Evaluation of Safety and Effectiveness of Localized Arctic Ice Albedo Restoration Method to Slow Climate Change Impacts

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The continuing acceleration of climate change and its impacts point to a need to consider climate interventional solutions. Climate restoration solutions can join climate mitigation and adaptation measures to bring a needed third option to climate stability. Such solutions require thorough vetting through research and development, including climate modeling, materials evaluation, safety testing, and small-scale field testing conducted with permissions, transparency, and collaboration with the community, to allow careful evaluation of effectiveness, safety, and cost. International policy and governance are required to determine, given the information developed in the R&D, what solutions are in the best interests of humanity, so they can be funded and implemented at a scale to stabilize climate, in time to prevent or reduce climate-change-related harms.

Ice loss in the Arctic, initially an outcome of global temperature rise, is now a driver accelerating global temperature rise, as the Earth's Arctic ice cover has diminished rapidly. NOAA reported in 2018 that 95% of the most-reflective multi-year ice has disappeared over the past 40 years. The effect of this lost Arctic reflectivity is to increase the net energy influx to the Arctic, accelerating heating locally and worldwide, leading to increasing climate-related impacts on populations and ecosystems. Arctic Ice Project's focus is on evaluating and developing an innovative solution to artificially
restore lost Arctic reflectivity using thin layers of hollow glass microspheres to reverse the increased summer radiative forcing from the Ice-Albedo Feedback Effect. We will report on the physical characterization of the HGMs proposed for this use, the approach taken for field testing and safety evaluations, and the strategy for evaluating and modeling where to conduct limited deployment of this restoration method to achieve the most leveraged positive impact. Restoring Arctic ice reflectivity has the potential to be the largest single safe lever that could be practically and effectively deployed in the short term to give the world the time needed to complete the needed transition to sustainable practices, while reducing climate devastation.

The Arctic Ice Project is focused on developing this needed information, through extensive international collaborations, to evaluate the safety and effectiveness of a proposed localized intervention to restore ice reflectivity in the Arctic.