Committee of Permanent Representatives
Subcommittee Meeting
Thursday, 27 April 2023
10:00 – 13:00, 15:00 – 18:00 (GMT+3)
Conference Room 1
Hybrid meeting

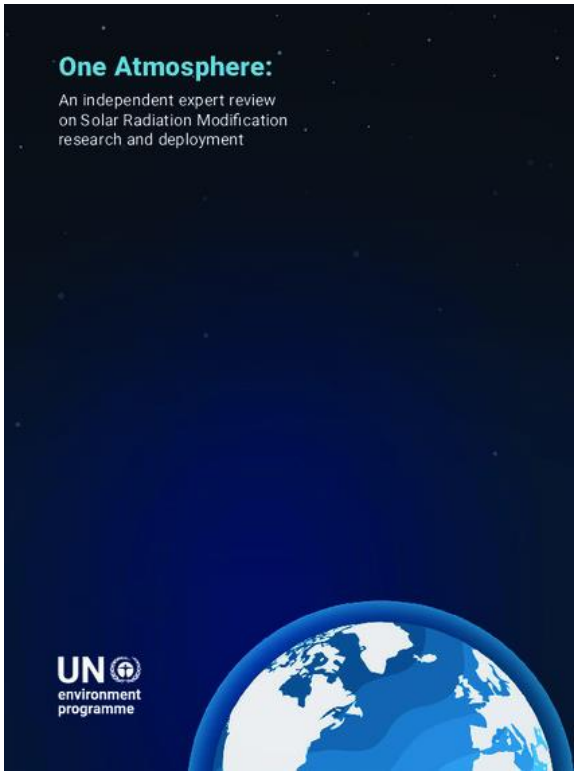
Agenda item 4: Briefing on the UNEP Solar Radiation Modification Report.

This note serves as an information background document for consideration of agenda item 4, whereby the Committee will be provided a presentation on the One Atmosphere: An Independent expert Briefing on Solar Radiation Modification (SRM) Research and Development (2023) by the Secretariat.

Following the presentation, Member States and Stakeholders are invited to engage in an exchange of views with the Secretariat on the findings of the report.

One Atmosphere: An Independent expert Briefing on Solar Radiation Modification (SRM) Research and Development (UNEP, 2023)

In early 2022, the United Nations Environment Programme (UNEP) convened a multidisciplinary expert panel to undertake a rapid review of the state of scientific research on Solar Radiation Modification (SRM). UNEP published a summary of findings from the work on 27 February 2023, in the report *One Atmosphere: An Independent expert Briefing on Solar Radiation Modification Research and Development*. The review outlines a range of informed views, and includes issues of environmental and social impacts, governance, technology development and financing.



Urgent action to slash greenhouse gas emissions (GHG) and invest in adapting to the impacts of climate change is immutable. Yet current efforts remain insufficient. In response, an increasing number of scientists are advocating for research and development of SRM technologies, also known as solar geoengineering.

The IPCC continues to warn that the world is not on track to meet the internationally agreed goals of the Paris Agreement and that drastic, rapid and sustained cuts in GHG emissions are critical to avoid the most severe impacts and global temperature overshoot of 1.5C. Current emission trajectories and national commitments will be insufficient to address the increasing frequency and intensity of extreme high-temperature events which are virtually certain to increase in the future as global temperature increases, in addition to melting of polar and glacial ice, and sea level rise, among other changes in the Earth system.

Solar Radiation Modification (SRM) approaches (also known as solar radiation management, or solar geoengineering – aim to reduce the amount of incoming solar radiation reaching the surface by reflecting some sunlight back into space, to reduce the global temperature. The exploration of all SRM technologies, thus far, is largely theoretical, and very little is known about their potential adverse effects on the climate, environment, and health. Stratospheric Aerosol Injection (SAI) specifically, is the most mature and is discussed as a temporary "emergency" method. SAI involves the injection of aerosols into the stratosphere. Modelling studies indicate a large-scale continuous SRM deployment could offset some effects of anthropogenic climate change on global and regional scales. Volcanic

eruptions give us some indication of the potential to cool the planet. SRM does not reduce, remove or manage GHG emissions.

A group of eminent international experts across a spectrum of informed views and expertise were convened as an Independent Expert Panel under the guidance of UNEP Chief Scientist, in close consultation with other UN entities, to undertake the review of SRM. The Review Panel was asked to consider the current state of knowledge on SRM technologies, research (including modelling), and associated environmental, social, economic and health issues. The review was undertaken with consideration of the precautionary principle to gain a deeper understanding of the potential benefits and risks of SRM technologies. The review focused on the most studied and the most feasible SRM approach currently under investigation—namely Stratospheric Aerosol Injection (SAI)—in terms of scientific underpinnings, cost, effectiveness, and engineering.

The Expert review provides important new insights including a series of identified actions and **recommends a comprehensive periodic scientific review including the physical and social sciences and environmental health and social impacts to inform decision making** including the need for an international inclusive discussion about SRM issues and the need for much broader engagement on the topic. The report cautions that any large-scale operational SRM deployment would introduce new risks to the stratosphere, climate, people, and ecosystems which are currently under-researched, and not well understood. It recommends a comprehensive review of the latest science including the environmental health and social impacts to inform decision-making.

The report identifies there is currently no international scientific consensus on the risks, impacts or benefits of SRM and widely diverging views within (and beyond) the scientific community. The concerns raised by many stakeholders demonstrate both the great trepidation with which SRM is perceived, the complexity of the science, technology, and the urgent need to foster international scientific cooperation to ensure risks to the atmosphere are prevented.

Detractors and proponents of SRM are raising the need for a governance architecture. It has been clear for some time that some Member States, as well as both proponents and critics of SRM, are requesting an international governance process for SRM. The expert panel finds that governance options informed by a rigorous scientific and technical assessment could be helpful to guide decisions surrounding the acceptability of possible SRM research activities and SRM deployment strategies.

The Intergovernmental Panel on Climate Change (IPCC) does not include SRM as a climate technology solution, but at Member States' request, has discussed SRM concluding that critical knowledge gaps and risks exist. SRM technologies are not included in the IPCC's climate scenarios or in the Summary for Policymakers. SRM was however, assessed at the request of governments, in Working Group 1 (2021) and Working Group 3 (2022), which both note critical knowledge gaps, significant and uncertain risks, and low levels of confidence in our understanding of the impacts and consequences of SRM, particularly at the regional scale. There is relatively little analysis or empirical evidence of the environmental or socioeconomic impacts of SRM nor whether SRM could constitute an ethical and/or legally valid approach to climate protection in the future.

Nearly all modelling is theoretical and thus model design to a large extent determines outcome findings. Nearly all SRM research to date is based on modelling studies or theoretical analysis which show that the potential impacts of SRM depend strongly on the way the modelling is undertaken, and the assumptions made. For example, large uncertainties are associated with SRM-related climate processes (e.g., aerosol microphysics), socio-economic and environmental impacts, and the extent to which SRM will reduce adverse climate change impacts on humans and natural ecosystems. The Panel was also in full agreement about the need for a rigorous review of SRM to support decision-making.

The potential impacts of a large-scale (operational) deployment of SRM are varied but need to be further characterized. The cooling effects of SRM would start to diminish as soon as the SRM deployment is halted – causing what is known as a termination shock –a rapid and damaging rise in temperatures. Other impacts include a delay in the closing of the ozone hole, warming of polar regions, and cooling of the tropics. Research in this field could be viewed as the path to deployment. These technologies are seen as potentially influencing geopolitics, introducing security risks, and aiding developed countries at the expense of developing countries/economies; which are already deeply impacted by changes to the environment and climate.

The Montreal Protocol assessed SRM from the perspective of stratospheric ozone impacts. In January 2023, the Scientific Assessment Panel of the Montreal Protocol Substances that Deplete the Ozone Layer released the latest intergovernmental scientific assessment of Ozone Depletion which, for the first time, examined the potential effects on the ozone arising from the intentional addition of aerosols into the stratosphere—the SRM technique known as a stratospheric aerosol injection (SAI). The assessment warned that an "unintended consequence" of SAI was that it "could also affect stratospheric temperatures, circulation and ozone production and destruction rates and transport."

The UN Human Rights Council (HRC) Advisory Committee released a report on 9 February 2023 on the impact of climate-altering interventions, including SRM, for climate protection on the enjoyment of human rights. The findings of the HRC report are aligned with the views of the Expert Panel and present a similar position on the need for further research on SRM risks.