June 2, 2025

VIA FEDEX AND EMAIL

Peter Kyle, Secretary of State
Department for Science,
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Re: *ARIA's Climate Engineering Program*

Dear Secretary Kyle:

We write on behalf of our client, Informed Consent Action Network ("**ICAN**"), regarding Advanced Research and Invention Agency's ("**ARIA**") controversial climate engineering program which the United Kingdom ("**UK**") is funding.[1] ICAN is a not-for-profit organization with a mission of combatting man-made disease and a proven record of raising public awareness about medical products and their effects on health. ICAN also actively investigates and reports on environmental pollutants/toxins and governmental activities and acts as a watchdog to hold government actors accountable to the people so that every person is provided true informed consent.

ICAN is concerned by ARIA's "Exploring Climate Cooling" program[2] ("the **Program**") which is poised to begin controversial outdoor geoengineering experiments[3] to test and develop technology to block sunlight by intentionally manipulating the earth's temperature through solar radiation modification ("**SRM**")[4] or "climate cooling techniques."[5] Alarmingly, if deployed, SRM technology could adversely, and potentially irreversibly, affect human health and the environment. It is well established that the impacts of SRM, a host of technologies which include injecting chemicals into the stratosphere upwards of 40,000 feet above the earth, among other proposals, will be felt globally. According to the United Nations Environment Programme ("**UNEP**"), "SRM

[1] https://www.aria.org.uk/.

[2] https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling.

[3] https://www.aria.org.uk/media/wotbzgsm/aria-actively-cooling-the-earth-programme.pdf (https://perma.cc/MRX6-EBLH). *See also*, https://www.bbc.com/weather/articles/c5ygydeqq08o (https://perma.cc/2A8H-Q6XT).

[4] https://www.climate.gov/news-features/understanding-climate/solar-radiation-modification-noaa-state-science-fact sheet (https://perma.cc/3W55-GAQN).

[5] While ARIA uses the term "climate cooling techniques" in place of geoengineering, it appears the Program is focused primarily on solar geoengineering or SRM.

deployment in one country could have impacts regionally and globally, and those impacts are unclear at this point. As illustrated in the title of [UNEP's] report [on the topic]: we have 'one atmosphere.' Everyone is a stakeholder."[6] Thus, given the serious risks that the Program presents to the global community, ICAN asks DSIT to encourage ARIA to halt the Program unless ARIA amplifies its transparency and obtains meaningful informed consent of the people.

I. DSIT SHOULD DISCOURAGE GEOENGINEERING GIVEN THE DIRE RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

ICAN opposes any research or deployment of SRM or climate cooling interventions absent transparency and meaningful informed consent. Informed consent requires full disclosure of the risks and benefits of SRM before the technology is developed, tested, or deployed in a manner that impacts people and the environment. Given the nascent state of SRM technology and general lack of understanding by even its greatest proponents of the potential risks of SRM, it is impracticable to fully apprise the public of the risks that ARIA's SRM projects pose to humanity.

Indeed, the risks of SRM appear insurmountable. Proponents of geoengineering research admit in the 2021 National Academies of Sciences, Engineering, and Medicine ("**NAS**") report, "Reflecting Sunlight: Recommendations for Solar Geoengineering Research and Research Governance" (collectively, "**NAS Report**") that if SRM is deployed, it could have potentially catastrophic effects on weather, agriculture, natural ecosystems, and human health.[7] Specifically, proponents of SRM acknowledge that deployment could lead to stratospheric ozone depletion,[8] effects on global food production and biodiversity,[9] increases in air pollution and UV exposure-related premature mortality,[10] disruption of local and regional weather patterns leading to intensified droughts or flooding,[11] disruption of monsoon cycles that provide critical rain to agriculture,[12] ocean acidification,[13] increased acid deposition resulting in air pollution and acid rain,[14] diminution of solar power systems,[15] geopolitical conflict over who controls the global thermostat with SRM, and retaliation by countries suffering the effects therefrom,[16] and unintended warming or excessive cooling due to uncertainty in estimates of the amount of SRM

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[6] https://www.unep.org/news-and-stories/story/new-report-explores-issues-around-solar-radiation-modification (https://perma.cc/Y7QF-3XFP).

[7] https://nap.nationalacademies.org/read/25762/chapter/4#90 (https://perma.cc/8AZK-M3U3).

[8] https://nap.nationalacademies.org/read/25762/chapter/4#43 (https://perma.cc/AA5B-MNFK).

[9] (https://perma.cc/R526-5X87).

[10] https://online.ucpress.edu/elementa/article/10/1/00047/195026/Stratospheric-aerosol-injection-may-impact-global (https://perma.cc/J43T-45RC).

[11] https://www.nature.com/articles/s41598-024-73149-6 (https://perma.cc/FJ99-A2YC).

[12] *Id*.

[13] https://www.tandfonline.com/doi/epdf/10.1080/00963402.2008.11461140?needAccess=true.

[14] *Id.*

[15] *Id.*

[16] https://www.frontiersin.org/journals/climate/articles/10.3389/fclim.2021.720312/full (https://perma.cc/U29Q-6XMH).

needed. There are additional unknown health risks as the chemicals being discussed for SRM, namely sulfur dioxide, sulfate aerosols, aluminum oxide, calcium carbonate, titanium dioxide and diamond dust, have not been sufficiently studied to ensure safety. SRM proponents acknowledge these risks while simultaneously acknowledging that the effects of SRM, good or bad, will be incredibly complex and cannot be fully known without deploying SRM and experimenting on our planet.[17]

Moreover, scientists at ARIA are undoubtedly aware that researchers project that once SRM starts, it must continue in perpetuity, binding successive generations to use of the technology without their consent.[18] Thus, if the current UK government begins experimenting outdoors and thereafter deploying SRM and a future UK regime decides to cease SRM operations, the result very well might be termination shock or a rapid onset of extreme temperatures possibly four times greater than temperatures scientists believe would be caused by climate change in the first place.[19] Such a result would devastate our planetary systems. Consequently, researchers concerned about global warming, but skeptical of SRM, fear that the so-called "cure" of SRM could be worse than the "disease" of climate change due to such novel risks posed by SRM which are not predicted for climate change.[20]

Additionally, scholars acknowledge that even researching climate cooling techniques may inexorably lead the global community down a slippery slope toward normalization of geoengineering and full-scale deployment.[21] As one paper suggests, "[a] slippery slope scenario might arise where a research program is structured to develop a technology without adequate consideration of risks, unintended consequences, and other societal concerns along the way."[22] ARIA's Program overview states "[it] will not fund, and does not support, the deployment of any climate cooling approaches."[23] Yet, the research and experiments proposed in the Program may be the necessary precursor to deployment. As stated by "Mary Church, at the Center for International Environmental Law, [] 'Solar geoengineering is inherently unpredictable and risks breaking further an already broken climate system. Conducting small-scale experiments risks normalising highly controversial theories and accelerating technological development, creating a slippery slope toward full-scale deployment.'"[24] ARIA's Program completely ignores this risk.

Furthermore, as troubling as these risks are, what is worse is that predictions of possible SRM efficacy are based solely on models – models which SRM proponents acknowledge are

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[17] https://phys.org/news/2024-09-climate-crisis-scientists.html (https://perma.cc/R526-5X87).

[18] https://www.researchgate.net/publication/324163092_Towards_legitimacy_of_the_solar_geoengineering_research_enterprise.

[19] https://doi.org/10.1038/s41467-017-01606-0 (https://perma.cc/KV9R-DGEF).

[20] https://doi.org/10.1016/j.gloenvcha.2023.102674 (https://perma.cc/QGL2-YJCW).

[21] https://journals.sagepub.com/doi/abs/10.3197/096327123X16702350862737.

[22] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3797329 (https://perma.cc/UWX8-UNHW).

[23] https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling.

[24] https://www.theguardian.com/environment/2025/may/07/real-world-geoengineering-experiments-revealed-by-uk-agency (https://perma.cc/RQ24-MSNJ).

inherently limited in their ability to accurately estimate the potential risks and benefits of SRM.[25] Generally, scientists use the same models for SRM research that they have been using to justify their predictions for climate change. As they utilize these models, "scientists are noticing unsettling mismatches between some of their predictions and real outcomes."[26] According to Gavin Schmidt, the director of NASA's Goddard Institute for Space Studies, "'[f]rom the 1970s on, people have understood that all models are wrong … [b]ut we've been working to make them more useful.'"[27] Climate scientists further admit that "[s]ome models 'run hot,' suggesting more warming than what actually plays out."[28] Moreover, the IPCC's Sixth Assessment Report acknowledged that despite general improvements with climate models, uncertainties remain as to cloud feedbacks, aerosol effects, and regional projections, impacting confidence in the accuracy of specific climate outcomes.[29] This uncertainty by no means justifies real world experiments to validate these models. To the contrary, if ARIA continues with its proposed experiments based on these models, ARIA will only discover the model inaccuracies after experimenting on people and ecological systems. ARIA has no right and has not obtained the required consent of the people to proceed with such experiments for the purpose of validating flawed or inept models.

Moreover, in contemplation of these risks, the people are already voicing their dissent to the Program's proposed projects. As you are certainly aware, the UK Parliament has received a petition with over 157,000 signatures to "[m]ake all forms of 'geo-engineering' affecting the environment illegal."[30] As stated in the petition, UK citizens "do not want any use of technologies to intervene in the Earth's natural systems."[31] Likewise, indigenous communities who will be most impacted by ARIA's proposed artic sea ice experiments are also speaking out. Inuit Circumpolar Council international chairwoman Sara Olsvig was questioned by Scientific American reporter Alec Luhn in a recent piece regarding polar geoengineering by companies like private company Real Ice.[32] Ms. Olsvig believes "governments need to start regulating geoengineering, and **researchers need to seek the free, prior and informed consent of local communities.** When

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[25] https://nap.nationalacademies.org/read/25762/chapter/4#51 (https://perma.cc/6BF7-QBLX).

[26] https://www.theatlantic.com/science/archive/2025/01/climate-models-earth/681207/?_hsenc=p2ANqtz-8ncg0HQsfZcwI1pjjitD94PfA2LSW4LI4bg4yWSRHRub6BU4AtGKP2VHYN06zvZQ7bljcDMloxx7BPtpLBlWj3kBN0i0AIQ_FIdY-OENNsAuswv88&_hsmi=253870156 (https://perma.cc/EX4Z-NLL4).

[27] *Id*.

[28] *Id*. *See also*, https://www.science.org/content/article/use-too-hot-climate-models-exaggerates-impacts-global-warming; https://www.usgs.gov/programs/climate-adaptation-science-centers/news/addressing-hot-model-problem-approaches-using#:~:text=Some%20climate%20models%20fall%20victim,of%20evidence%20suggest%20will%20occur (https://perma.cc/9GQ7-9YF2).

[29] https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf (https://perma.cc/R4ZG-MWLG).

[30] https://petition.parliament.uk/petitions/701963 (https://perma.cc/TS52-R9RU).

[31] *Id*.

[32] Real Ice is of course, one of ARIA's funding recipients, receiving an undisclosed share of the £9.9 million grant to thicken artic sea ice. Real Ice hopes to eventually sell cooling credits for its work that ARIA is funding, similar to an American company, Make Sunsets, who is now under investigation by the U.S. Environmental Protection Agency for its unilateral deployment of balloons containing sulfur dioxide out of California for which it too sells cooling credits to profit off geoengineering. *See;* https://www.scientificamerican.com/article/can-we-refreeze-the-arctics-ice-scientists-test-new-geoengineering-solutions/ (https://perma.cc/SE7W-C3GM); https://www.epa.gov/newsreleases/epa-demands-answers-unregulated-geoengineering-start-launching-sulfur-dioxide-air (https://perma.cc/4JRT-JAR3).

somebody claims, 'We need your piece of land in the name of a greater good,' that's exactly what happened when we were colonized."[33] According to a local Inuit woman, Annie Atighioyak, who was also interviewed, Real Ice's actions could mean disaster for her people, "'[i]f they start doing that under the water, we're going to get no more fish, no more seal, no more nothing.'"[34] ARIA must respect the wishes of the people and halt its proposed experiments. Thus, it is indisputable that ARIA has not received informed consent from the people that stand to be impacted by ARIA's actions should it proceed with its Program. Given the uncertainty and dangers surrounding SRM, ICAN implores DSIT to respect the will of the people and dissuade ARIA from engaging in research or experimenting with SRM. In sum, ARIA has no right to unilaterally expose people to such devastating risks.

II. DSIT SHOULD NOT SUPPORT THE PROGRAM DUE TO ITS LACK OF OVERSIGHT AND LACK OF TRANSPARENCY

A. There Is No Governance Framework in Place to Regulate Geoengineering Experiments

SRM is a highly controversial and radical climate technofix with poorly understood and potentially devasting side effects. At present, all geoengineering, including SRM, is unregulated. Given SRM's novelty, no UK nor international governance scheme exists for its research, experimentation, nor deployment. More than five hundred international scholars from sixty-one countries advocate for an international non-use agreement on solar geoengineering which demands effective political control, no public funding of geoengineering proposals, restriction of the development of SRM technologies, and prevention of the normalization of geoengineering.[35] In a recent report, UNEP warns SRM research and experimentation "might facilitate or exacerbate tensions and security risks."[36] The UNEP is currently conducting a global review of SRM and preparing an assessment framework to provide safeguards and oversight of local, national, and international SRM research.[37] Even researchers in favor of geoengineering called for a governance plan for research of SRM and **no deployment** of SRM in the NAS report.[38] Individual countries like Mexico have discussed banning geoengineering. In the last two years in the U.S., more than thirty states have introduced bills to ban geoengineering and/or weather modification reflecting the will of many Americans to ban the kind of SRM experiments ARIA intends to deploy. Certainly, given the overall lack of governance and oversight, ARIA's actions defy the recommendations of many of the greatest supporters of SRM research in academia and the will of the people who will undoubtedly be impacted. Thus, DSIT should discourage and halt funding of the Program's unregulated SRM experiments.

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[33] *Id* (emphasis added).

[34] *Id*.

[35] https://www.solargeoeng.org/non-use-agreement/ (https://perma.cc/GXD3-LHCB); https://www.solargeoeng.org/non-use-agreement/open-letter/ (https://perma.cc/K64W-3W4A).

[36] *Id*.

[37] *Id*.

[38] https://www.nationalacademies.org/news/2021/03/new-report-says-u-s-should-cautiously-pursue-solar-geoengineering-research-to-better-understand-options-for-responding-to-climate-change-risks.

Moreover, should ARIA choose to proceed with its Program, without the appropriate governance in place, it could instigate international conflict. The international community is deeply divided on SRM deployment, including under what circumstances deployment would be necessary, what governance model would be appropriate, and whether any deployment or governance model could be broadly acceptable to all countries. For example, in early 2024, Switzerland proposed an SRM resolution at the United Nations Environment Assembly (UNEA-6), but the resolution failed after numerous African countries and others from the Global South opposed it.[39] The opposition expressed concerns with the promotion of SRM technologies and called for a global governance mechanism for non-use of SRM.[40] Their concerns include whether SRM deployment could disrupt local and regional patterns, negatively impact water availability and food production, threaten biodiversity, and increase pollution levels in an already over polluted world. Further, we know countries like Russia[41] and China are researching SRM deployment, with China considering geoengineering as a potential warfare strategy. [42]

Because it would be impossible to precisely define and limit the target impact area of SRM to a particular nation, SRM conducted in one county may adversely affect neighboring countries and cause international conflicts. In sum, DSIT should oppose SRM research, experimentation, and deployment and encourage ARIA to halt the Program to prevent international and domestic geopolitical conflicts.

B. ARIA Acts Autonomously with Minimal Oversight

Due to the Advanced Research and Invention Agency Act 2022, ARIA acts autonomously with minimal and merely high-level supervision from the Secretary of State for Science, Innovation, and Technology. "Aria [] sits in a shady no-man's land, in charge of eye-watering amounts of public cash, but with little genuine accountability to the public, for all its talk of transparency and consultation."[43] ARIA determines its own procedures as well as that of any committee or sub-committee. Advanced Research and Invention Agency Act 2022, c. 4, sch. 1, § 10 (U.K.). "ARIA may do anything which appears to it to be necessary or expedient for the purpose of, or in connection with, the exercise of its functions." Advanced Research and Invention Agency Act 2022, c. 4, sch. 1, § 17 (U.K.). Even, the Program's "independent Oversight Committee composed of international experts and chaired by Piers Forster," has no real power or control over ARIA's actions given that "ultimate funding decisions rest with ARIA,"[44] and "[t]he oversight

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[39] https://nation.africa/kenya/news/solar-radiation-modification-why-this-science-fiction-climate-hack-was-rejected-at-unea-6-4547200.

[40] https://wedocs.unep.org/bitstream/handle/20.500.11822/43789/K2316003E-AMCEN-19-6-ADVANCE-REPORT.pdf?sequence=3 at 32 (https://perma.cc/KM6W-845P).

[41] https://thediplomat.com/2023/01/how-china-uses-geoengineering-to-pursue-a-hybrid-warfare-strategy/ (https://perma.cc/YBB3-MSTF).

[42] https://thediplomat.com/2023/01/how-china-uses-geoengineering-to-pursue-a-hybrid-warfare-strategy/ (https://perma.cc/YBB3-MSTF).

[43] https://freewestmedia.com/2025/05/09/plans-to-dim-the-sun-shine-a-light-on-uks-high-risk-research-arm/ (https://perma.cc/RMA7-XVEM).

[44] https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling.

committee will not be involved in any direct management or day-to-day decision making for any of the projects."[45] In sum, ARIA can act as it pleases with no real system in place to hold it accountable to the interests of the people it serves or the global community its actions will surely impact.

C. The Program Lacks Promised Transparency

Despite repeated assurances of transparency, thus far ARIA's Program has been anything but. A recent opinion piece published in the *Proceedings of the National Academy of Sciences*, co-authored by Shuchi Talati, a member of the Program's Oversight Committee, highlights the importance of transparency of funding and transparency of action when it comes to SRM, to ensure appropriate oversight by the public.[46]

> Decision-makers and members of the general public need to know that geoengineering research is legitimate, which means that findings are robust, contrary results aren't hidden, and investigations are free from conflicts of interest. This applies as much to "outdoor" research as it does to modeling and laboratory work, where the idea of geoengineering is shaped. If people are going to evaluate whether to support [geoengineering] research or even deployment, they want to know where the idea came from, who funded it, and who was or wasn't at the table. This is how trust is built....
>
> In a field as controversial and rife with misinformation as solar geoengineering, a lack of transparency can lead to serious problems. One classic example occurred in 2012 when the Stratospheric Particle Injection for Climate Engineering (SPICE) Project in the United Kingdom was canceled because of concerns about financial gain from patent applications that were initially withheld by the researchers.[47]

The Program, as it stands, fails to meet the above guidance. ARIA claims, "[a]s a publicly funded, non-profit agency, our research efforts are grounded in transparency, responsible stewardship, and a commitment to broad public benefit."[48] Yet, to date, ARIA has provided only minimal and high-level details regarding its proposed experiments. Shockingly, the public has no means of requesting this information from ARIA because, "ARIA is not subject to the Freedom of Information Act 2000."[49]

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[45] https://www.aria.org.uk/media/j1pomxx1/aria-_-programme-oversight-and-governance-v2.pdf (https://perma.cc/D29N-PHD8).

[46] https://www.pnas.org/doi/10.1073/pnas.2419587122.

[47] *Id*. Concerningly, one of the researchers from the SPICE project, Dr. Hugh Hunt of the University of Cambridge, is a grant recipient under the current Program.

[48] https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling/.

[49] https://www.aria.org.uk/contact.

Thus far, ARIA has only disclosed that it will fund twenty-one projects involving: 1) stratospheric aerosol injection, 2) marine cloud brightening, and 3) thickening Artic sea ice to make it more reflective, which will include outdoor experiments.[50] Only broad short summaries are provided for each project. No project proposals or more detailed summaries are publicly available. No doubt, these proposals were proffered by grant recipients. Such proposals should be publicly available.

ARIA claims that it will conduct small-scale experiments that are rigorously assessed and will not involve toxic materials.[51] Even assuming these experiments do not involve injecting metals or "toxic materials" into the atmosphere, there are no studies to support the safety of releasing *anything* into the atmosphere. ARIA does not provide any information from grant recipients demonstrating baseline safety for the proposed experiments. Absent such information, ARIA cannot demonstrate that however its experiments do proceed, which again is a mystery as no details are provided, that such experiments will not harm or alter human health, ecosystems, or the environment.

Equally concerning is that ARIA still has not disclosed detailed information like the names of the individual researchers who will receive the allocated £56.8 million in funding to conduct this research and the experiments. And, no information is provided regarding potential conflicts of interests of these researchers. Moreover, much of the funding is going to private institutions, including companies that stand to profit from their work for the Program, e.g., Real Ice and their plan to sell cooling credits. Such, "[d]isparate private efforts" are problematic as they can "shape what is researched and discussed and, critically, what is not discussed…[and because] private research lacks oversight by the public [] unacceptable risks may be ignored or suppressed in the name of preferred outcomes or profit."[52]

Moreover, history has shown us that geoengineering researchers can profit handsomely from their work. For instance, top geoengineering researcher David Keith led the now defunct SCOPEx project at Harvard.[53] Mr. Keith has been an outspoken proponent of SRM research for decades. In 2023 he left Harvard and sold his company Carbon Engineering to Occidental Petroleum for $1.1 billion.[54] Mr. Keith made $72 million from the sale.[55]

Conversely, according to Raymond Pierrehumbert, an atmospheric physicist at the University of Oxford, "[SRM is] not only a bad idea in terms of something that would never be

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[50] https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling#fundedprojectshttps://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling#fundedprojects.

[51] https://www.bbc.com/weather/articles/c5ygydeqq08o (https://perma.cc/DKQ3-FT7P).

[52] https://www.pnas.org/doi/10.1073/pnas.2419587122.

[53] https://www.theverge.com/2024/8/12/24216232/harvard-solar-geoengineering-policy-analysis-science?utm_source=chatgpt.com (https://perma.cc/7MWK-UJQL).

[54] https://www.nytimes.com/2024/08/01/climate/david-keith-solar-geoengineering.html (https://perma.cc/P54U-A7BE (paywall removed)).

[55] *Id*.

safe to deploy [. . .] [b]ut even doing research on it is not just a waste of money, but actively dangerous."[56] Indeed, researchers across the globe like Pierrehumbert who signed the international non-use agreement on solar geoengineering, demand that governments commit to halting funding for any development of SRM, including further research.[57] For all these reasons, DSIT should halt the Program, cease all funding to ARIA for geoengineering, and encourage full transparency of any expenditures to date in furtherance of ARIA's aims.

III. ACTIONS REQUESTED

DSIT must intervene to fulfill its obligations to provide oversight over the public funding it provided to ARIA for the Program. Full transparency and public oversight are crucial to ensure any geoengineering program does not harm human health and the environment. ARIA's Program is devoid of transparency, oversight, and accountability to the public. ICAN implores DSIT to:

1. **Halt all public funding to ARIA for the Program.**

2. **Encourage ARIA to halt the Program and all research and experimentation stemming therefrom so that no climate cooling activities that may affect the people can be conducted without the informed consent of the people.**

3. **Encourage ARIA to disclose all details regarding any proposed SRM research or experimentation and disclose the amount, recipients, and purpose of all funding that has been or will be dispersed.**

ICAN implores DSIT to take the actions above and intercede on behalf of the people and for our planet. We look forward to a prompt response explaining what actions DSIT will take.

Very truly yours,

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[56] https://www.nytimes.com/2024/08/01/climate/david-keith-solar-geoengineering.html (https://perma.cc/P54U-A7BE).

[57] https://www.solargeoeng.org/why-the-new-letter-of-support-for-solar-geoengineering-research-is-misguided/ (https://perma.cc/4CWD-FEFY).