

Exploring Climate Cooling

Programme oversight and governance

Updated July 2026

What are ARIA's core principles for governance of this programme?

ARIA will not fund experiments where the activities proposed are prohibited by domestic or international law or that violate indigenous rights, including those outlined in the UN Declaration on the Rights of Indigenous People. Project teams will be required to show how their tests comply with all applicable laws.

The governance measures that ARIA has put in place for this programme have been designed with the following principles in mind:

- **Deliver Valuable & Transformational Knowledge.** We aim to select and design for research that will address the most pressing critical scientific questions surrounding approaches for actively cooling the climate.
- **Minimise Risk.** All experiments should be designed to reduce direct risk as far as possible.
- **Engage With, and Respect Key Communities.**
- **Communicate Proactively and be Transparent, Open, and Honest** at both the programme and project level, including around levels and sources of funding, intentions, how the research is conducted, outputs, and impacts.
- **Be Cognisant of the Broader Implications of Research + Integrate Systems Thinking** into research on approaches for actively cooling the climate.
- **Learn, Adapt and be Responsive.** Success will require a willingness to adapt to lessons learned during the programme and to changing circumstances.

Measures to try and uphold these principles are discussed in the programme [thesis](#). In particular, we are:

- Working with and refining a detailed framework for approving funding for outdoor experiments in order to be transparent about our decision-making, ways of minimising risk and engagement with communities (see Figures 1-3 below).
- Opening the funding opportunity to a global pool of researchers in order to support a wider set of perspectives on critical questions.
- Maintaining a policy of transparent reporting of findings and open IP (when applied to climate intervention) in order to ensure that the knowledge gained is available for public benefit.

The programme's independent oversight committee (see below) is a mechanism intended to strengthen governance of the programme.

However, ARIA acknowledges that this is a complex and ethically-challenging research field and that circumstances unforeseen by the proposed governance measures may arise. By applying the principles above, ARIA will continue to iterate and update the programme's governance mechanisms in order to adhere to the principles above.

The role of the oversight committee and its relationship to the project teams

The programme oversight committee will have three main roles prioritised in this order:

1. Supporting ARIA's leadership in the effective oversight and governance of the outdoor experiments conducted as part of this programme, including producing guidance to ensure transparent and objective communication of findings.
2. Shaping the development of internationally-accepted and responsible norms and standards for oversight and governance of outdoor experiments of approaches for actively cooling the Earth.
3. Identifying constructive ways to contribute to the wider international discussion on possible governance mechanisms for these approaches.

The programme oversight committee is a panel of experts (including international members) that is independent of the project teams and the programme director and that makes recommendations directly to ARIA's leadership. Roughly half of the members of the

oversight committee were in place in time to contribute during the selection of projects by ARIA's leadership and the programme team. Additional members will continue to be appointed to the committee at the recommendation of the existing oversight committee members (and with the approval of ARIA's leadership) as the need arises. This flexible intake approach allowed for independent oversight during project selection, whilst also allowing the precise expertise of the committee to be tuned to best suit the projects that have been selected.

The initial members of the committee (see biographies below) were identified by ARIA on the basis of their expertise and international standing across a wide range of areas relevant to climate science and climate engineering. Potential members were then invited to join the committee by ARIA's leadership after meeting with the programme director and ARIA's CEO. These initial members have been appointed for the duration of the programme (5 years). Members appointed subsequently will be appointed for the remaining duration of the programme by invitation from ARIA's leadership, at the recommendation of the existing members of the committee and after consulting with the programme director. At the outset, the committee will have the opportunity to deliberate on and refine its terms of reference, for approval by ARIA's leadership.

Members of the committee will be paid at a fixed rate by ARIA in order to ensure that they can dedicate sufficient time to programme oversight. Remuneration will not be dependent on the progress of the project teams or on the delivery of particular recommendations regarding these teams, supporting the committee's independence. Budget will be available to allow the committee members to join in-person ARIA meetings and workshops.

The names, affiliations and biographies of the current members of the committee, together with information on their specific roles on the committee and any potential conflicts of interest are supplied below.

It is expected that the oversight committee will discuss the development of plans for outdoor experiments with the project teams and programme director, but it will be the responsibility of the project teams to develop suitable technical and non-technical plans. The oversight committee will not be involved in any direct management or day-to-day decision making for any of the projects. This approach is designed to give project teams access to the expertise of the oversight committee members (promoting the development of plans and pre-experiment activities in line with best practice), whilst allowing the oversight committee members to maintain a high level of objectivity regarding individual projects.

Budget and additional expert support services contracted by ARIA will be available to project teams to allow them to design and undertake the necessary pre-experiment public engagement and co-design activities. At the point at which project teams require additional budget in order to actually perform the outdoor tests, they will go through a formal “outdoor experiment funding approval” process, whereby their technical and non-technical plans and pre-experiment activities will be assessed, and approval for release of funds for the outdoor experiment (or series of linked experiments) will be either granted or refused by ARIA’s leadership on the basis of the materials that the project teams submit for consideration.

Outdoor experiments will only be funded if they meet the criteria outlined in the [programme thesis](#) in the section “A Suggested Framework for Outdoor Experiments”. Two key figures from the thesis are reproduced below for ease of access (Figures 1 and 2, which are called Figures 2 and 3 in the programme thesis). Further context on these figures is given in the programme thesis.

All ARIA projects must adhere to all relevant applicable domestic and international laws, and must respect the rights of indigenous peoples. For projects that propose to conduct activities that may require particular permissions, or compliance with particular regulatory or project management practices (e.g. outdoor experiments), ARIA will exercise its adaptive funding mechanism to review specific plans before funding is released for that component of the project.

An overview of the outdoor experiment funding approval process (and the role of the oversight committee in that process) is summarised in Figure 3. The decision trees in Figures 1 and 2 feed directly into this process, by informing which experiment proposals progress as far as seeking funding through the mechanism summarised in Figure 3. This figure also shows the relationship of the oversight committee to ARIA’s leadership, the ARIA board committee for ethics and social responsibility (which has visibility across all of ARIA’s programmes), the programme director, and to individual project teams. It is important to note that while ARIA’s leadership makes the final decision on any given outdoor experiment, no project that violates applicable domestic or international laws or the recognized rights of indigenous peoples would be funded.

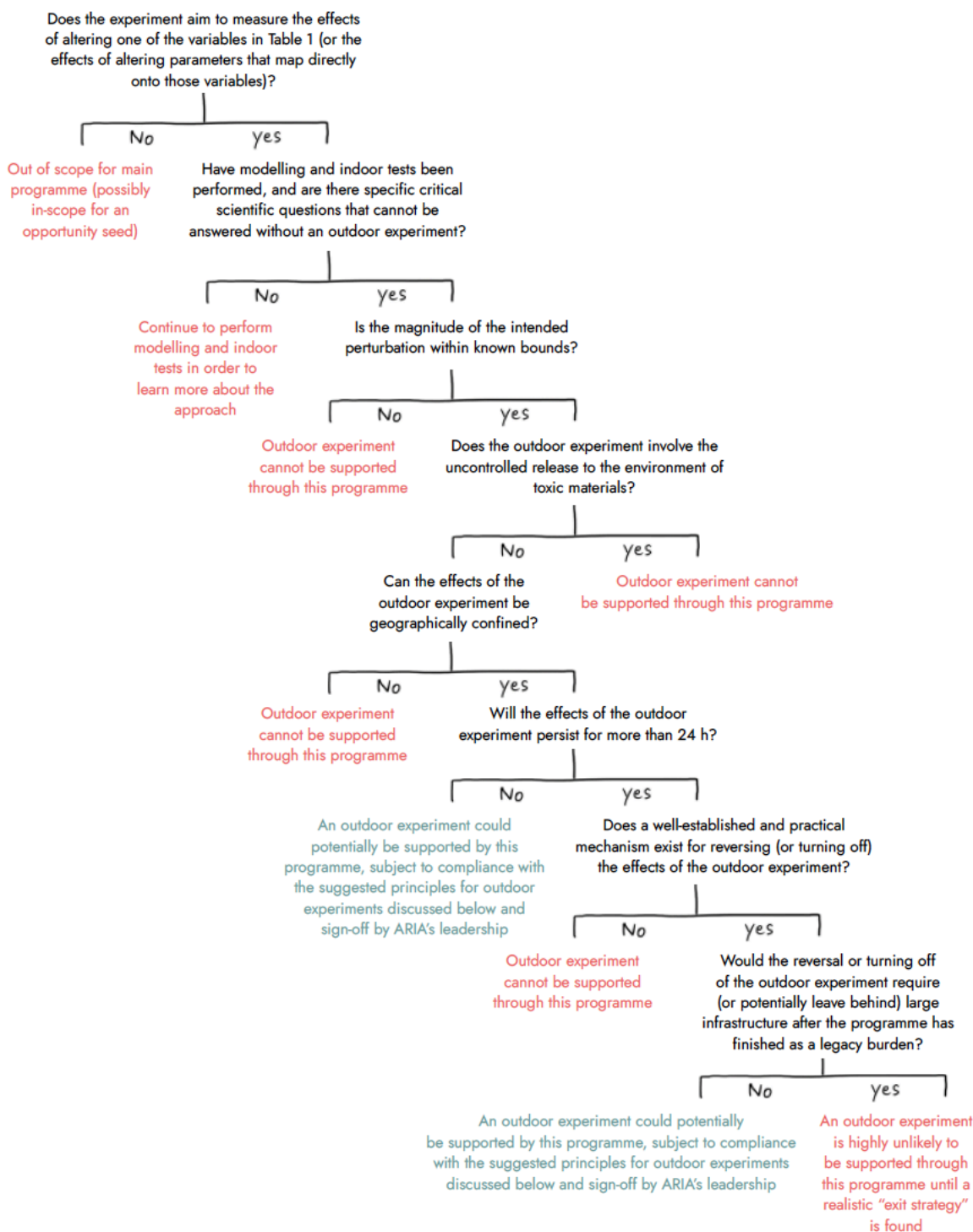


Figure 1: The suggested outdoor experiment technical consideration decision tree (called “Figure 2” in the programme thesis). Table 1 refers to Table 1 in the Programme Thesis.

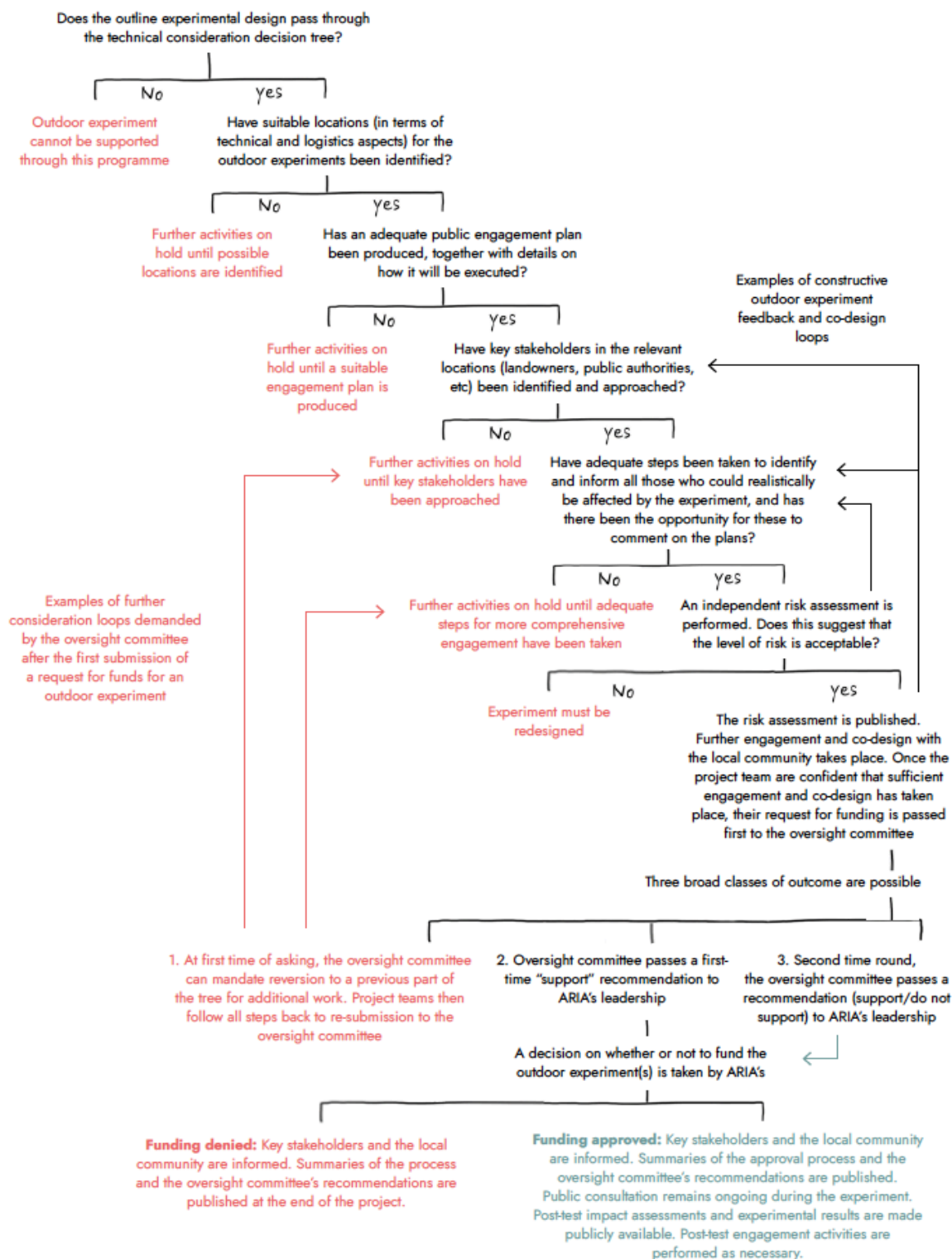


Figure 2: The suggested outdoor experiment funding approval decision tree (called "Figure 3" in the programme thesis). This figure is to be used in conjunction with Figure 1 above.

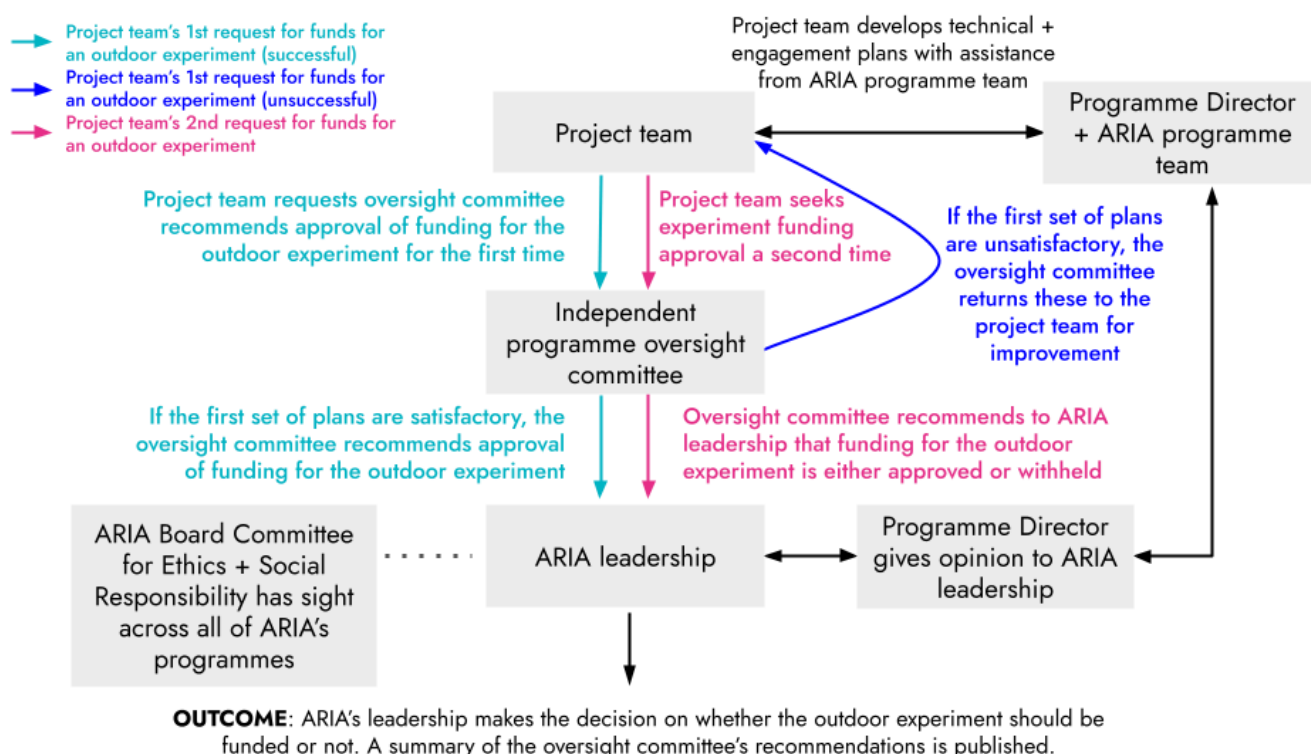


Figure 3: The relationship of the oversight committee to ARIA's leadership, the ARIA board committee for ethics and social responsibility, the programme director, and to individual project teams, together with an overview of the process by which the oversight committee can insist on alterations to project teams' plans for outdoor experiments, and how subsequent decisions will be taken.

At the outset of the outdoor experiment funding approval process, project teams will submit materials describing their plans and activities-to-date related to the outdoor experiment to the oversight committee, who will be able to scrutinise both the technical and non-technical aspects of these materials. The programme oversight committee will then make one of three recommendations to ARIA's leadership:

1. If the committee is thoroughly satisfied with the project team's plans and pre-experiment activities, then a recommendation will be made to ARIA's leadership that funding for the outdoor experiment (or series of linked experiments) should be approved (teal arrows in Figure 3).

2. If the committee is mostly satisfied with the project team's plans and pre-experiment activities, then a recommendation can be made to ARIA's leadership that funding for the outdoor experiment should be approved contingent on certain minor clarifications or amendments being made (teal arrows in Figure 3).
3. If the oversight committee is dissatisfied with the project team's plans and pre-experiment activities, then the oversight committee will have the power to refuse funding approval for any outdoor experiment (or series of linked experiments) on its own initiative at the first time of asking. Should this occur, the committee will be able to request alterations to a project team's plans and/or request that additional activities are performed prior to the start of an outdoor experiment (blue arrow in Figure 3). The project team will then be obliged to address these concerns and re-submit their updated materials to the oversight committee, with three outcomes then possible (pink arrows in Figure 3):
 - a. The committee is now thoroughly satisfied, and recommends to ARIA's leadership that funding for the outdoor experiment is approved.
 - b. The committee is now mostly satisfied, and recommends to ARIA's leadership that funding for the outdoor experiment can be approved contingent on certain minor clarifications or amendments being made.
 - c. The committee remains dissatisfied, and recommends to ARIA's leadership that funding approval for the outdoor experiment is not granted.

The ultimate decision as to whether any individual outdoor experiment (or linked series of experiments) can be funded by ARIA therefore rests with ARIA's leadership. A summary of the committee's recommendations on any particular outdoor experiment (or linked series of experiments) will be made public on the ARIA website before the experiment takes place (in the cases where funding approval is ultimately granted), or at the end of the project in cases where funding approval is not granted. This summary will be prepared by the committee members, in consultation with the programme director.

When making recommendations as to whether any individual outdoor experiment (or linked series of experiments) can be funded by ARIA, the oversight committee will consider the following criteria:

- Is there sufficient scientific value in the proposed experiment and in the knowledge that could be gained by performing it to merit an outdoor experiment?
- Does the design of the experiment minimise risk sufficiently (e.g. to experimenters, the local environment and ecosystem, to property, etc)?

- Has sufficient meaningful engagement with the local community and key stakeholders taken place, and is there sufficient evidence of experimental co-design with these groups?
- Has there been sufficient consideration of the potential broader societal ramifications of the experiment?

Current membership of the oversight committee

The following international experts are the current members of the oversight committee. The committee is chaired by Piers Forster. While the current makeup of the committee provides expertise across a range of climate fields and geographies, ARIA and the oversight committee intend to add to the membership of this committee as the programme progresses and additional perspectives are needed.

As of September 2024, committee members are paid for their participation at a rate of £575/day. ARIA expects that participation will be ~1 day/month.

Committee Membership (April 2026)

Piers Forster (Co-Chair)

Piers Forster is a highly cited atmospheric scientist with over 30 years of experience researching the causes and impacts of climate change, as well as mitigation and adaptation approaches and their connection to national and international climate policy. He was principal investigator for some of the first publicly funded research on geoengineering, the UK's Integrated Assessment of Geoengineering Proposals over 2010-2015.

Piers is a fellow of the American Geophysical Union and has played leading roles authoring Intergovernmental Panel on Climate Change (IPCC) reports, including its Special Report on 1.5°C and its latest IPCC 6th



Assessment Report. He has sat on the UK Government's Climate Change Committee since 2018 and has served as the Committee's Interim Chair since 2023.

He is founding Director of the Priestley Centre for Climate Futures and Professor of Physical Climate Change at the University of Leeds. The Priestley Centre was founded in 2016 to support interdisciplinary research, innovation and teaching on climate and foster strong working relationships with policy makers, businesses and the third sector to support climate actions that deliver wide societal and ecosystem benefits.

Declared conflicts of interest: The University of Leeds are recipients of funding from the ARIA call. Piers Forster was not involved in the proposals or funding decisions. A contract of work between Stardust Solutions and the Priestley Centre was agreed in late 2025, which funds some of Piers Forster's time. This contract funds a postdoc that will work with Professors Dan Marsh and Piers Forster. The work is designed to test the effectiveness of sunlight reflection technology and the impact of any physical and chemistry side effects. The plan is to publish both positive and negative results as the work progresses. The work is not under a non-disclosure agreement.

Jessica Seddon (Co-Chair)

Dr. Jessica Seddon's work on environmental governance focuses on how new sources of data can be leveraged to enable new (and more sustainable) ways of interacting with the environment around us. Her career spans academic, programme leadership, and strategic advisory roles in the U.S., India, and internationally, focused on institutional design for integrating science into policy and social initiatives. Dr. Seddon is currently Senior Fellow and Director of the Deitz Family Initiative on Environment and Global Affairs at the Yale Jackson School of Global Affairs and a co-founder of The Institutional Architecture Lab.



Jessica worked with the ARIA programme team on the initial design of the governance approach including formation of the Oversight Committee, on which she served as Interim

Chair. As Secretary, Jessica works as a bridge between the ARIA programme team and the Oversight Committee to facilitate some of the operational aspects of the Committee's relationship with ARIA. This includes, inter-alia: conveying questions and agenda requests from the programme team to the Oversight Committee, consolidating and conveying advice from Oversight Committee to the programme team, and supporting the programme team on governance-related questions as they arise.

Declared conflicts of interest: none

Arunabha Ghosh (ordinary member)

Dr Arunabha Ghosh is an internationally recognised public policy expert, author, columnist, and institution builder. He is the founder-CEO of the Council on Energy, Environment and Water, and has led CEEW to the top ranks as one of Asia's leading policy research institutions and among the world's 20 best climate think-tanks. He played a formative role in creating the International Solar Alliance, and was a founding board member of the Clean Energy Access Network. Co-author/editor of four books and with experience in 54 countries, he previously worked at Princeton, Oxford, UNDP (New York), and WTO (Geneva). The Asia Society honoured him with the 2022 Asia Game Changer Award, for his and CEEW's "incredible work, which is making a real difference for India and for the planet".



Arunabha advises governments, industry, civil society, and international organisations around the world. In October 2024, the Government of India appointed him to the Commission for Air Quality Management. He currently co-chairs the World Economic Forum's Global Future Council on the Energy Nexus (and previously co-chaired the GFC on Clean Air). He served on the Government of India's G20 Finance Track Advisory Group and advised the Sherpa Track for India's G20 Presidency in 2022-23. In 2022, the UN Secretary-General appointed him to the High-level Expert Group on the Credibility and Accountability of Net-Zero Announcements by Non-State Actors. In 2020, the Government

of India appointed him Co-Chair of the energy, environment and climate change track for India's Science, Technology and Innovation Policy (STIP2020).

Dr Ghosh has been a member of the UN Committee for Development Policy since 2019 (nominated by the UN Secretary-General; Vice-Chair 2023-25). He co-convened the Our Common Air Commission. He is a member of several international expert advisory groups: Global Commission on the Economics of Water; High-Level Group of Economists, constituted by the French president for the One Planet Lab; and the Senior Consultative Group for the Energy Transition Accelerator.

He writes monthly columns across various platforms. A frequent speaker, he has hosted or featured in several documentaries, and his 2019 TED Talk on air quality (Mission 80-80-80) has crossed 280,000 views. He was a World Economic Forum Young Global Leader. He holds a D.Phil. from Oxford.

Declared conflicts of interest: none

Jack Stilgoe (ordinary member)

Dr Jack Stilgoe is a professor in science and technology studies at University College London, where he researches the governance of emerging technologies. He is part of the UKRI Responsible AI leadership team (www.rai.ac.uk). He worked with EPSRC and ESRC to develop a framework for responsible innovation that is now being used by the Research Councils. Among other publications, he is the author of 'Who's Driving Innovation?' (2020, Palgrave) and 'Experiment Earth: Responsible innovation in geoengineering' (2015, Routledge). He is currently chairing an oversight committee for public dialogue on geoengineering research for the Natural Environment Research Council (NERC). He previously worked in science and technology policy at the Royal Society and the think tank Demos. He is a trustee of the Royal Institution.



Declared conflicts of interest: Jack is an employee of University College London, where one of his colleagues, Cian O'Donovan, is part of The Liminal Space, the consultancy that ARIA has contracted with to support teams funded by the Exploring Climate Cooling programme in developing their public engagement plans. He recused himself from advising ARIA on The Liminal Space's proposal.

Shuchi Talati (ordinary member)

Dr. Shuchi Talati is a climate technology governance expert and founder of The Alliance for Just Deliberation on Solar Geoengineering (DSG). DSG is a nonprofit organisation working towards just and inclusive deliberation about research and potential use of solar geoengineering. She is a contributing author to the American Geophysical Union's Ethical Framework for Climate Intervention Research, Experimentation, and Deployment. Dr. Talati was the co-chair of the Independent Advisory Committee to oversee SCoPEX, an effort to provide oversight for the proposed solar geoengineering experiment by Harvard University. She most recently served as a Presidential Appointee in the Biden-Harris Administration at the U.S. Department of Energy where she focused on creating just and sustainable frameworks for carbon dioxide removal. Dr. Talati has previously held roles in academia and civil society advising on policy and governance for emerging climate technologies, including as a Visiting Scholar at the Kleinman Center for Energy Policy at the University of Pennsylvania, an AAAS/AIP Congressional Science Fellow in the U.S. Senate and the Fellow on geoengineering research governance and public engagement at the Union of Concerned Scientists. Dr. Talati has a BS in environmental engineering from Northwestern University, an MA in climate and society from Columbia University, and PhD from Carnegie Mellon in engineering and public policy.



Declared conflicts of interest: A member of The Alliance for Just Deliberation on Solar Geoengineering is part of the team for the project entitled "Evidence-based Assessments to Guide Perceptions, Governance, and Ethical Frameworks for South Asia," providing support on policy analysis, ethical framing and stakeholder engagement. Shuchi Talati was not involved in the review of the project proposal and will not be involved in oversight of this component of the project.

Jan McDonald (ordinary member)

Jan McDonald is Professor of Environmental and Climate Law at the University of Tasmania, Australia. Jan's research explores the legal frameworks required to responsibly govern the research, development and deployment of both solar radiation management and marine carbon dioxide removal technologies. Jan has previously worked for the United Nations Development Program in the Pacific and consulted on a range of projects to local, state and national governments in Australia, Vanuatu and the Solomon Islands. She is a Fellow of the Australian Academy of Law and co-founder of the Australian Forum for Climate Intervention Governance.



Declared conflicts of interest: none

Elena Kavanagh (ordinary member)

Dr Elena Kavanagh is an Indigenous Rights Scholar at University College Cork, Ireland, and a Research Affiliate at the Centre for the Study of



Existential Risk (CSER) at the University of Cambridge. Her broader areas of expertise include international law, Indigenous rights, human rights, and international relations, with a strong emphasis on ethical research approaches with a geographical focus on the Arctic. Elena's current research also engages with emerging global governance challenges. She examines how Indigenous knowledge and rights frameworks can inform debates on climate interventions, artificial intelligence, and the governance of outer space, particularly in relation to Free Prior and Informed Consent (FPIC), ethics, and participatory rights.

Elena completed her PhD in Law at University College Cork, where her doctoral research explored Indigenous language rights in the Arctic. During her academic work, she also engaged in field-informed research and training at the University of Lapland (Finland) and Nord University (Norway), specialising in Arctic governance, Sámi rights, and the operation of international human rights regimes in circumpolar and global contexts.

In addition to her academic work, Elena holds several international leadership roles. She currently sits on the Advisory Board of Directors of the Arctic Youth Network (Canada), serves as Chair of the Humanities and Social Sciences Working Group within the Network for Arctic Researchers in Ireland (NARI), and is the President of APECS—Ireland, where she supports early-career researchers engaging in polar and Indigenous scholarship.

Declared conflicts of interest: Elena sits on the Advisory Board of Directors of the Arctic Youth Network, a coalition-building grantee of the Climate Emergencies Forum (CEF), an initiative led by Renaissance Philanthropy, an ARIA Activation Partner.

Kwesi Twentwewa Quagraine (ordinary member)

Dr. Kwesi Twentwewa Quagraine is a climate scientist and postdoctoral researcher at Texas A&M University whose work focuses on understanding climate and weather extremes, atmospheric dynamics, and climate intervention science. His research combines advanced climate modeling, high-performance computing, artificial intelligence, and large-scale data analytics to better understand high-impact weather and climate risks across past, present, and future climates.



His work spans hydroclimate extremes, compound climate hazards, atmospheric rivers, tropical systems, and climate model evaluation, with particular emphasis on risks affecting vulnerable and underrepresented regions across the Global South. Dr. Quagraine has contributed extensively to interdisciplinary climate research collaborations and scientific assessment efforts, while also serving in editorial and peer-review roles across leading climate science journals and emerging interdisciplinary platforms.

Beyond research, he is actively engaged in discussions surrounding climate risk governance, responsible climate intervention research, and equity considerations in emerging global climate decision-making frameworks. Through his scientific leadership, mentorship, and international collaborations, he brings an evidence-based, globally informed perspective to complex climate and environmental challenges that affect policy and practice.

Declared conflicts of interest: None.

Julia Reindl (Secretary)

Julia Reindl is a foresight analyst and transitions researcher specialising in public engagement with emerging technologies and environmental change. Her work focuses on how publics and institutions engage with and respond to complex technological, environmental, and societal shifts.

As a Research Fellow at the SOIF Institute, Julia led research on participatory approaches to the deliberation and governance of solar geoengineering. She is a collaborator with the Alliance for Just Deliberation on Solar Geoengineering (DSG), where she co-initiates youth engagement projects to facilitate participation in climate intervention discourse. Her work includes coordinating international, multi-partner projects across public sector and civil society contexts, including EU Horizon



collaborations. She has contributed to European Commission initiatives on foresight and intergenerational fairness.

Declared conflicts of interest: None.

Emeritus Members

Nana Klutse

Prof. Nana Ama Browne Klutse is a distinguished Ghanaian known for her expertise in climate modelling, climate change impacts, adaptation, and mitigation strategies, particularly in Africa. She has been involved in various high-profile research projects and has contributed significantly to global climate assessments, including her work with the Intergovernmental Panel on Climate Change (IPCC) as the Vice Chair of the Working Group I. She is a full professor, researcher and the Head of the Department of Physics at the University of Ghana. She focuses on climate variability, climate change modelling, Solar Radiation Management, and the impacts of climate change on society for her research and often addresses how climate change affects sectors such as agriculture, water resources, and health in Africa. Prof. Klutse has also been an advocate for integrating indigenous knowledge systems with scientific research to develop more comprehensive and context-specific climate adaptation and mitigation strategies. Her work aims to inform policy decisions and promote sustainable development in the face of climate change challenges. She has received various awards and recognitions for her contributions to climate science and her efforts to improve understanding and action on climate change in Africa.



Nana Klutse was an oversight committee member from August 2024 until August 2025
