-effective, scalable, and long-term strategies. Example project topics might include:

- Microorganisms for water treatment
- Mangrove reforestation for coastal protection
- Mycorrhizal fungi to enhance soil carbon
- Agroforestry systems for carbon sequestration
- Cover cropping to restore soil health
- Crop rotation for nutrient cycling
- Pollinator habitat conservation
- Grassland management to prevent desertification
- Coral reef restoration for ocean resilience
- Regenerative grazing for methane reduction

**Theme 3: Biologically-inspired design and biomimicry.** Biologically-inspired design and biomimicry reflect nature, enabling the development of new technologies, materials, or systems patterned on strategies, processes, and structures found in the natural world. Drawing on billions of years of evolution, these solutions offer efficient, low-waste pathways that can often be adapted to complex ecosystems and sustainability challenges. By imitating nature, humans stand a greater chance of designing tools and systems for scalable impact. Potential project types in this theme include:

- Bacteria-inspired self-healing bio-concrete
- Whale fin-inspired wind turbine blades
- Plant-inspired systems for enhanced carbon capture
- Root-inspired systems for carbon storage
- Termite-inspired passive cooling architecture
- Spider silk-inspired biodegradable materials

**Theme 4: Molecular design and engineering.** Molecules like amino acids, DNA, proteins, lipids, and carbohydrates, are the building blocks that make up the structure and function of cells. Cells organize and regulate these molecules to perform essential life-enabling processes like energy production, growth, and reproduction. Achieving gains in biological solutions for sustainability will always include molecular interactions, and in many cases, manipulating molecules can form the basis of the solution itself. Examples of potentially relevant projects in this theme include:

- Engineering microbes for plastic biodegradation
- Harnessing biomolecular pathways for metal recovery in battery recycling and rare earth element mining
- Scaling synthetic enzymes for carbon capture
- Optimizing algae strains for biofuels
- Engineering microbial consortia for soil remediation
- Building protein scaffolds for wastewater treatment
- Designing microbes for methane mitigation
- Enabling synthetic pathways for nitrogen fixation
- Enabling technologies to discover next-generation protein solutions and microbial screening

**Theme 5: Artificial intelligence, machine learning, and systems biology.** AI has the potential to analyze complex biological data to accelerate discoveries in both natural and synthetic systems. From modeling ecosystems to optimizing genetic designs and predicting environmental impacts, AI stands to enable more efficient and precise deployment of solutions to complex and multivariate challenges. AI adds a layer of computational power to solve problems discrete in nature and those that would typically require system biology understandings and methods. Potential project types in this theme include:

- AI-guided microbial pathway engineering
- Machine learning for protein design
- Predictive modeling of soil microbiomes
- Deep learning for carbon sequestration mapping
- Synthetic gene circuit design algorithms
- AI-driven biodiversity monitoring platforms
- Digital twins of ecosystems and farms
- AI-assisted algal biofuel optimization
- Climate impact forecasting with biological data

**Theme 6: Policies to enable biological solutions.** Both natural and synthetic biological solutions require supportive policy environments to enable the flow of finance and stimulate continued innovation. Biologically-focused policies can be designed to promote resilience and long-term sustainability at local, national, and international levels for scalable impact. Examples of topics in this theme include:

Natural biological solutions

- Incentives for regenerative agriculture
- Payments for ecosystem services schemes
- Wetlands and mangrove protection programs
- Carbon sequestration credit systems
- Biodiversity corridors and habitat restoration plans

Synthetic biological solutions

- Safety and standards for microbe engineering
- Policy design for synthetic biology driven climate mitigation efforts
- Incentives for bio-based alternative materials
- Carbon-negative biofuel development subsidies
- International guidelines on genetic rescue and restoration
- Stimulus for gene-edited crops
- Open-access bio-foundry infrastructure

**Theme 7: Others.** Projects which align with overall Flagship goals are invited beyond these themes, if not described above.

## Biological Solutions Contact

For any questions regarding the Biological Solutions Flagship, please contact the Flagship's Managing Director, Timothy Bouley (tbouley@stanford.edu), with cc to Trevor Cambron (tcambron@stanford.edu).

# Climate Adaptation Flagship RFP Scope

**The goal of the flagship destination for Climate Adaptation is to improve the lives of one billion people by 2035 by enhancing adaptive capacity, strengthening resilience, protecting ecosystems, and reducing vulnerability to climate change, with a focus on climate-related extreme events.**

## Climate Adaptation Context and Motivations

Over millennia, human societies and natural ecosystems have adapted to and coped with climate variability and extremes. But today we are in uncharted waters. Climate change poses an urgent and complex set of challenges that threaten communities, natural ecosystems, and economies worldwide. Climate-related extreme events, rising global temperatures, biodiversity loss, water scarcity, threats to food security, and impacts on human health and wellbeing are accelerating. In many cases, those most affected are also least able to adapt, creating critical equity concerns.

Strategic and proactive adaptive interventions are crucial for protecting people and ecosystems from mounting climate-related impacts. However, current adaptation efforts often lack resources, integration across sectors, and the scale needed to match growing climate threats.

There is a strong need for innovative, science-based solutions and collaborations that bring together experts from multiple fields—policy, engineering, finance, biology, social sciences, and more—to develop technologies, policies and strategies that help communities and economies adapt and build resilience in the face of climate change. The aim is to generate solutions that are both locally effective and globally relevant, addressing gaps in technology, policy, governance, and financing, while engaging a broad base of stakeholders with a focus on solutions that can scale.

## Climate Adaptation Scope & Themes

In this Request for Proposals (RFP), we seek projects offering actionable solutions that help communities, businesses, governments, and natural systems worldwide adapt to climate change, with a focus on extreme climate events such as extreme heat, droughts, wildfire, floods, hurricanes and strong storms.

Solutions may include climate resilience technologies; the transformation and regeneration of agricultural systems, water resources, biodiverse ecosystems, cities and communities, health systems, and supply chains; physical and financial risk management services; policy, governance, and financial strategies; amongst others.

While “improving lives” is qualitative, we are looking for projects that will have quantifiable

impact at scale. For example, more than 1 billion people across 77 countries are already at high risk due to lack of access to cooling and more will be at risk as temperatures rise. Widespread uptake of solutions such as passive cooling, intact cold chains for medicine and food, and low-GHG, low-cost air conditioning can measurably improve lives, health, and productivity. Proposals are encouraged to use diverse approaches—including technical, policy, nature-based, economic, legal, behavioral, societal, equity-oriented, and educational strategies. We are particularly interested in technology and policy solutions, as they can be highly scalable. We are also interested in solutions that combine nature-based and human-based strategies to deliver co-benefits across different sectors in both adaptation and mitigation. Collaborative and cross-disciplinary submissions are highly encouraged, and integrating multiple themes within one project is welcomed.

Individual adaptation projects may develop actionable measures at a community, local, regional, national or global level, provided the project sets its sights on major impact through replicability and scalability.

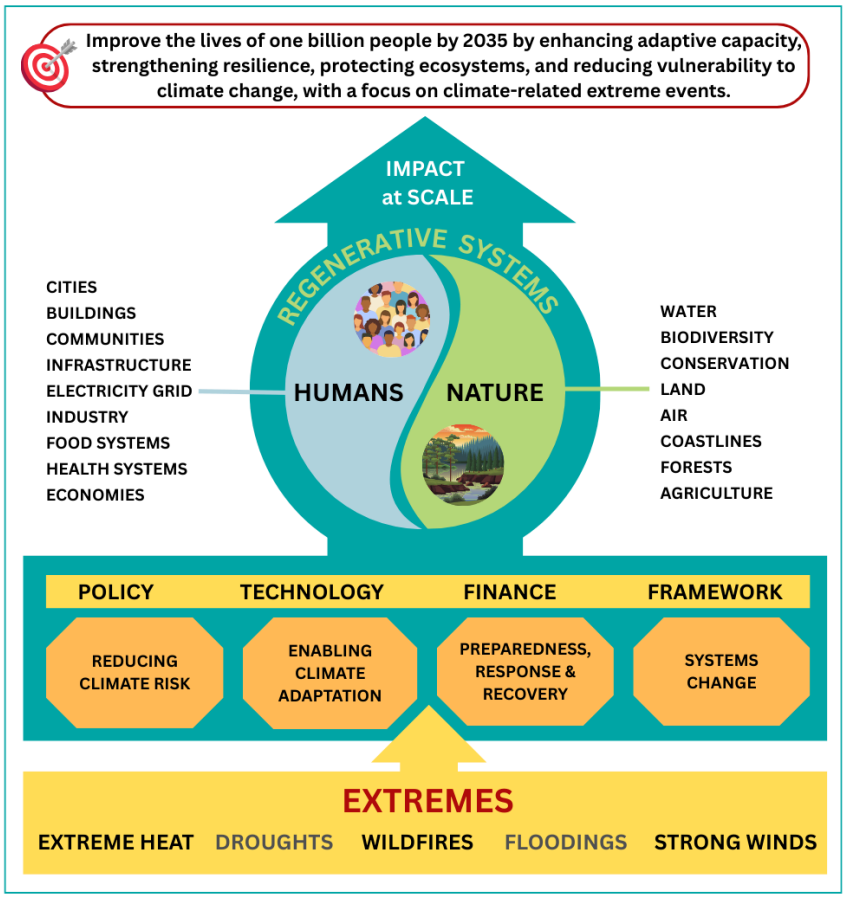


*Fig 1. High level visual representation of the Climate Adaptation Flagship scope and destination.*

The Accelerator invites proposals that address challenges within and across the following themes:

**Theme 1: Reducing Climate Risk**. Projects that help communities, businesses, institutions, or regions reduce their vulnerability to climate impacts. This may include: work on resilient natural ecosystems and infrastructure; insurance mechanisms; financial instruments; public policy; risk modeling, management and communications; land use and planning; water management; resilience technologies (e.g. advanced weather forecasting, fire tech, etc.); among others.

**Theme 2: Enabling Climate Adaptation.** Initiatives that boost the adaptive capacity of ecosystems and communities. This can include designing resilient cities, ecosystem restoration, urban cooling solutions, water resilient crops, adaptive measures for climate-related human pathogens, or strengthening supply chains for essential resources (water, food, energy).

**Theme 3: Preparedness, Response and Recovery from Extreme Events.** As climate-related events become more frequent, we seek to improve community preparedness, response flexibility, and quick recovery from extreme events like heat waves, floods, droughts, wildfires, and typhoons through solutions such as early warning systems, effective communication, and restoring essential services like health, water, shelter, food and energy. Developing countries often experience greater impacts due to socio-economic vulnerabilities. As such, we encourage tailored solutions for marginalized populations and regions, even as we continue to prioritize replicability and scalability. Proposals may focus on indigenous-led adaptation, justice in adaptation finance, accessible adaptation resources, and inclusive policy reforms.

**Theme 4: Systems Change for Adaptation.** Approaches that address systemic barriers to adaptation and resilience—such as governance, financing, or regulatory systems. Solutions could involve new public-private partnerships, innovative funding mechanisms, innovative business models, enabling policy frameworks, or integrating adaptation and resilience into broader development planning.

Proposals will need to demonstrate alignment with the scope of this RFP and the flagship destination. Proposals should identify barriers to scale and how the proposed solution can overcome them. It is important that applicants demonstrate strong partnerships and collaborations (governments, NGOs, local authorities, investors, corporations, citizens, etc.) to maximize the effectiveness and reach of their proposed solutions, and help the solution externalize from Stanford. Externalization pathways may include creating a company, creating an NGO, licensing the solution to third parties, providing key input to a major policy debate, creating a new Stanford Initiative,or any other mechanism that moves the solution out of Stanford, into the world, positioned to have impact at scale.

## Climate Adaptation Contact

For any questions regarding the Climate Adaptation Flagship, please contact the Flagship's Managing Director, Gemma Guilera (gemma99@stanford.edu), with cc to Katherine Li (qkl2@stanford.edu).

# Electricity and Grid Systems Flagship RFP Scope

**The Electricity and Grid Systems flagship destination aims to reduce gigatons per year of greenhouse gas emissions from the electricity sector globally by 2035, while driving toward zero-GHG, reliable, flexible, affordable, and socially just electricity for all by 2050.**

## Electricity and Grid Systems Context and Motivations

One-quarter of global greenhouse gas (GHG) emissions are attributed to electricity generation, with China, the U.S., India, the EU, and Russia being the largest contributors.[1,2] To achieve global climate goals while ensuring access to reliable, affordable, and clean electricity, electricity systems must both decarbonize and expand in response to rising demand. Key drivers of this demand include the electrification of transportation, industry, and buildings, a growing consumer base (including more than 660 million people who continue to lack access to electricity, primarily in sub-Saharan Africa),[3] and power demands from data centers and AI. The International Energy Agency's net zero emissions scenario estimates a 2.5-fold increase in power generation by 2050.

While the growth of solar and wind generation is promising, significant challenges remain in attaining reliable, affordable, and clean electricity for all. Large-scale systems with increased variable renewables necessitate energy storage solutions and clean firm power generation (including nuclear, hydropower, geothermal, etc). Transitioning towards decentralized, customer-focused grids requires innovative solutions for managing distributed energy resources (DERs), as well as strategies to empower and influence end-user behavior.

Accessibility, affordability, and resilience are critical concerns, particularly for low-income individuals. Electricity generation companies must adapt to changing demand patterns, necessitating smarter load management strategies to address peak demands during low renewable generation periods. Distribution systems will require upgrades to accommodate new loads and distributed generation. Only by tackling these and other challenges can we achieve sustainable and equitable electricity systems.

[1] UN Environment Programme: Emissions Gap Report 2024.
https://www.unep.org/resources/emissions-gap-report-2024

[2] European Commission: EDGAR - Emissions Database for Global Atmospheric Research.
https://edgar.jrc.ec.europa.eu/report_2024#emissions_table

[3] Tracking SDG7: Energy Progress Report.
https://trackingsdg7.esmap.org/results?p=Access_to_Electricity&i=Population_without_access_to_electricity,_million_people_(Total)

## Electricity and Grid Systems Scope & Themes

Proposals must demonstrate the potential to have impact at scale. Proposed solutions may be specific to a large country or region or replicable across jurisdictions. Successful proposals should outline products or activities that can drive scale, emphasizing the potential for cost-competitiveness and other advantages that will help solutions gain traction beyond Stanford.

The Accelerator invites proposals that address challenges within and across the following themes:

**Theme 1: Generation, Transmission, and Distribution.** This category focuses on transitioning the grid from fossil fuel based electricity generation to clean, renewable, and reliable power generation with increased transmission and distribution capacity to accommodate the growth in electricity demand and more flexible loads.[4] Proposals could explore, for example, new materials that reduce the cost of clean generation technologies (nuclear, geothermal, solar, wind, etc) or devices that significantly improve the efficiency and reliability of transmission and distribution systems.

**Theme 2: Operation and Optimization.** A modern, distributed renewable energy grid will require a more flexible control framework. Developing countries, in particular, have many areas that are too remote for traditional grid expansion and require new solutions. To address these gaps, proposals may include the development of Virtual Power Plants (VPP), improved predictive intelligence to reduce curtailment, and digital twins to assess grid modernization approaches.

**Theme 3: Storage.** Energy storage technologies will be essential in the energy transition. Storage technologies provide backup power during outages, stabilize the grid, lower the cost of meeting peak power demand, and reduce transmission infrastructure costs. Proposals in this category may include, for example, advancements in multi-day long duration energy storage, which include technologies such as electrochemical batteries, pumped storage hydropower, compressed air, and thermal storage batteries.

**Theme 4: Policy, Regulation and Governance.** Applicants can propose analysis and engagement strategies on policy, regulatory, and governance challenges affecting electricity systems. Examples include streamlining permitting processes, upskilling clean energy workers, enabling new financing mechanisms, and developing guidance for renewable energy certificates frameworks. The Accelerator is most interested in solutions that can be implemented and tested in a particular jurisdiction but with applicability beyond that jurisdiction.

[4] Electricity grids and secure energy transitions, IEA, Nov. 2023, Link.

**Theme 5: Prosumers and End-users.** The grid of the future will require consumers that not only consume energy but also actively produce and manage it. As these “prosumers” enter the market, new technologies and business models will be needed to support a decarbonized energy system. Example projects could encourage adoption of energy efficient natural cooling in buildings, smart appliances to alter behavior, and bidirectional EV charging infrastructure/approaches that support grid flexibility and optimization.

**Theme 6: Electricity Markets, Economic Analysis, and New Business Models**. Market rules - such those that govern the wholesale market - may need to adapt to accommodate a higher share of distributed and variable energy resources. Example projects may include analysis and pilots on peer-to-peer trading platforms, dynamic pricing models, or other approaches that can align supply and demand dynamically.

Proposals must align with the RFP objectives and identify barriers to scale, offering solutions to overcome them. Strong partnerships (governments, NGOs, investors, corporations, etc.) are crucial for enhancing the effectiveness and reach of proposed solutions. Potential externalization pathways may include creating companies or NGOs, licensing technologies, influencing policy debates, or other mechanisms aimed at moving solutions out of Stanford and achieving impact at scale.

### Electricity and Grid Systems Contact

For any questions regarding the Electricity and Grid Systems Flagship, please contact the Flagship’s Managing Director, Albert Chan (alby@stanford.edu) with cc to Mana Iwata (miwata@stanford.edu).

# Food and Agriculture Flagship RFP Scope

**The goal of this flagship destination is to reduce gigatons per year of greenhouse gas emissions from food and agriculture systems by 2035 while enabling more efficient, productive, and environmentally sustainable practices to feed a growing global population.**

## Food and Agriculture Context and Motivations

Global food and agricultural systems lie at the center of human life, sustaining health and wealth in myriad ways that stretch from field to farm to table. Agriculture is by many accounts humanity's most important innovation, enabling our success as a species and every civilization and invention since agriculture's neolithic birth more than ten millennia ago. Yet, as humanity has spread, so too has the environmental impact of agriculture and food systems. The same systems that nourish Earth's 8 billion human inhabitants are also the foremost drivers of many of our most intractable environmental challenges.

Speeding innovation in food and agricultural systems is essential for achieving long-term sustainability and in particular, addressing climate change. As much as a third of current greenhouse gas (GHG) emissions can be attributed to food and agriculture. Reducing the GHG footprint of these sectors carries multiple environmental co-benefits: enabling healthier ecosystems and richer biodiversity, reducing land and water pollution, reversing deforestation and desertification, among others.

The complex nature of our food and agriculture systems requires action on multiple fronts to achieve significant reductions in emissions while achieving widespread environmental and social benefits. Success will depend on integrated approaches that include the development of more sustainable practices, policies, technologies, governance, financing mechanisms, and environmental stewardship strategies. Fundamentally, the Sustainability Accelerator is interested in solutions across this spectrum and seeks a diversity of approaches which can be scaled with speed.

## Food and Agriculture Themes

The Accelerator invites proposals that address challenges within and across the following themes:

### Theme 1: Growing and harvesting food on land (crops, livestock)

Land-based agriculture drives environmental degradation in several ways: through land clearing, fertilizer and pesticide runoff, overgrazing, irrigation that depletes and contaminates water sources, and others. These practices accelerate soil erosion, biodiversity loss, and climate change by releasing GHGs and disrupting natural ecosystems. Climate impacts are

particularly driven by methane emissions from livestock, nitrous oxide from fertilizer use, and carbon dioxide released by agriculturally-driven deforestation and soil disturbance, each of which amplify atmospheric warming, while reducing land's natural capacity to act as a carbon sink. Solutions may come in many forms, examples of which include technology or policy innovations in the following areas:

- "Green" or alternative fertilizers
- Molecular approaches to improving crop health
- Genetically engineered plants
- Microbial enhancements and seed coatings
- Regenerative agriculture
- Improved and enhanced animal feed
- Approaches to managing climate-sensitive diseases in crops and livestock
- Biotechnological interventions for improved animal or crop health
- Satellite remote sensing and earth observation for agriculture
- Artificial intelligence and data-based interventions
- Subsidies and other policy and financial levers

### Theme 2: Growing and harvesting food in the water (aquaculture and fisheries)

Fishing has long been a staple source of nutrition for humans, while aquaculture has only recently achieved widespread adoption, owing primarily to advancements in infrastructure and selective breeding. Blue food (fish and aquaculture) presents unique sustainability challenges and opportunities that are ripe for innovative solutions. Examples of projects that may fall into this theme include:

- Feed enhancements and efficiencies for aquaculture
- Aquaculture infrastructure improvements
- Biotechnological interventions for aquatic plants and algae
- Innovations for farming or fishing alternative species
- Artificial intelligence and data-based interventions
- Nature-based solutions for farming more sustainable marine crops
- Subsidies and other political and financial levers

### Theme 3: Alternative protein

Alternative protein refers to food sources that provide protein without relying on conventional livestock. This includes plant-based products, cultivated (lab-grown) meat, or protein derived from insects, algae, or microbes. These "alternatives" aim to meet growing protein demand while reducing environmental impacts, including greenhouse gas emissions. Potential projects in this category include, but are not limited to:

- Emerging technologies for culturing and cultivating meat
- Molecular and cellular mechanisms for accelerating alternative proteins
- Approaches for new plant-based protein products
- Fungi-based protein
- Insect-based protein
- Artificial intelligence and data-based interventions
- Subsidies and other policy and financial levers

### Theme 4: Food waste

Globally, more than 1 billion tons of food is wasted each year, equal to roughly one-third of all food produced for human consumption**.** This loss occurs across the entire supply chain, from farms and transport to retail and households. Strikingly, this food waste is responsible for 8–10% of global greenhouse gas emissions, coming from both the wasted energy, land, and inputs used to produce food that's never eaten, and from methane released as discarded food decomposes in landfills. Innovation is desperately needed within this theme, with potential project concepts including, but not limited to technologies and policies for:

- Smart packaging with freshness sensors
- AI-powered supply chain forecasting
- Surplus food redistribution platforms
- Edible and compostable packaging
- On-farm food recovery programs
- Upcycled food product development
- Household food tracking apps

### Theme 5: Packaging, processing, and supply chain

The packaging, processing, and supply chain technologies necessary to get food to customers consume large amounts of energy and materials, relying typically on plastics, fossil fuels, and resource-intensive infrastructure. These activities contribute to GHG emissions, pollution, and waste, amplifying the sector's overall environmental footprint far beyond the farm level. Innovations in this value-chain relevant theme are welcomed, with potential project types including:

- Biodegradable and compostable packaging materials
- Renewable energy in food processing
- Cold chain efficiency and insulation tech for food supply chains
- Blockchain for transparent supply chains
- Regionalized food hubs and markets
- Smart logistics and route optimization

### Theme 6: Artificial intelligence and machine learning for food and agriculture

The ability of machine learning and artificial intelligence to analyze large-scale datasets stands to have out-sized impact in the world of food and agriculture, optimizing crop yields, reducing resource use, and minimizing waste and emissions. Artificial intelligence provides a set of critical new tools in a system that is inherently complex, global, and dependent on interoperable systems across supply chains. AI has scope to help farmers, purchasers, consumers, and policymakers make data-driven decisions to reduce emissions and conserve critical environmental resources. Examples of project innovations in this space may include:

- Precision irrigation and water optimization systems
- AI-driven crop yield forecasting tools
- Automated pest and disease detection
- Smart soil health monitoring platforms
- Predictive climate impact modeling software
- AI-powered supply chain optimization
- Drone-based crop health assessment
- Livestock monitoring and welfare analytics
- Food waste tracking and reduction algorithms
- Satellite imaging with machine learning insights

### Theme 7: Food and agriculture policy

Food and agricultural policy sets the rules and incentives that shape how resources are used, which technologies are adopted, and how risks are managed across the sector(s). Strong policies can accelerate the scaling of sustainable solutions to reward climate-smart and sustainable practices, spur innovation, and ensure equitable access to healthier food systems. Policy project examples include:

- Subsidies for climate-smart agriculture
- Regulations to protect against agriculturally-related environmental harms
- Incentives for regenerative agriculture adoption
- Stricter limits on fertilizer runoff
- Design of food waste reduction programs
- Carbon pricing in agriculture sector
- Investment in sustainable aquaculture systems
- Mandatory sustainability reporting for agribusinesses
- Institutional policy shifts to lower-carbon diets
- Interdisciplinary initiatives to integrate policy and technical innovation

### Theme 8: Others

Projects which align with overall Flagship goals are invited beyond these themes, if not described above.

## Food and Agriculture Contact

For any questions regarding the Food and Agriculture Flagship, please contact the Flagship's Managing Director, Timothy Bouley (tbouley@stanford.edu), with cc to Trevor Cambron (tcambron@stanford.edu).

# Greenhouse Gas Removal (GHG-R) Flagship RFP Scope

**The GHG-R flagship destination aims to remove gigaton(Gt)s of CO2 equivalents (CO2e) from the atmosphere per year by mid-century through an integrated approach that will support the development of needed technological, governance, financial, and other societal innovations necessary to scale removals solutions.**

## GHG-R Context and Motivations

Greenhouse gas (GHG) emissions have risen steadily since industrialization. Atmospheric $CO_2$ concentrations are at record highs approaching 430 parts per million (ppm), over 50% above the 278 ppm pre-industrial baseline.[5] To stabilize global temperature, anthropogenic $CO_2$ emissions must reach net zero around mid-century, and net negative thereafter. Even with aggressive emissions cuts, residual and legacy emissions will persist, especially from hard-to-abate sectors that underpin livelihoods and economic development. Therefore, GHG removal (GHG-R) must scale rapidly in parallel with deep emissions cuts to halt the rise in GHG concentrations and, over time, drive them down.

Recent assessments indicate that 7-10 $GtCO_2yr^{-1}$ of global removal could be needed by 2050 for net-zero pathways. Today, approximately 2.1 $GtCO_2yr^{-1}$ is removed, mostly by conventional land sinks (<0.1% from novel CDR).[6] [7] While technologies to cut emissions are maturing, at-scale GHG-R is nascent and pathways to deployment are not well understood. Closing this removals gap will require a portfolio of high quality GHG-R solutions. Although $CO_2$ has been the primary focus to date, the Accelerator welcomes proposals addressing removal of any GHG with substantial warming impact (e.g., $CH_4$, $N_2O$) (see Table 1 below).

| | | Global Warming Potential (time horizon in years) | | |
|---|---|---|---|---|
| Gas | Lifetime (years) | 20 years | 100 years | 500 years |
| $CO_2$ | 5-200 | 1 | 1 | 1 |
| $CH_4$ | 12 | 62 | 23 | 7 |
| $N_2O$ | 114 | 275 | 296 | 156 |
| HFCs | 0.3-260 | 40-9,400 | 12-12,000 | 4-10,000 |
| PFCs | 2,600-50,000 | 3,900-8,000 | 5,700-11,900 | 8,900-18,000 |
| $SF_6$ | 3,200 | 15,100 | 22,200 | 32,400 |

Table 1: Global warming potential and atmospheric permanence of various GHGs[8]

[5] "Trends in $CO_2$" *NOAA Global Monitoring Laboratory*, National Oceanic and Atmospheric Administration, 14 July 2025, Link
[6] *The State of Carbon Dioxide Removal*, 2024, Link
[7] "Negative Emissions Technologies and Reliable Sequestration–A Research Agenda (2019)" *National Academies of Sciences, Engineering, and Medicine*, n.d., Link
[8] *Jardine, C.N. & Boardman, Brenda & Osman, Ayub & Vowles, Julia & Palmer, Jane. (2023). methane*

## GHG-R Scope and Themes

We invite proposals for GHG-R solutions and strategies with credible potential to deliver annual removals at Gt $CO_2e$ scale by 2050. Projects focused on reducing or avoiding GHG emissions (e.g., carbon capture from fossil fuel combustion, reduced emissions from land use change) are not appropriate for this RFP because they do not focus on removing previously emitted GHGs.

Proposals should:

- State your hypothesis for how your solution can scale: Describe key milestones, the deployment model and siting, and enabling conditions including critical inputs & supply chain, infrastructure, policy, piloting, market and offtake, etc.
- Quantify high-quality net removals after deployment: Provide expected $GtCO_2yr^{-1}$ by 2050 with clear system boundaries, life-cycle assessment (LCA) assumptions, and a monitoring, reporting, and verification (MRV) plan; and describe mitigation strategies for permanence, leakage, and reversal risks.
- Close scale-critical gap(s): Identify the key barriers to climatically significant GHG-R and how this project de-risks them.
- Assess impacts and co-benefits: Evaluate potential environmental and community impacts, and, where relevant, the energy/material requirements, potential co-benefits, and options for mitigating potential adverse effects of the solutions proposed.

We invite proposals focused on the following themes:

**Theme 1: Atmospheric GHG-R ($CH_4$, $N_2O$, and $CO_2$).** For atmospheric removal, projects may focus on any GHG-R area except $CO_2$ direct air capture (DAC), unless the DAC concept is clearly innovative, transformational, and high-risk/high-reward beyond current practice. We welcome methods for direct atmospheric capture of methane and nitrous oxide that involve abiotic catalytic approaches that tackle the energy penalty and assess techno economics are of interest. Proposals on new methods that might convert/reduce/capture these gasses when released in terrestrial environments involving biological means are also invited.

**Theme 2: Terrestrial Natural Climate Solutions.** On land, we are interested in projects focused on: any nature-based and engineered solutions with gigaton-scale potential and durable storage of carbon (e.g., increasing the area of forests, increasing biomass density, building soil organic matter, enhanced rock weathering (ERW), biochar and BECCS, assessing policy, market, and risks of these solutions).

**Theme 3: Ocean Solutions.** In the ocean, we seek solutions for carbon capture and storage including direct ocean capture, ocean alkalinity enhancement (OAE), mangrove and seagrass restoration, enhanced carbon uptake by biomass, and other methods for accelerating new

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production in the ocean are of interest.

**Theme 4: Monitoring, Reporting and Verification (MRV), GHG Accounting.** MRV is a key enabler of GHG-R solutions. New methods for improved accuracy in GHG accounting are needed across the board to ensure robustness and accuracy of claimed removals.

- MRV Solutions in open systems such as biochar, ERW, and OAE.
- Address how MRV approaches may or may not create sufficient certainty to drive investment into GHG-R pathways.
- Consider solutions for differentiating between different GHG-R pathways based on their reversal risk and relative permanence.

**Theme 5: Market Mechanism, Policy and Governance of GHG-R.** It will take more than new technologies and voluntary markets to realize the scale of GHG-R required to meet global climate goals. Robust market formation, supported by smart policies and governance structures, will be critical. Applicants might, for example, propose to:

- Explore policies and regulatory structures that would drive market development for GHG-R solutions.
- Explore the potential and the limits of current voluntary approaches and the timing by which alternatives may be needed to facilitate scale-up.
- Develop quality protocols to define high quality GHG-R solutions (durability thresholds, MRV, uncertainty bounds, additionality, etc.)
- Explore GHG-R market infrastructure and governance across both demand- and supply-side policies, including building/validate registries, open data standards, MRV, etc.
- Create tools that help establish an enabling environment, such as permitting/siting playbooks, finance/risk toolkits, etc.

## GHG-R Contact

For any questions regarding the GHG-R Flagship, please contact the Flagship's Managing Director, Jeff Brown (brown01@stanford.edu), with cc to Chubing Li (licbing@stanford.edu).

# Industry Flagship RFP Scope

**The Sustainable Industry flagship aims to reduce gigatons per year of greenhouse gas emissions from industry by 2035 by launching solutions that are market-competitive, sustainable, scalable, and equitable.**

## Industry Context and Motivations

Reducing greenhouse gas (GHG) emissions from industry is crucial for combating climate change, as industrial sectors account for more than 20% of global GHG emissions. Heavy industries such as steel, cement, chemicals, and oil refining are major contributors.[9,]

Additionally, industrial emissions are closely linked to material consumption; circular economy approaches can reduce emissions by up to 40% in material-intensive sectors like plastics and aluminum.[10] To achieve net zero emissions by 2050, the industrial sector must adopt cleaner technologies, improve energy efficiency, transition to renewable energy sources, embrace circular practices, and implement carbon capture solutions.

Addressing industrial emissions requires scaling innovative processes, decarbonizing key inputs like electricity and heat, and developing methods for material reuse and recycling. Achieving this decarbonization is complex and will involve technological, economic, regulatory, and behavioral solutions. High temperature heat (T >500$^{o}$C) in industrial processes stands out as a particularly challenging area, as does fuel consumption (air and maritime) for the transport of materials in the supply chain.

## Industry Scope and Themes

We invite proposals focused on the following four themes, with an emphasis on achieving gigaton-scale GHG emissions reductions:

**Theme 1: Low Carbon Processes and Fuels.** We seek novel technologies to reduce GHG emissions in hard-to-abate sectors, including but not limited to:

- **Cement**: solutions involving low carbon cement, new supplementary cementitious materials, advanced grinding systems, electrified kilns, and capture carbon capture technologies.[11,12]

[9] https://www.climateworks.org/report/achieving-global-climate-goals-by-2050-pathways-to-a-1-5-c-future/
[10] Ellen MacArthur Foundation. 2021. Completing the Picture: How the circular economy tackles climate change.
[11] i) World Economic Forum, Article 2024, Link; ii) ClimateWorks Foundation, Blog, July 2024, Link.
[12] Dziejarski et al., Fuel. 342 (2023), 127776, https://doi.org/10.1016/j.fuel.2023.127776.

- **Steel**: solutions addressing efficient energy and material use, including furnace gas recovery, green hydrogen applications and electrification.[13]

- **Chemicals**: solutions utilizing electrification processes, low carbon alternatives to petroleum-based plastics and fluorinated gasses, and novel production routes for major chemicals like ammonia, methanol, and ethylene.[14]

- **Mining**: solutions allowing mineral extraction to be more sustainable to meet the rising demand for metals and critical minerals through, for example, novel primary or secondary production pathways for Li, Co, Mn, Ni, rare earth metals, etc.[15]

- **Heavy transport:** global emissions from heavy transport represent approximately 9 percent of total GHG emissions,[16] and innovations for sustainable aviation fuel, green ammonia, green methanol, and green $H_2$ are needed.

Proposals for other sectors like textiles, semiconductors, paper, and glass are also welcome if they demonstrate gigaton-scale decarbonization potential.

**Theme 2: New Sustainable Materials and Materials Efficiency.** We are seeking the development and adoption of new materials that are low-carbon, fit for purpose, cost-competitive, and environmentally responsible. Examples include innovative construction materials sourced from plant-based feedstocks and waste/recycled materials. Projects can focus on the development and adoption of innovative circularity and material efficiency practices that may include efficient designs, shared use of products, and enhanced product lifetimes.

**Theme 3: Policy and Markets.** Rapidly reducing GHG emissions from industry requires action and cooperation at all levels of governance. The Accelerator is seeking actionable policy and regulatory measures, incentives, and strategies that can substantially accelerate or unlock industrial decarbonization. Proposals should include analysis as well as engagement strategies that will support the development and implementation of new policies, standards, market mechanisms, or regulations at local, state, national, and/or international levels. This may include regulatory standards for emissions trading, public procurement policies that build demand for green materials and products, innovative derisking mechanisms to encourage investment in low-carbon industrial projects, and initiatives to promote sustainable global trade.

**Theme 4: New Sustainable Business Models.** New business models may be needed to accelerate the industrial sectors' transition to a low carbon economy. Adopting low carbon

[13] Wei et al., Energy Environ. Sci., 2024, 17, 2157, DOI: 10.1039/d3ee03875k
[14] i) C&EN Global Top 50 Chemical Firms for 2023; ii) IRENA and Methanol Institute (2021), Innovation Outlook: Renewable Methanol, International Renewable Energy Agency, Abu Dhabi; iii) World Economic Forum, Net-Zero
Industry Tracker, 2023 Edition, Insight Report.
[15] IEA, Global Critical Minerals Outlook 2024, Link.
[16] S. Monteith, L. Aldrete, and T. Lau, Climate Works Global Intelligence, "Achieving global climate goals by 2050," Apr 2023.

products and processes will be challenging, as well as the shift away from the traditional “linear take-make-waste model”. The Accelerator is looking for the design and demonstration of new sustainable business models. This may involve innovative financing for first-of-a-kind projects, buyer coalitions for low-carbon products, and circular business models that can provide value to various stakeholders. We encourage business, social, and design-minded researchers to collaborate with technical researchers to develop pathways to scale projects.

Proposals must align with the RFP objectives and identify barriers to scale, offering solutions to overcome them. Strong partnerships (governments, NGOs, investors, corporations, etc.) are crucial for enhancing the effectiveness and reach of proposed solutions. Potential externalization pathways may include creating companies or NGOs, licensing technologies, influencing policy debates, or other mechanisms aimed at moving solutions out of Stanford and achieving impact at scale.

## Industry Contact

For any questions regarding the Electricity and Grid Systems Flagship, please contact the Flagship’s Managing Director, Albert Chan (alby@stanford.edu) with cc to Mana Iwata (miwata@stanford.edu).

# Planetary Intelligence Flagship RFP Scope

Planetary Intelligence is a flagship enabler that drives progress toward our flagship destinations. **Our goal for Planetary Intelligence is to significantly contribute to the reduction of gigatons per year of greenhouse gas emissions and/or to improve the lives of one billion people by 2035 through advanced technology and data-enabled solutions.**

## Planetary Intelligence Context and Motivations

Tackling global sustainability challenges demands a deep understanding of Earth's interconnected human and natural systems (physical, chemical, and biological processes in terrestrial, atmospheric and ocean environments). This understanding—or "planetary intelligence"—can, for example, help us manage resources sustainably, predict and prepare for adverse and extreme weather events, and adapt to climate-induced changes in ecosystems. To drive meaningful action, we must collect high-quality data, analyze it effectively and efficiently, and transform insights into practical solutions. Innovative technologies and approaches can transform the way we expand, manage, and employ our collective planetary intelligence.

Humanity, technology, and nature can thrive as an interconnected, intelligent system—one where data flows continuously through a global network of sensors, AI, and human observers, monitoring the dynamic relationships between people, machines, and the natural world, and informing individual, corporate, and government decisions. Planetary intelligence that collects, analyzes, and learns from real-time information about ecosystems, weather, urban and rural life, human behavior, and more can generate deep insights that shape strategies and support sustainable prosperity.

We envision advanced technologies and policy approaches that not only support human creativity and well-being but that also actively collaborate with us to restore and protect the environment. For example, cities can function like living organisms, powered by clean energy and informed by ecological feedback loops. In this world, the boundaries between the digital, biological, chemical, physical, and human domains blur, giving rise to a resilient, adaptive civilization that thrives by understanding and co-evolving with our planet Earth itself.

The transition to a truly sustainable and thriving planet will require unprecedented collaboration among scientists, industry leaders, policymakers, civil society, and other key stakeholders. Advancing how we understand and interact with Earth's systems (natural and human systems) is key to driving sustainable, evidence-based, impactful solutions.

## Planetary Intelligence Scope and Themes

The goal of this RFP is to support innovative, interdisciplinary projects that advance the "Planetary Intelligence" capacity to observe, understand, manage, and interact with our Earth's natural and human systems for long-term sustainability through data-enabling solutions. The focus is on bridging gaps in measurement, data analysis, and actionable insights, using

advanced techniques such as sensing, modeling, AI, robotics, quantum technology, blockchain, edge computing, digital twins, AR, 5G and next-gen connectivity, systems integration, among other enabling data-intensive technologies.

Proposals should advance solutions (technologies, policies, or other solutions) that address sustainability in one or more of the following critical areas:

- Industry
- Food and Agriculture
- Water
- Climate Adaptation
- Electricity and Grid Systems
- Greenhouse Gas Removal
- Biodiversity
- Human and Planetary Health

**Examples of solutions** for each area are provided below for inspiration but are not intended to be exhaustive or exclusive:

Industry: digital twins to optimize industrial processes for energy efficiency, predictive maintenance, and emissions reduction; combine IoT sensors and AI algorithms to shipping fleets to track fuel consumption and emissions in real time and suggest more efficient routes or operating speeds; robotic retrofitting and maintenance solutions such as the detection and repair of gas leaks; leveraging blockchain for transparent and traceable supply chains.

Food and Agriculture: precision agriculture solutions that utilize sensors, drones, satellite imagery, IoT, and AI to optimize the use of water, fertilizers, and pesticides; remote sensing for land use management; policies that use sensors and tracking technologies to incentivize sustainable supply chains; implementation of technologies to analyze food waste so it can be optimally converted into valuable products; methods to accurately measure and report livestock emissions for inventories and mitigation strategies.

Water: AI-powered analytics to optimize reservoir management and forecast demand; robotic systems to inspect and repair pipes; real-time freshwater quality monitoring through sensor arrays and ML for early pollution detection; water networks digital twins to simulate upgrades and prioritize repairs using big data; AI-powered forecasting tools for predicting marine heatwaves and acidification events; sensing, modeling, and robotic technologies to enable coral reef restoration.

Climate Adaptation: improved data models to understand risk and inform risk management; AI-driven flood and drought prediction models using real-time sensor and climate data; drone-based property and crop insurance assessments; autonomous monitoring robots (surface & underwater) to track water levels, speeds, and temperatures and issue warnings; battery storage forecasting; urban digital twin platforms for scenario-testing, policy assessment, and adaptive design.

Electricity and Grid Systems: improved predictive modeling to minimize curtailment and ramping demands; better weather forecasting to predict supply and demand of renewables; software planning tools for grid management and integration of renewables and clean firm energy; platforms to monitor and optimize the use of DERs (i.e. residential solar panels, battery storage, and EVs; policy designs that support integration of new technologies and models to enhance grid flexibility and reliability.

Greenhouse Gas Removal: Accurate and cost-effective MRV of distributed, natural, or open systems by using AI/ML algorithms to integrate multi-source data; real-time environmental impact monitoring of large-scale interventions (e.g. afforestation, ocean alkalinity) through sensors and remote sensing with automated alerts.

Biodiversity: AI-powered image recognition for species and habitat detection to monitor ecosystem health; environmental DNA monitoring in water, soil, or air to detect organisms; blockchain to prevent illegal wildlife trade; mapping and valuing natural ecosystems through multi-modal sensing technologies and advanced ML algorithms to provide nature-based solutions in urban and rural environments; evidence-based recommendations for updates to policies and legal frameworks (e.g., policies and laws that protect endangered species) to integrate spatial data and GIS for better habitat protection and management.

Human and Planetary Health: monitoring pathogens in water; using big data and AI to track and predict vector-borne disease outbreaks because of climate change or human-induced changes to the environment; leveraging data analytics and IoT to develop resilient agricultural practices in response to climate variability.

Projects and solutions supported under this RFP are expected to:

- Deliver innovative, scalable, and interdisciplinary approaches to understanding and leveraging the interconnections among natural, human, and machine systems.
- Demonstrate clear potential to deliver sustainable, measurable, positive impact on society and the environment at scale.
- Engage relevant external partners and stakeholders for greater real-world impact.
- Provide a clear translational pathway from concept to actionable solution.

## Planetary Intelligence Contact

For any questions regarding the Planetary Intelligence Flagship, please contact the Flagship's Managing Director, Gemma Guilera (gemma99@stanford.edu).

# Water Flagship RFP Scope

**The Water flagship destination seeks to ensure a future in which, by 2050, water is equitably secured, climate resilient, and sustainably managed for all people and ecosystems—in balance with crucial uses, such as agriculture, industry, and energy.**

## Water Context and Motivations

Water challenges affect billions globally, with one-quarter of the world's population facing extremely high water stress.[17] The planetary boundary for freshwater has been surpassed, accompanied by increasing water-related extreme events like floods and droughts.[18, 19] Despite water being a human right, 2.2 billion people lack access to adequate drinking water, and 3.5 billion lack proper sanitation.[20]

Water challenges are systemic and interconnected with climate, food, and energy systems. Agriculture consumes 70% of freshwater withdrawals, often inefficiently, while industrial and urban demands continue growing. Climate change is intensifying these pressures, altering precipitation patterns and threatening water-dependent ecosystems. Addressing water security requires integrated solutions spanning technology, policy, finance, and governance.[21]

By 2050, the global population is projected to exceed 9.5 billion, dramatically increasing water demand while climate change disrupts traditional supply patterns. This convergence of challenges presents an urgent need for innovative approaches to water supply, management, treatment, distribution, and conservation that are scalable, equitable, and climate-resilient.[22]

## Water Scope and Themes

We invite proposals focused on the following themes:

**Theme 1: Water Supply and Management.** We seek breakthrough scalable solutions that advance equitable, secure and sustainable water provision for all people and ecosystems. This theme also encompasses the improvement of water usage in sectors like agriculture, energy and industry. Examples of solutions in this theme include:

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[17] S. Kuzma, L. Saccoccia, and M. Chertock. “25 Countries, Housing One-Quarter of the Population, Face Extremely High Water Stress,” World Resources Institute, August 16, 2023, https://www.wri.org/insights/highest-water-stressed-countries.
[18] M. Porkka et al. “Notable shifts beyond pre-industrial streamflow and soil moisture conditions transgress the planetary boundary for freshwater change.” 2024, Nature Water.
[19] Richardson, Katherine, Will Steffen, Wolfgang Lucht, Jørgen Bendtsen, Sarah E. Cornell, Jonathan F. Donges, Markus Drüke et al. "Earth beyond six of nine planetary boundaries." Science advances 9, no. 37 (2023): eadh2458.
[20] United Nations. “The Sustainable Development Goals Report.” 2022. Available at: https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf
[21] Global Commission on the Economics of Water. “The Economics of Water: Valuing the Hydrological Cycle as a Global Common Good”.
[22] GCEC, “The Economics of Water”.

- Advanced desalination technologies with reduced energy consumption and environmental impact
- Precision agriculture systems that dramatically reduce water consumption while maintaining yields
- Water pricing, policy, and allocation mechanisms that promote efficiency and equity
- Real-time monitoring networks for water quantity and management
- Decentralized water systems for remote and underserved communities
- Smart distribution networks that minimize losses and optimize allocation
- Strategies for providing universal access to safe and affordable drinking water

**Theme 2: Water Quality and Treatment.** This category focuses on ensuring adequate water quality, novel treatment, safe disposal, and the protection and restoration of the ecosystems that drive the water cycle.

- Novel treatment technologies for emerging contaminants (pharmaceuticals, PFAS, microplastics)
- Decentralized wastewater treatment and reuse systems
- Industrial water recycling and zero-discharge processes
- Nature-based treatment solutions that integrate ecosystem restoration
- Regulatory frameworks for water reuse, quality standards, and ecosystem protection
- Market-based mechanisms that value ecosystem services

**Theme 3: Water System Resilience.** Proposals under this category must address the necessary evolution and preparedness required for water systems in the presence of climate change, population growth, and evolving infrastructure needs. This can include:

- Climate-resilient infrastructure combining gray and green approaches
- Early warning systems for floods, droughts, and water quality events
- Groundwater recharge and aquifer management technologies and policies
- Ecosystem-based adaptation approaches that enhance natural water cycles
- Disaster-resilient water and sanitation systems
- Novel technologies or policies that reduce the energy consumption and carbon footprint of the water industry
- Predictive models integrating climate, demand, and supply projections
- Innovative financing vehicles for water infrastructure in developing regions

## Water Contact

For any questions regarding the Water Flagship, please contact the Flagship's Managing Director, Jeff Brown (brown01@stanford.edu), with cc to Daniel Gajardo (dgajardo@stanford.edu).

# Section 3: Questions

Please note that all materials must be submitted through the application portal. **The questions below are for reference only.**

## Letter of Intent Questions

### Project Overview

1. What flagship(s) does your project contribute to? (Please check all that could serve as a primary flagship for your project)
    - ☐ Biological Solutions
    - ☐ Climate Adaptation
    - ☐ Electricity and Grid Systems
    - ☐ Food and Agriculture
    - ☐ Greenhouse Gas Removal
    - ☐ Industry
    - ☐ Planetary Intelligence
    - ☐ Water
2. Project Title
3. What is the problem you are trying to solve? (up to 150 words)
4. Describe the proposed solution with minimal jargon.

    * To allow for the use of figures (optional) the response to this question should be uploaded. The response should be limited to one page (including figures) and can be in PDF, .doc or .gdoc format. *Upload*
5. Why should this be an Accelerator project? (up to 300 words)
6. What makes the solution innovative? (up to 300 words)
7. How will the solution achieve impact at scale? (up to 300 words)
8. What work has the team completed to de-risk the solution for externalization? (up to 300 words)

### Team Organization

#### Project PI

Please provide the following information for the lead Principal Investigator (PI). Each proposal team must include a Stanford faculty or researcher who qualifies as a Principal Investigator (PI) according to Stanford University Policy.

- Name
- Email
- Stanford Department
- Link to PI's Stanford Profile

**Stanford Team Members**

We encourage interdisciplinary teams that engage Stanford faculty, students (both graduate and undergraduate), post-docs, and non-PI-eligible staff from departments across Stanford.

It is strongly recommended that the team include or plan to include a designated postdoc or student lead for the project (the postdoc/student lead may already be part of the team or be a planned addition). This student/postdoc will serve as the primary point of contact with the Accelerator for entrepreneurial development.

Please provide the following information for each Stanford team member, including faculty, researchers, post-docs, and students:

- Name
- Email
- Title (Faculty, Postdoc, Student, etc)
- Stanford Department
- Role on Project Team (one sentence)

**External Collaborators**

We view the engagement and involvement of external collaborators as important to externalizing a solution. Although external collaborators are not required for your project to be selected, it is an expectation that you will establish relationships with external collaborators early in the project.

Please provide the following information for each external collaborator:

- Name
- Email
- Organization
- Link to Professional Profile (Linkedin, Org website etc)
- Role on Project Team (one sentence)

**External Reviewers**

Please suggest three reviewers, external to Stanford, who would be qualified to evaluate your project. Please note that the Accelerator team will select the final review panels.

- Name
- Email

- Organization
- Link to Profile (eg. Linkedin, Org Website)

## Proposal Questions

The proposal questions will be released when project teams are invited to submit a proposal, by November 10, 2025.