Re: The Restriction of Geoengineering under International Law

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Joint Opinion

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1. We are instructed by the Heinrich Böll Foundation (HBF), a not for profit political foundation closely affiliated to the German Green Party. As part of its climate work, HBF has developed a policy focus on geoengineering since 2016, both in its own right and as part of various coalitions, including the 'Hands Off Mother Earth' (HOME) campaign, a coalition of 195 members including 41 international organisations opposed to geo-engineering.[1]

2. HBF seeks advice on the extent to which international law restricts the use of geoengineering technologies. Our advice is structured as follows:
    - **Section I: Background and context;**
    - **Section II: Restrictions on the development and use of geoengineering adopted under multilateral environmental agreements (MEAs)**;
    - **Section III: The implications of customary international law for the development and use of geoengineering technologies;**
    - **Section IV: The implications of the international climate change regime for the development and use of geoengineering technologies;**
    - **Section V: The implications of international human rights law and principles of public participation for the development and use of geoengineering technologies**;
    - **Section VI: Conclusions.**

3. Advocates of geoengineering technologies support their development and deployment as a means of preventing or reducing the risks posed by climate change. We are therefore asked to consider whether such justifications are consistent with the existing international climate change legal regime, and whether that regime requires or promotes the use of such technologies to meet its objectives. **We address these issues in section IV**.

[1] https://www.handsoffmotherearth.org/

4. Proponents of geoengineering technologies, as well as those who oppose their use, point to the lack of a specific international governance framework applicable to all geoengineering technologies. Some proponents of the technologies have called for a regulatory framework which would facilitate their increased use. Others, including HBF, consider that any such governance framework should institute a moratorium or a total ban on their use in view of the risks that they pose, both environmental and social.

5. In summary, our views are as follows (we set out our conclusions in **section VI)**:
    - **Section I**: The relevant context for considering the current law, as well as the further legal response, to geoengineering importantly includes scientific uncertainty as to some of the risks posed by the technologies and concerns as to the extent to which geoengineering could undermine commitment to achieving deep reductions in carbon emissions by locking in fossil fuel use. Lock-in brings associated risks of 'overshoot' (exceeding the international temperature goal before taking steps to bring the temperature back down towards the goal) and the crossing of climate tipping points;
    - **Section II**: In the light of these concerns, restrictions on the development and deployment of geoengineering technologies have been adopted by the parties to MEAs including the Convention on Biological Diversity (**CBD**), the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter and its 1996 London Protocol (**LCLP**) and the Montreal Protocol on Substances that Deplete the Ozone Layer. These decisions may be framed as guidance to the parties (the CBD) and/or as amendments to the parent instrument (the LCLP). The decisions adopted under the CBD and LCLP refer to serious concerns as to the potential impacts of geoengineering on biodiversity and the marine environment, as well as on the rights of indigenous peoples and local communities;
    - The growing recognition of the normative influence of soft law decisions of treaty bodies confirms that in a contentious area with recognised serious risks, such as geoengineering, the duty of cooperation which applies to all parties to a multilateral treaty may endow these COP decisions, and future similar decisions, with a normative importance. Until parties can agree on whether or not the deployment of geoengineering technologies can be justified, taking into account the significant risks that they pose, the adherence to a moratorium as indicated in the COP Decisions adopted under the CBD and LCLP may be the only feasible expression of their duty to cooperate with each other in good faith;

- **Section III**: The uncertainty as to the impacts of geoengineering on complex planetary systems and the irreversibility of those potential impacts clearly make precaution relevant. Whether a given geoengineering option for mitigating climate change should be pursued in spite of scientific uncertainty regarding its impacts must be evaluated against alternative options, including those about which there is more scientific certainty. In the event that there is a total or partial governance gap, precaution is potentially legally significant in weighting alternatives so that less uncertain and or risky alternatives (such as a moratorium on fossil fuel extraction) might be recognised as preferable, being the less potentially harmful option;
- The legal implications of scientific uncertainty are framed by precaution as a principle applying under MEAs together with legal requirements relating to risk assessment and the protection of human rights in situations where the risks/scale of impacts are uncertain. The International Panel on Climate Change (**IPCC**) has highlighted the 'large uncertainties and knowledge gaps as well as substantial risks' facing the use of Solar Radiation Management or Solar Radiation Modification (**SRM**) measures. In relation to Carbon Dioxide Removal (**CDR**), the IPCC has indicated that there are uncertainties as to the potential contribution CDR might make to achieving climate goals. It has also indicated that there are substantial concerns as to the potential adverse impacts of this range of technologies;
- The duty not to cause transboundary harm is clearly relevant in the context of geoengineering activities which may cause damage to the environment of other states or to areas beyond the limits of national jurisdiction, including the atmosphere and the high seas. It is also relevant in relation to the risk that reliance on geoengineering will increase the likelihood (or even acceptance of) overshoot with the risks that that poses;
- **Section IV**: The international climate regime does not explicitly address geoengineering technologies. However to the extent that there is evidence that the use of such technologies may undermine actions to cut emissions, lock in dependency on fossil fuels and/or have an adverse impact on the protection of sinks and reservoirs, it is strongly arguable that the deployment of such technologies runs counter to the aims and purposes of the UN Framework Convention on Climate Change and the Paris Agreement on Climate Change (**UNFCCC/PA**). This concern is reinforced in the light of evidence as to the ongoing emissions and production gaps;

- In addressing the technical and policy choices to be made in determining these issues, Parties will need to address the goals and requirements of the international climate regime together with international environmental and human rights regimes and principles which require precaution, the prevention of harm, assessment of risk and that human rights are respected;
- **Section V**: Human rights law is clearly relevant to the assessment of the risks posed by geoengineering and, in view of the range of rights potentially impacted and the scale of potential interference with those rights, supports a restrictive approach and potentially a moratorium. The right to life offers particularly strong protection as it is not subject to derogation. Principles of Free Prior Informed Consent (**FPIC**) and public participation and transparency are also relevant;
- In the light of these risks, including transboundary risks, and the existence of alternative responses to the threat of climate change, it is not apparent that deployment of geoengineering technologies would meet the strict requirements for recourse to emergency powers which derogate from human rights protections. It appears doubtful that a state would, consistent with its obligations under international law, be completely free to adopt and apply far-reaching unilateral emergency powers legislation in order to justify being able to proceed to authorise and carry out geoengineering activities.

I: Background and Context

6. **Geoengineering**: There appears to be no universally agreed definition of geoengineering although a number of definitions have emerged in various treaty fora, including the Convention on Biological Diversity (**CBD**) and the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972) and its 1996 London Protocol (**LCLP**). Discussion on geoengineering often differentiates between two categories of technologies, namely Carbon Dioxide Removal (**CDR**) and Solar Radiation Management or Solar Radiation Modification (**SRM**) and the IPCC adopts this distinction.[2] CDR technologies

[2] The Glossary to the IPCC's SR 1.5 Report indicates that 'separate consideration is given to the two main approaches considered as 'geoengineering' in some of the literature: solar radiation modification (SRM) and carbon dioxide removal (CDR). Because of this separation, the term 'geoengineering' is not used in this report. See also Carbon dioxide removal (CDR) and Solar radiation modification (SRM).' In the ISO process, the term Earth Radiation Management is also used separately from SRM, although HBF and its allies take the view that there is no meaningful distinction between the two.

aim at removing CO2 from the atmosphere and storing it.[3] Broadly speaking, we understand that SRM technologies aim at reducing the warming impact of greenhouse gases by blocking incoming solar radiation, reflecting more of it into space, or allowing more heat to escape the earth's atmosphere.[4] The marine environment is also being considered as an arena for both CDR and SRM.[5] Other proposals relate to weather modification, such as cloud seeding and fog or hail suppression. We understand that some of these technologies have been deployed at local or regional scales for decades, for agricultural, commercial and military purposes.

7. **Opposition to Geoengineering**: Commentators have identified a range of significant risks associated with the use of geoengineering technologies including environmental, economic and political/moral.[6] HBF and its allies, together with other civil society organisations[7], oppose geoengineering technologies for a number of reasons. These include:

   (1) the scale with which they may have to be deployed to have an impact on the climate, which could carry a high risk of unintended, irreversible consequences which could exacerbate the problem of climate change (in the case of SRM, it would need to continue unceasingly to avoid temperatures leaping back up in a way that would create more of a challenge than climate change alone (discussed in the scientific literature as 'termination shock'));

   (2) the risk that these technologies will exacerbate global power imbalances and inequity, carrying a risk of human rights violations, while also creating an excuse to avoid effective action on climate change in the hope of a technological fix (some have argued that there are links between fossil fuel interests and geoengineering which

[3] The IPCC Glossary states: Carbon Dioxide Removal methods refer to processes that remove CO2 from the atmosphere by either increasing biological sinks of CO2 or using chemical processes to directly bind CO2. CDR is classified as a special type of mitigation.

[4] The IPCC Glossary states: Solar radiation modification refers to the intentional modification of the Earth's shortwave radiative budget with the aim of reducing warming. Artificial injection of stratospheric aerosols, marine cloud brightening and land surface albedo modification are examples of proposed SRM methods. SRM does not fall within the definitions of mitigation and adaptation (IPCC, 2012b, p. 2).

[5] https://www.c2g2.net/wp-content/uploads/c2g_policybrief_marine-SRM.pdf

[6] Robock, A. (2008). 20 reasons why geoengineering may be a bad idea. Bulletin of the Atomic Scientists, 64(2), 14–18.

[7] See, e.g., Climate Action Network International, Position on Solar Radiation Modification (SRM), September 2019. Available online at https://climatenetwork.org/resource/can-position-solar-radiation-modification-srm-september-2019/. (The Climate Action Network identifies itself as "world's largest climate network made up of over 1,500 civil society organisations in over 130 countries, together fighting the climate crisis." https://climatenetwork.org/overview/).

indicate that geoengineering may lock in fossil fuel use and related infrastructure);[8] and

(3) the risk that geoengineering represents a dangerous diversion of resources away from real solutions to climate change, such as the reduction of emissions at source and the decarbonisation of the global economy through the use of renewable sources of energy.

8. **The Governance Gap**: As HBF point out, there is widespread concern at the potential risks posed by geoengineering technologies, as well as at the lack of international governance and oversight over both research into, and the potential deployment of, these technologies. As recognised in academic and expert commentary, there are no international treaty regimes which specifically address geoengineering, although a number of multilateral environmental regimes have adopted specific decisions on geoengineering and contain provisions which are, or may be, relevant to regulating or restricting aspects of geoengineering (see **Section II**).

9. A number of initiatives has been established to look into the governance gap, whilst at two international fora, the CBD and the LCLP, state parties have adopted decisions which restrict the development and deployment of geoengineering technologies and which HBF and others consider to amount to a *de facto* moratorium on the relevant techniques. We address the effect of those restrictions in **Section II** below.

10. International acceptance that states are not on track to meet the internationally agreed climate change goals laid down in the UN Convention on Climate Change (**UNFCCC**) and the Paris Agreement (**PA**) has increased the level of attention on the potential deployment of geoengineering to address climate change, including through increased research.

11. **Scientific Uncertainty**: The IPCC has expressed concern as to the uncertainties and potential risks posed by these technologies. Although one such technology, bioenergy with carbon capture and storage (**BECCS**), was featured in the Fifth Assessment Report (**AR5**) and the SR 1.5 Report, the IPCC has also highlighted the uncertainties as to the contribution and impacts of geoengineering technologies. The IPCC noted the 'large uncertainties and knowledge gaps as well as substantial risks' facing the use of SRM measures and SRM measures are not

[8] See also Fuel to the Fire by CIEL https://www.ciel.org/news/fuel-to-the-fire-how-geoengineering-threatens-to-entrench-fossil-fuels-and-accelerate-the-climate-crisis/

included in any of the available assessed pathways (IPCC SR 1.5 C.1.4). Some CDR measures (including afforestation and BECCs) are included in some of those pathways (IPCC 1.5, Summary for Policy Makers at C.3). However the IPCC has stated that:

> Existing and potential CDR measures include afforestation and reforestation, land restoration and soil carbon sequestration, BECCS, direct air carbon capture and storage (DACCS), enhanced weathering and ocean alkalinization. These differ widely in terms of maturity, potentials, costs, risks, co-benefits and trade-offs (high confidence). To date, only a few published pathways include CDR measures other than afforestation and BECCS. {2.3.4, 3.6.2, 4.3.2, 4.3.7} (IPCC SR 1.5 C.3.1)

The IPCC has highlighted the uncertainties and potential adverse impacts associated with CDR technologies:

> CDR deployment of several hundreds of GtCO2 is subject to multiple feasibility and sustainability constraints (*high confidence*). (IPCC SR 1.5 SPM C.3)…
>
> Most current and potential CDR measures could have significant impacts on land, energy, water or nutrients if deployed at large scale (high confidence). Afforestation and bioenergy may compete with other land uses and may have significant impacts on agricultural and food systems, biodiversity, and other ecosystem functions and services (high confidence). Effective governance is needed to limit such trade-offs and ensure permanence of carbon removal in terrestrial, geological and ocean reservoirs (high confidence). Feasibility and sustainability of CDR use could be enhanced by a portfolio of options deployed at substantial, but lesser scales, rather than a single option at very large scale (high confidence). (IPCC SR 1.5 SPM C.3.4)
> Most CDR technologies remain largely unproven to date and raise substantial concerns about adverse side-effects on environmental and social sustainability (Smith et al., 2015; Dooley and Kartha, 2018) (IPCC 2.3.4)

12. **The Climate Emergency**: The current context, in which an acknowledged governance gap is accompanied by a growing concern as to the inadequate global response to climate change, means that the necessity of addressing the climate emergency is likely to be used with increasing force by proponents of the technology, including in relation to funding for research. As noted in a recent study prepared for the European Union (EU):

> Given that in the "vast majority" of scenarios considered by the IPCC, staying within the 2°C target during the 21st century would necessitate some form of greenhouse gas removal, this commitment may have challenging implications for climate engineering policy in the EU. Seen from this perspective, research on greenhouse gas

removal could become a significant component of developing and evaluating policy options for staying below the 2°C limit.[9]

13. On the other hand, concern that geoengineering detracts from mitigation and adaptation measures required under the UNFCCC/PA, and may even lock in dependence on fossil fuels, is also likely to increase. Such concerns could be used in support of measures to limit or take such technologies off the table so that international resources and attention can focus on responses to the threat of climate change that do not carry such potential risk or such uncertainty.

14. The relevant context for the purposes of considering the current law, as well as the further legal response, to these issues importantly includes:
    - **scientific uncertainty as to some of the risks posed by the technologies** (which varies across the different technologies). The legal implications of this uncertainty are addressed throughout this analysis;
    - **concern as to the extent to which recourse to geoengineering undermines commitment to achieving the deep reductions in carbon emissions and other measures provided for the international climate regime (moral hazard)[10]** in the context of the need to meet the international climate goals in order to prevent dangerous climate change **(see Section IV);**
    - concern as to the specific risk that geoengineering deployment may in fact **lock in fossil fuel use and/or risk overshoot and the crossing of climate tipping points (see Section IV)**
    - growing **integration of environmental law with human rights law** due in part to cross references in key instruments, including the preamble to the PA, and to the increasing

[9] Schäfer, S.; Lawrence, M.; Stelzer, at al (2015) *The European Transdisciplinary Assessment of Climate Engineering (EuTRACE): Removing Greenhouse Gases from the Atmosphere and Reflecting Sunlight away from Earth.* Funded by the European Union's Seventh Framework Programme under Grant Agreement 306993 at page 139.

[10] The IPCC has noted that: 'Concerns have been raised that building expectations about large-scale CDR deployment in the future can lead to an actual reduction of near-term mitigation efforts (Geden, 2015; Anderson and Peters, 2016; Dooley and Kartha, 2018). The pathway literature confirms that CDR availability influences the shape of mitigation pathways critically (Krey et al., 2014a; Holz et al., 2018b; Kriegler et al., 2018a; Strefler et al., 2018b) (IPCC SR 1.5 2.3.4.1)'. See also the findings of the European Academies' Science Advisory Council (EASAC) as to the moral hazard in placing 'unrealistic expectations' on negative emissions technologies, cited in Beck S, Mahony M (2018). The politics of anticipation: the IPCC and the negative emissions technologies experience. Global Sustainability 1, e8, 1–8. https://doi.org/10.1017/sus.2018.7 at page 6.

focus of a range of human rights bodies and tribunals on the relationship between environmental risk and human rights law (**See Section V**)

II: Restrictions on the development and use of geoengineering adopted under multilateral environmental agreements (MEAs) (non UNFCCC)

The Convention on Biological Diversity (CBD)

15. The CBD has given consideration to the issue of geoengineering, including through the adoption of Decision X/33 on Biodiversity and Climate Change, para 8 of which 'Invites Parties and other Governments, according to national circumstances and priorities, as well as relevant organizations and processes, to consider the guidance below on ways to conserve, sustainably use and restore biodiversity and ecosystem services while contributing to climate change mitigation and adaptation'. Para 8(w) then directs Parties to:

> Ensure, in line and consistent with decision IX/16 C, on ocean fertilization and biodiversity and climate change, in the absence of science based, global, transparent and effective control and regulatory mechanisms for geo-engineering, and in accordance with the precautionary approach and Article 14 of the Convention, that no climate-related geo-engineering activities that may affect biodiversity take place, until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts, with the exception of small scale scientific research studies that would be conducted in a controlled setting in accordance with Article 3 of the Convention, and only if they are justified by the need to gather specific scientific data and are subject to a thorough prior assessment of the potential impacts on the environment; (emphasis added)

16. The elements included in this decision (which the Parties reaffirmed in Decision XI/20, see below) are relevant to the discussion surrounding geoengineering more generally as they reflect principles laid down in international environmental agreements and in customary international law. These include:
    - Precaution;
    - The need for prior impact assessment but only when there is an adequate scientific basis to justify such activities (see below as to research studies), and
    - Appropriate consideration of the associated risks and impacts

- With the exception of small scale scientific research studies under specified conditions and only if justified by the need to gather specific scientific data, and subject to prior assessment
- Those research studies must be conducted in a controlled setting that complies with the principles laid down in Article 3 CBD which include the responsibility to ensure that activities within the state's jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction[11].

17. These elements should be considered in the context of the overall direction in para 8(w) that: 'no climate-related geo-engineering activities… that may affect biodiversity take place, until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts'. This language indicates that this decision represents a moratorium albeit with a qualified and limited exception for small scale scientific research studies.

18. State parties to the CBD have expressly laid down a requirement, in the absence of a science based global and transparency governance mechanism, for prior justification (on an adequate scientific basis) for both the deployment of climate related geoengineering technologies and the conduct of small-scale scientific research studies. Even where there is the requisite scientific justification for proceeding, there must be a full prior impact assessment of the risks for biodiversity and associated impacts. The reference to 'appropriate consideration' indicates that where the risks outweigh the perceived scientific basis for proceeding, the deployment will not go ahead (field studies are considered further below).

19. Decision X/33 thus represents not only a precautionary approach but one which places the onus for justification more broadly on those wishing to proceed with deployment of geoengineering technologies in light of the risks to biodiversity and also associated social, economic and cultural impacts. This emphasis on prior justification, both from a scientific point of view and from a broader environmental, social and cultural perspective, is relevant

[11] Article 3 provides that: 'States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

in our view to the approach to be taken to geoengineering in other fora, including the UNFCCC/PA which we consider below in **Section IV**.

20. The way in which these elements relate to the regulation of ocean fertilization under the LCLP is considered below, but it is notable that the earlier CBD Decision IX/16 contains similar elements to those set out in Decision X/33:

> …requests Parties and urges other Governments, in accordance with the precautionary approach, to ensure that ocean fertilization activities do not take place until there is an adequate scientific basis on which to justify such activities, including assessing associated risks, and a global, transparent and effective control and regulatory mechanism is in place for these activities; with the exception of small scale scientific research studies within coastal waters. Such studies should only be authorized if justified by the need to gather specific scientific data and should also be subject to a thorough prior assessment of the potential impacts of the research studies on the marine environment, and be strictly controlled, and not be used for generating and selling carbon offsets or any other commercial purposes. (emphasis added)

21. The parties to the CBD have also adopted Decision XI/20 on climate related geo-engineering which reaffirmed para 8(w) of CBD Decision X/33, noted the work being undertaken by the IPCC and invited the SBSTTA to consider the reports on geoengineering prepared under the auspices of the CBD (see further below in **Section IV**).

The London Convention and London Protocol (LCLP)

22. The issue of marine geoengineering has been addressed at the LCLP, including in the form of detailed guidance on ocean fertilization and carbon storage. We are instructed that Parties are considering wider application to other marine geoengineering activities within their mandate. In 2019 GESAMP Working Group 41[12] published its *High Level Review of a Wide Range of Proposed Marine Geoengineering Techniques.* One of the objectives of the review was to provide advice to the London Protocol Parties to assist them in identifying those marine

[12] As stated on the report, GESAMP is an advisory body consisting of specialized experts nominated by the Sponsoring Agencies (IMO, FAO, UNESCO-IOC, UNIDO, WMO, IAEA, UN, UN Environment, UNDP). Its principal task is to provide scientific advice concerning the prevention, reduction and control of the degradation of the marine environment to the Sponsoring Agencies.

geoengineering techniques that it might be sensible to consider for listing in the new Annex 4 of the Protocol.[13]

23. Following the adoption in 2007 of a statement of concern on ocean fertilization, in 2008 the Parties adopted Resolution LC-LP.1 (2008) on the Regulation of Ocean Fertilization. The preamble to that Resolution notes that 'knowledge on the effectiveness and potential environmental impacts of ocean fertilization is currently insufficient to justify activities other than legitimate scientific research'. The Resolution states that parties agree that ocean fertilization activities fall within the scope of the LCLP (para 1) and states that Parties:

> Agree that, given the present state of knowledge, ocean fertilization activities other than legitimate scientific research should not be allowed. To this end, such other activities should be considered as contrary to the aims of the Convention and Protocol and not currently qualify for any exemption from the definition of dumping in Article III.1(b) of the Convention and Article 1.4.2 of the Protocol. (para 8) (emphasis added)

This Resolution, which we are instructed was agreed by consensus, relates to parties to both the LC and LP.

24. In 2010, referring back to the 2008 Resolution, Parties adopted an Assessment Framework for Scientific Research Involving Ocean Fertilization (LC-LP.2(2010)). We note that the 2010 Resolution states that: "Contracting Parties should use the Assessment Framework to determine, with utmost caution, whether a proposed ocean fertilization activity constitutes legitimate scientific research that is not contrary to the aims of the London Protocol or the London Convention." The Resolution also affirms that the LCLP:

> should continue to work towards providing a global, transparent, and effective control and regulatory mechanism for ocean fertilization activities and other activities that fall within the scope of the London Convention and the London Protocol and have the potential to cause harm to the marine environment, particularly in light of the progress made with this resolution, resolution LC-LP.1(2008), and the Assessment Framework

25. In 2013 Parties adopted Resolution LP4(8) on the amendment to the London Protocol to regulate the placement of matter for ocean fertilization and other marine geoengineering

[13] See page 11.

activities (inserting a new article 6bis[14] and new annexes 4 and 5). The Resolution reiterates ongoing concerns about the environmental impacts of ocean fertilization activities and states that the precautionary approach is to be applied in implementing the LCLP. The Resolution expresses concern about potential widespread, long-lasting or severe impacts on the marine environment of unregulated ocean fertilization activities and 'other proposed marine engineering techniques'. The Resolution refers to CBD Decisions X/33 and XI/20. The Resolution then prohibits the placement of matter into the sea from vessels, aircraft, platforms or other man-made structures at sea for marine geoengineering activities listed in a new Annex 4, unless the listing provides that the activity or the sub-category of an activity may be authorized under a permit.[15]

26. These amendments have not yet come into force. Resolution LP 4(8) reaffirms that resolutions LC-LP.1 (2008) and LC-LP.2(2010) continue to apply for all Contracting Parties, pending the entry into force of the amendments to the London Protocol (para 2) and that the scientific assessment framework to be adopted under Annex 4 is the scientific assessment framework adopted in LC-LP.2 (2010) (para 3).[16]

27. It follows from the Resolutions in our view that that Parties have agreed that the moratorium and assessment framework already exists within the LC/LP in the form of resolutions which refer back to the objectives of the LCLP. The 2010 Resolution states that Parties:

> REAFFIRM that for activities, including ocean fertilization research activities, that fall within the scope of Article III(1)(a) of the London Convention or Article 1.4.1 of the London Protocol, and are not otherwise exempted from being "dumping", placement of matter for a purpose other than the mere disposal thereof which is contrary to the aims of the London Convention or the London Protocol does not fall within the

[14] New Article 6bis provides: "1 Contracting Parties shall not allow the placement of matter into the sea from vessels, aircraft, platforms or other man-made structures at sea for marine geoengineering activities listed in annex 4, unless the listing provides that the activity or the subcategory of an activity may be authorized under a permit. 2 Contracting Parties shall adopt administrative or legislative measures to ensure that the issuance of permits and permit conditions comply with provisions of annex 5 and takes into account any Specific Assessment Framework developed for an activity and adopted by the Meeting of the Contracting Parties. A permit shall only be issued after the activity has undergone assessment which has determined that pollution of the marine environment from the proposed activity is, as far as practicable, prevented or reduced to a minimum. A permit shall only be issued if the outcome of the assessment is that the activity is not contrary to the aims of the Protocol. 3 Article 4 does not apply to activities listed in annex 4."

[15] The Parties have also addressed Carbon Capture and Storage (CCS) and prohibited the disposal of CO2 in the water column.

[16] http://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/London-Convention-London-Protocol-(LDC-LC-LP)/Documents/LP.4(8).pdf

exemption under Article III(1)(b)(ii) of the London Convention and Article 1.4.2.2 of the London Protocol and should be regarded as "dumping"; (para 6) (emphasis added)

28. Notwithstanding the fact that the amendments to the LCLP have not yet come into force, there is a strong argument in our view that the restrictions laid down in the 2008 Resolution on ocean fertilisation constitute a subsequent agreement and/or practice as to the interpretation of the LC/LP within the meaning of Vienna Convention on the Law of Treaties (**VCLT**) Article 31(3)(a) and/or (b) and that the LCLP should be interpreted as restricting ocean fertilization activities as contrary to the aims of the LCLP within the terms laid down in the 2008 Resolution and as reaffirmed and elaborated in the 2010 Resolution.[17]

29. We note that the 2008 Resolution begins by recalling the objectives of both the Convention and the Protocol:

> Contracting Parties shall individually and collectively promote the effective control of all sources of pollution of the marine environment, and pledge themselves especially to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea."(Article II of the London Convention).
>
> Contracting Parties shall individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter. Where appropriate, they shall harmonize their policies in this regard. (Article 2 of the London Protocol).

30. Taking into account the CBD COP IX/16 to which the 2008 LCLP Resolution refers, and CBD Decisions X/33 and XI/20 to which the 2013 LCLP Resolution refers, there is a strong argument in our view that these LCLP Resolutions effectively implement a moratorium alongside a monitoring and assessment framework, even prior to the ratification and entry into force of the amendments to the LCLP.

[17] In an article entitled "Update on the London Protocol" the authors, who apparently include the former Head of the London Convention/Protocol and Ocean Affairs at the International Maritime Organisation conclude that ocean fertilisation activities, other than for research purposes within the assessment framework and permitting conditions, are now prohibited.

31. This understanding appears to be supported by statements by state parties, including a statement from Canada set out in a report of the Governing bodies to the LC-LP in 2018 that it would be using the ocean fertilisation assessment framework (OFAF) adopted under the Convention and the two decisions to evaluate whether legitimate scientific activity was taking place.[18] Likewise, a report from Korea to a meeting of the scientific groups of the LC-LP states that while the amendment is not in force "resolution LC-LP.2 (2010) applies." [19] There do not appear to have been any opposing statements.

32. Subsequent LC/LP decisions have reaffirmed the position and established further procedures for determining what can be considered legitimate scientific research. In 2014 arrangements were made for establishing a roster of independent experts on marine geoengineering and guidance for the consideration of marine geoengineering activities was approved.[20] There have also been statements of concern relating to projects in the Galapagos Islands and off the coast of Canada (in relation to the Oceaneos project).[21] In 2015 the Parties established a working group on marine geoengineering (WG41).

33. Accordingly, an ocean fertilization activity may only be considered for a permit if it is assessed as constituting legitimate scientific research, taking into account any specific placement assessment framework. Such a framework is provided in a new Annex 5. That assessment framework provides that Parties should consider any advice on proposals from independent international experts.

34. This framework signals concerns about geoengineering which have implications beyond the marine environment in our view. The LCLP framework indicates the use of caution, prohibition and science-based assessment in relation to a relatively new set of technologies. From a legal perspective, this supports the relevance and importance of the principles of international environmental law discussed in **Section III** below.

[18]Report of the governing bodies of the LC-LP from November 2018 (LC 40-16 Para 5.14).
[19] See cover sheet, information paper to the meeting of the Scientific Groups to the LC-LP in March 2017 (LC/SG 40/INF.4) The project referred to in the report was suspended, presumably following application of the framework.
[20] http://www.imo.org/en/MediaCentre/MeetingSummaries/LCLP/Pages/LC-36-LP-9.aspx (see para 5.16)
[21]http://www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/geoengineering/OceanFertilizationDocumentRepository/OceanFertilization/Pages/default.aspx

35. The issue of the relationship of these rules with the UNFCCC/PA regime remains important as there may be more pressure to deploy these marine technologies as the climate crisis deepens. This is addressed in in **Section IV**.

36. Rules and standards established under the LCLP are considered to be relevant for the implementation of UNCLOS.[22] The wider relevance of UNCLOS is not addressed in this analysis but the principles laid down in Part XII and XIII of that Convention are clearly central to the regulation or restriction of marine geoengineering.

The Montreal Protocol

37. As pointed out in the 2012 CBD Regulatory study[23] (section 3.5), the injection of aerosols could fall within the scope of the Vienna Convention/Montreal Protocol. The authors suggest that the Vienna Convention provides a basis for regulating rather than banning geoengineering, whereas the use of certain ozone depleting substances (**ODS**) for example in aerosol injection could be restricted under the Montreal Protocol (para 115). There seems to be some doubt among legal commentators as to whether the Montreal Protocol specifically regulates any of the chemicals likely to be used in stratospheric aerosol injection.[24]

38. A 2019 note by the MP Secretariat, prepared for the Open-Ended Working Group on the Montreal Protocol,[25] refers in turn to the 2018 quadrennial report of the Scientific Assessment Panel (SAP):

> The report states that intentional, long-term geoengineering applications[26] that substantially increase stratospheric aerosols with the aim of mitigating global warming by reflecting sunlight *would alter the stratospheric ozone layer*. The report further states that, although the estimated magnitude and even the signs of changes in ozone levels are uncertain in some regions, *a significant increase of the stratospheric sulfate aerosol burden would delay the recovery of the Antarctic ozone*

[22] UNEP/CBD/SBSTTA/16/10 p4.
[23] Secretariat of the Convention on Biological Diversity (2012). Geoengineering in Relation to the Convention on Biological Diversity: Technical and Regulatory Matters, Montreal, Technical Series No. 66, 152 pages. Part II: The Regulatory Framework for Climate-related Geoengineering Relevant to the Convention on Biological Diversity.
[24] *Solar Engineering and International Law*, Daniel Bodansky, Governance of the Deployment of Solar Engineering, Harvard Project on Climate Agreements, February 2019, page 120.
[25] Dated 3 April 2019, UNEP OzL.Pro/WG.1/41/2.
[26] The Report makes it clear that it is referring to SRM when it refers to geoengineering, see main report section 3.4.3.3 and see Chapter 6.

hole. Moreover, *less is known about the effects on ozone of geoengineering solutions that use non-sulfate aerosols* (para 25, emphasis added)

39. In the 2018 report of the MP Environmental Effects Assessment Panel (EEAP),[27] it is stated that:

> Recent studies have concluded that, despite progress in understanding the potential environmental, political, and societal risks and benefits of solar geoengineering, the current state of knowledge remains insufficient for conducting a comprehensive assessment that would be required for making future decisions on deployment…(page 58)

40. The EEAP is less comprehensive than the SAP Report and assesses only the effects on UV radiation (page 58). The Report also states:

> New threats might include "geoengineering" activities proposed to combat the warming caused by greenhouse gases…which could have consequences for UV radiation reaching the Earth's surface. In particular, proposals to inject sulfuric aerosols into the stratosphere to reduce solar radiation at the Earth's surface...would likely have important side effects for stratospheric ozone and UV radiation. Sulfate aerosols could accelerate stratospheric ozone loss if substantial amounts of ODSs remain in the atmosphere. (page 17)

41. The EEAP highlights uncertainties as to the impacts of SRM, for example:

> Conclusions that plant productivity will be enhanced by projected increases in diffuse solar radiation resulting from manipulating aerosol levels in the atmosphere to reduce climate change…must be viewed with a high degree of uncertainty because they will depend on the geographic location, on the extent of the reduction in incident irradiance, and whether the increased canopy light-use efficiency from diffuse radiation is sufficient to offset this and persist in the long term (page 182)

42. From a legal perspective, certain findings of these reports appear to be relevant:

    - The science indicates that there is a potential adverse impact from SRM on the fulfilment of the objectives of the MP;

[27] EEAP. 2019. *Environmental Effects and Interactions of Stratospheric Ozone Depletion, UV Radiation, and Climate Change. 2018 Assessment Report.* Nairobi: Environmental Effects Assessment Panel, United Nations Environment Programme (UNEP) 390 pp. https://ozone.unep.org/science/assessment/eeap

- There appears to be particular concern as to the potential impact of a significant increase in the stratospheric sulfate aerosol burden on the recovery of the Antarctic hole on the ozone layer (delaying that recovery);
- There is uncertainty as to extent and nature of specific impacts of SRM;
- This is an issue that falls within the scope of concern of parties to the MP;
- This issue should continue to be assessed and monitored by the SAP/EEAP.

43. To the extent that there remains scientific uncertainty as to scale or nature of the impacts of SRM on the protection of the ozone layer, the precautionary principle will be relevant, bearing in mind that both the Convention and the MP refer to 'precautionary measures' in their Preambles. In the 2008 Doha Declaration, the parties reaffirmed the importance of precaution when they stated:

> *Cognizant of the fact* that safeguarding the ozone layer will require continued global commitment, a sustained level of scientific research and monitoring and the taking of precautionary measures to control equitably total global emissions of substances that deplete the ozone layer…

44. Some commentators argue that climate impacts pose greater direct health risks than those posed by from stratospheric aerosols:

> The direct health risks arising from increased particulate matter and decreased stratospheric ozone from stratospheric aerosols are small – one or two orders of magnitude less than climate impacts/benefits. If, for example, stratospheric sulfate aerosol injection was adjusted to produce the same RF as is produced by tropospheric sulfate aerosol pollution, the mortality from the stratospheric sulfates would be roughly 1,000-fold smaller (Eastham *et al.* 2018).[28]

45. However, in our view that is not the right comparison. Two key issues are whether, in the light of the framework laid down in the UNFCCC/PA, and the principles laid down both in the international climate regime and in customary international law, there are (1) alternative ways of addressing the threat of climate change which do not carry the same environmental and other risks as SRM and (2) the use of geoengineering, including SRM, would actually undermine the steps needed to meet international climate goals, primarily the rapid

[28] The Science and Technology of Solar Geoengineering: A Compact Summary, David Keith and Peter Irvine (Harvard Climate Project), page 21.

reductions of emissions, by locking in fossil fuel use and infrastructure and risking overshoot (see further **Section IV**).

46. There are also clear human rights implications arising from the decision of whether or not to address SRM in the MP, in particular because of the health impacts of delaying recovery of the ozone layer. Many commentaries refer to the importance of cost benefit analysis for key states. A recent article states that:

> In terms of the ‘‘human face’’ of the [MP's] achievements, up to 2 million cases of skin cancer maybe prevented each year by 2030; 283 million cases of skin cancer avoided for those born between 1890 and 2100 in the US, 8.3 million being melanoma; 1.6 million deaths from skin cancer prevented; and 46 million cases of cataract prevented according to the United States Environmental Protection Agency…[29]

47. As discussed below, the cost benefit arguments in relation to geoengineering are more complex but they cannot displace the need to respect international human rights standards or a full analysis of the alternatives available for addressing the threat of climate change, in line with the framework laid down in the PA (see **Section V**).

48. The Parties agreed in 2019 that the 2022 report of the Scientific Assessment Panel should include an assessment of information and research related to SRM and its potential effect on the stratospheric ozone layer.[30]

49. Given the findings of the 2019 report that geoengineering techniques may pose risks to the recovery of the ozone layer, and given that state parties have agreed to address the implications of SRM/geoengineering in the 2022 scientific assessment, there appears to be a strong argument that the caution applied to geoengineering under the CBD and LCLP should also be applied under the MP. Interested states could push for greater transparency and precaution by those contemplating the development of such techniques, relying in particular on general duties of cooperation laid down in Article 2(2) of the Vienna Convention, which should inform the conduct of parties to the MP.

Legal Status of COP Decisions

[29] See *Montreal Protocol at 30: The governance structure, the evolution, and the Kigali Amendment*, Tina Birmpili CR Geoscience 350 (2018) 425-431

[30] UNEP/OzL.Pro.31/9/Add.1 Para 5 (g)

50. In this context, it is relevant to consider the legal strength of COP decisions for enforcing a ban or moratorium on geoengineering technologies. HBF and its allies refer to the CBD and LCLP decisions as de facto moratoriums and have pointed out that they were adopted as consensus decisions; they have also been cited by NGOs and others in advocacy against proposed geoengineering projects.[31]

51. There is an ongoing debate as to the legal nature of COP decisions in multilateral environmental fora, but they are generally viewed as soft law which, whilst playing an increasingly important role both in operationalising MEAs and in increasing political pressure on states to adopt legal binding measures, are not of themselves binding instruments.[32]

52. Some commentators have pointed to the practical or functional effect of moratoria and their use as a policy tool in order to freeze the status quo without prejudice to the final settlement of the subject matter in question.[33] Some have pointed to the increasing importance of soft law, arguing that traditional custom/treaty distinctions are "no longer adequately capturing the subtlety of the processes by which contemporary international law can be created and can influence state behavior (sic)".[34]

53. It is important in our view to distinguish two issues: (a) whether a COP decision is legally binding per se, and (b) whether a COP decision is non-binding as such but produces some legal effect, for example as an authoritative interpretation of provisions of the treaty under which it was adopted, or as representing subsequent agreement or practice such as to constitute agreement on interpretation, and/or as a matter to which parties must have regard in implementing obligations under the treaty in question.

[31] See for example the Lohafex project https://www.nature.com/news/2009/090114/full/news.2009.26.html ; the Haida Gwai project https://www.theguardian.com/environment/2012/oct/15/pacific-iron-fertilisation-geoengineering.

[32] The leading article is J.Brunnée, 'Coping with Consent: Law-making under Multilateral Environmental Agreements', 15:1 *Leiden Journal of International Law* (2002), 1, to which many others have responded.

[33] *Moratorium in International Law* Wenqiang Yin 11 Chinese Journal of International Law (2012), 321–340 and *Moratoria for Global Governance and Contested Technology: The Case of Climate Engineering* Megan M. Herzog & Edward A. Parson (March 20, 2016). UCLA School of Law, Public Law Research Paper No. 16-17, Available at SSRN: https://ssrn.com/abstract=2763378.

[34] The Role of the United Nations Environment Assembly in Emerging Issues of International Environmental Law Franz Xaver Perrez Sustainability, MDPI, 15 July 2020, page 4, citing Boyle, A. Some Reflections on the Relationship of Treaties and Soft Law. Int. Comp. Law Quart. 1999, 48, 901–913.

54. Under the VCLT, a treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose (Article 31(1)). Under Article 31(3) VCLT there shall be taken into account, together with the context:

> (a) Any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions;
>
> (b) Any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation;…

55. In ICJ *Whaling in the Antarctic, Australia and New Zealand (intervening) v Japan*[35], the issue of the legal effect of Resolutions of the International Whaling Commission (**IWC**) was raised by the Parties in the context of lethal sampling of whales conducted under special permit. Australia argued that IWC Resolutions constituted subsequent agreement regarding interpretation of the International Convention on the Regulation of Whaling (**ICRW**) and/or subsequent practice indicating subsequent agreement as to the interpretation of Convention within the meaning of Article 31(3)(a) and (b) of the VCLT (see para 79 of the judgement).

56. The Court did not accept this argument on the basis that not all the IWC Resolutions relied upon had been adopted by consensus but it did find that, as Parties had a duty to cooperate under the ICRW (which both sides accepted), state parties had a duty to have regard to such resolutions when issuing permits for whaling for scientific purposes (para's 83 and 137). Although the Court's findings are specific to the ICRW and the facts of that case, this illustrates that non-binding decisions of treaty bodies can have legal effects under international law.

57. On that basis, a COP decision or other soft law resolution may contribute to a normative shift in state behaviour but unless it constitutes subsequent practice or agreement (which is unlikely if the issue is heavily contested) it will not have any binding legal effect.

58. The growing recognition of the normative influence of soft law decisions of treaty bodies (leaving aside their legal implications as outlined above) confirms that in a contentious area with recognised serious risks, such as geoengineering, the duty of cooperation which applies to all parties to a multilateral treaty may endow these COP decisions, and future similar decisions, with a normative importance. The duty to cooperate is expressly laid down in Article

[35] See ICJ GL No 148, ICGJ 471 (ICJ 2014), 31st March 2014, International Court of Justice [ICJ].

5 of the CBD and appears in many other MEAs and other agreements. Until parties can agree on whether or not the deployment of geoengineering technologies can be justified, taking into account the significant risks that they pose, the adherence to a moratorium as indicated in the COP Decisions adopted under the CBD and LCLP referred to above may be the only feasible expression of their duty to cooperate with each other in good faith.[36]

59. **Field trials and tests**: There have been different proposals for determining what geoengineering related research might be prohibited, permitted and/or regulated, including the use of thresholds and an indoor/outdoor divide, whilst others have asserted that testing of geoengineering is impossible without full-scale deployment.[37]

60. As noted above, CBD Decision X/33 makes a limited exception to the general prohibition of climate-related geo-engineering activities that may affect biodiversity, for the conduct of:

> small scale scientific research studies that would be conducted in a controlled setting in accordance with Article 3 of the Convention, and only if they are justified by the need to gather specific scientific data and are subject to a thorough prior assessment of the potential impacts on the environment

61. The reference to Article 3 of the CBD indicates that a 'controlled setting' must remove the risk that the activity will cause harm to the environment of other States or of areas beyond the limits of national jurisdiction. The 2012 CBD Regulatory study notes that it may be difficult to draw a clear distinction between field trials for research, and deployment and states that 'if research occurs at a scale that doesn't impact the global climate, then it actually falls outside the proposed definition of geoengineering' (page 141). However this assertion should be read in the light of the restrictions laid down in CBD Decision X/33 and the decisions adopted under the LCLP.

62. A number of current projects and trials appear to raise questions as to their consistency with CBD Decision X/33, as well as other standards and laws. Pending detailed analysis of specific cases, the framing of the limited exception in CBD X/33 raises a number of issues which appear to be relevant to these projects.

[36] See the examples of a similar approach in fields ranging from nuclear disarmament to deep sea mining in Yin cited above.
[37] See the discussion in *Geoengineering as collective experimentation*, Jack Stilgoe, Sci Eng Ethics (2016) 22:851–869, pages 858-860.

63. In order to fall within the exception laid down in CBD X/33, it is evident that the research study must have a clear research objective and must be justified by the need to gather specific scientific data. Any proposed action which is not being conducted with a genuine scientific research objective but simply in order to pave the way for future deployment of the technology in question would not appear, in our view, to fall within the exception (although it may be difficult to establish the motive for the activity if a plausible research objective is presented).

64. Any action which is based on commercialisation of the technology or considerations of profit and/or which is not genuinely designed to gather scientific data which could not otherwise be obtained would not in our view meet the requirements of CBD Decision X/33. This appears to be a concern raised in relation to some recent projects.

65. Furthermore, if there is evidence that computer modelling would be an alternative or even more effective way of meeting the research objective, then the action would not in our view fall within the exception. This issue has been raised in relation to the SCoPEx proposal.[38]

66. CBD Decision X/33 also refers to the need for the study to be 'small scale'. This is not precise language but it opens the way to challenge any study which may have significant impacts or impacts which extend across a wide area, or perhaps extend for a significant duration. Some of the projects to which we have been referred appear to be of a scale that would be unlikely to meet this requirement, such as the outdoor testing conducted for the Arctic Ice Project which is reported to have covered an area of 17,500 m2 in 2017 and 15,000 m2 in 2018.

67. Similarly the phrase 'controlled setting' indicates a setting which, amongst other elements, limits the impacts of the study to a defined and small area. The reference to a controlled setting implies that inputs into and influences on an experiment can be regulated and monitored and that any risks associated with the experiment can be contained within the experiment area. The implications of these requirements for projects in the marine environment, for example, may be significant, bearing in mind the reference to Article 3 of

[38] David Battisti, atmospheric scientist at the university of Washington and David Santillo in https://www.nytimes.com/2017/04/18/magazine/is-it-ok-to-engineer-the-environment-to-fight-climate-change.html

the CBD in CBD X/33, in particular as Article 3 reflects principles of customary international law (as discussed below). A key issue is whether the setting is sufficiently contained or controlled to remove the risk of harm to the environment of other states or to areas beyond national jurisdiction. This may be a particular issue in relation to marine projects or those taking place in the stratosphere.

68. Article 3 of the CBD provides:

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, *and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction*. (emphasis added)

69. The principle that this provision reflects is considered further in **Section III** below. A state authorising a geoengineering project in the form of a research study would need to be able to demonstrate that it had had regard to this duty, given the nature of the risks posed by the geoengineering technology in question and the environment affected.

70. CBD Decision X/33 also requires any study to be to subject to a thorough prior assessment of the potential impacts on the environment. This is both important and, so far as we understand the position, challenging in the context of geoengineering experiments, where potentially affected stakeholders may be at a great physical distance from experiment sites, and where the criteria for discerning impacts against natural background variation would need to be considered carefully and with a strong precautionary lens. It appears that concerns have been raised in this regard in relation to a number of recent or proposed projects. Clearly such an assessment would need to conform to international standards of transparency in order to be shown to meet the requirement for thoroughness.

71. Given the strict conditions for research studies laid down in CBD Decision X/33 and the LCLP Resolutions (and the pending amendments) it is important in our view to retain explicit language in any future definition which seeks to support a ban/restrictions on deployment. If small scale field trials are to be exempted from control, taking into account the overall environmental and other objectives of the treaty in question, **the exemption should be tightly drawn in order to prevent this becoming a loophole in the ban or restriction.**

III: The implications of customary international law for the development and use of geoengineering technologies

72. In CBD Decision XI/20, parties noted that:

> …the application of the precautionary approach as well as customary international law, including the general obligations of States with regard to activities within their jurisdiction or control and with regard to possible consequences of those activities, and requirements with regard to environmental impact assessment, may be relevant for geoengineering activities but would still form an incomplete basis for global regulation (para 11)

73. A number of principles of customary law appear particularly relevant to geoengineering activities (human rights law is considered in **Section V** below). Some of these principles are also reflected in relevant treaties, including the UNFCCC/PA considered in **Section IV** below. These principles are described in the 2012 CBD Regulatory Study as forming an' incomplete basis for regulation'[39]. This is correct, in our view, to the extent that specific detailed rules are not laid down but these principles do provide an important and binding framework for assessing state conduct.

74. However, as already noted, the extent to which those principles simply require proper governance of geoengineering (see for example the judgment of the ICJ in *Pulp Mills* at para 197) rather than an outright ban will be contested by different states. The case for a ban depends to a large extent on the evidence of the potential risks posed by geoengineering. This has implications for the extent to which a deployment might constitute a breach of an obligation within the terms of the ILC Articles on State Responsibility for Internationally Wrongful Acts.[40] As pointed out in the 2012 CBD Regulatory Study, these rules do not address explicitly the conditions under which geoengineering activities would be permitted, limited or prohibited.[41]

75. **Precaution**: The precautionary principle is clearly relevant to the legal implications of the development and use of geoengineering technologies (and is expressly referred to as precaution or 'utmost caution' in the CBD and LCLP decisions). There have been attempts to

[39] See pages 106 and 122.
[40] International Law Commission's Articles on Responsibility of States for Internationally Wrongful Acts, (Annex to UNGA Res. A/RES/56/83 of 12.12.2001)
[41] 2012 CBD regulatory study at page 102.

dislodge the precautionary principle in the geoengineering context. HBF and its partners take the view that proposed solutions (to the risk posed by climate change) which imply large and uncertain environmental risks require a precautionary approach. In our view that is correct. A June 2020 briefing to the Special Rapporteur on human rights and the environment, of which HBF is a co-author, notes that:

> Geoengineering intends to intervene in poorly-understood, dynamic and complex systems, such as climate and ocean ecology. Interventions could go awry because of mechanical failure, human error, incomplete knowledge and climate data, unpredictable synergic effects, natural phenomena (such as volcanic eruptions, earthquakes and tsunamis), trans-boundary impacts, change in political regime or funding failures, among others…

The briefing also notes that geoengineering may cause irreversible adverse changes:

> We know that many tipping points in the global climate system will be irreversible. For instance, no amount of "negative emissions" is likely to help to refreeze the Arctic. The same concept of irreversible tipping points applies to the application of geoengineering technologies which may cause irreversible ecological or social damage. In particular, so-called "termination shock" …would carry grave impacts to biodiversity and the livelihoods of communities, should we deploy SRM while continuing to emit fossil fuel emissions. (Robock, 2018, Trisos *et al,* 2018) Similarly, large scale land conversion to provide biomass for a global scale application of BECCS would, once undertaken, be irreversible within any meaningful time-frame... [42]

76. These two major concerns: the uncertainty as to the impacts of geoengineering on complex planetary systems, and the irreversibility of those potential impacts clearly make the precautionary principle relevant in our view, taking into account Principle 15 of the Rio Declaration.

77. A key issue which arises in the context of applying the precautionary principle, and indeed the preventive principle (see below), to geoengineering is the extent to which the aim of

[42] See https://www.ohchr.org/EN/Issues/Environment/SREnvironment/Pages/HealthyEcosystems.aspx website, the link to the specific submission is https://www.ohchr.org/Documents/Issues/Environment/SREnvironment/Call/NGOs/BiofuelwatchETCHeinrichB%C3%B6llInputs.docx.

preventing harm caused by climate change can be used to justify deployment of these technologies, this is considered in **Section IV** below.

78. In its judgment in *Pulp Mills,* the ICJ held that the application of precaution does not reverse the burden of proof.[43] Whether that applies in this context is unclear however, in our view, given that parties to both the CBD and the LCLP have emphasized the need for prior justification before any deployment or even the conduct of research studies, in view of the level of concern as to the impacts of these technologies.

79. Some commentators argue that general principles are insufficient to fill the governance gap in respect of technologies such as SRM, noting that:

> …one might also invoke precaution in the other direction. If the world is on a path to exceed a 3°C temperature increase (constituting likely risk of serious and irreversible harm), one might argue that the lack of full scientific certainty regarding solar geoengineering should not be used as an excuse for not taking action to prevent environmental degradation.[44]

80. In our view, it is important in this context to look at all the risks posed by a proposed deployment of geoengineering to address geoengineering. These include the risk that reliance on such technologies encourages or makes more likely the adoption of a pathway leading to 'overshoot' (exceeding the PA temperature goal before taking steps to bring the temperature back down towards the goal). It has been pointed out that the implications of overshoot are also uncertain:

> Probably, there are tipping points that will be reached once global warming approaches 1.7 to 1.9C, which will lead to irreversible effects triggering further consequences [17,52–54]. In addition, overshoot scenarios bear the strong possibility of triggering negative socioeconomic effects, comprising livelihoods and burdening future generations [55–57]. In addition, adapting to first increasing and then

[43] *Case Concerning Pulp Mills on the River Uruguay, Argentina v Uruguay*, Judgment on the merits, ICGJ 425 (ICJ 2010), 20th April 2010, United Nations [UN]; International Court of Justice [ICJ], see para 164 of the judgment.

[44] *Solar Geoengineering: Hard Issues and the Limits of Environmental Principles* Biniaz, Harvard Project on Climate Agreements at p. 116.

decreasing temperatures within a matter of decades puts a double-strain on biological diversity [58–60]. Furthermore, there may be biophysical restrictions…[45]

81. The risks posed by overshoot should also be considered in the light of the precautionary principle, including in relation to a climate justification presented for pursuing policies which are likely to result in overshoot. The legal implications of the climate justification for deployment of geoengineering are addressed below. Whether a given option for mitigating climate change should be pursued in spite of scientific uncertainty regarding its impacts cannot be assessed in a vacuum. It must be evaluated against alternative options, including those about which there is more scientific certainty (such as reducing fossil fuel production and use). The precautionary principle is particularly important in the event that there is a total or partial governance gap and is potentially legally significant in weighting alternatives so that less uncertain and or risky alternatives (such as a moratorium on fossil fuel extraction) might be recognised as preferable, being the less potentially harmful option. The obligation to conduct an environmental impact assessment where there is a risk that a proposed industrial activity may have a significant adverse impact in a transboundary context, in particular on a shared resource is an obligation under general international law, as confirmed by the ICJ in the *Pulp Mills* case[46] and is also important in this context and could potentially apply to the conduct of field trials which may have transboundary effects. Principles of precaution and prevention are highly relevant to the interpretation of legal regimes which seek to restrict geoengineering through decisions and resolutions.

82. One interpretation of the precautionary principle might be to require that activities and possibly substances that may be harmful to the environment be regulated, and possibly prohibited, even if no conclusive or overwhelming evidence is available as to the harm or likely harm they may cause to the environment. (Sands, 2018 p. 234).

83. We note that the inclusion of a reference to precaution in the Swiss proposal for a UNEA resolution on geoengineering proved controversial with some states, in particular the US, on

[45] See Jutta Wieding, Jessica Stubenrauch, and Felix Ekardt, Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios, Sustainability 2020, 12, 8858; doi:10.3390/su12218858, at page 5 (2020)

[46] See paragraph 204 of the judgment. See also the Court's observation in *Costa Rica v Nicaragua* that: Although the Court's statement in the Pulp Mills case refers to industrial activities, the underlying principle applies generally to proposed activities which may have a significant adverse impact in a transboundary context (para 104 of the judgment of 16 December 2015).

the basis that it might pre-empt the content of the report to be requested under the Resolution.[47] However the language of the CBD and LCLP decisions and the elements of uncertainty and irreversibility clearly make precaution relevant in this context in our view.

84. ***Best Available Science (BAS) and Precaution***: The legal implications of scientific uncertainty are framed by precaution as a principle applying under the UNFCCC/PA, and the LCLP, as well as many national and regional legal systems, together with legal requirements relating to risk assessment and the protection of human rights in situations where risks/scale of impacts are subject to uncertainty. The legal implications of an issue not being addressed, or addressed in depth, by the IPCC in its reports are that the BAS standard still applies to decision making relevant to state obligations in relation to climate change, whatever the source of the BAS.

85. However the IPCC has in fact highlighted the 'large uncertainties and knowledge gaps as well as substantial risks' facing the use of SRM measures as indicated above (paragraph 11). SRM measures are not included in any of the available assessed pathways.

86. In relation to CDR measures, the IPCC has indicated that there are uncertainties as to the potential contribution such measures might make to achieving climate goals. It has also indicated that there are substantial concerns as to the potential adverse environmental and social impacts of this range of technologies as discussed above (see para 11 above).

87. **The 2012 CBD Regulatory Study raises the issue of whether current treaties or a future governance regime could address negative impacts from geoengineering as 'net effects' whereby the negative impacts of the geoengineering activity are weighed against future negative impacts of climate change avoided by that activity (page 144). This approach needs to be treated with caution in our view as it could be used to sidestep the issue of inadequate use of or support for safer and less uncertain alternatives such as implementing the deep cuts in emissions envisaged under the PA, see further Section IV.**

[47] *The Role of the United Nations Environment Assembly in Emerging Issues of International Environmental Law* Franz Xaver Perrez Sustainability, MDPI, 15 July 2020, pages 12-13

88. **Duty not to cause Transboundary Harm**: In its Advisory Opinion on *the Threat or Use of Nuclear Weapons*, the ICJ referred to Principle 2 of the Rio Declaration and Principle 21 of the Stockholm Declaration and then stated:

> The Court also recognizes that the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control *is now part of the corpus of international law relating to the environment* [29] (emphasis added)

89. This principle is also reflected in Article 3 of the CBD, as set out above and to which CBD Decisions X/33 refers in the context of small-scale scientific research studies. The Preamble to the UNFCCC recalls that States 'have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction' (UNFCCC, Preamble para 8).

90. This duty is clearly relevant in the context of geoengineering activities which may cause damage to the environment of other states or to areas beyond the limits of national jurisdiction, including the atmosphere and the high seas. It is also relevant in relation to the risk that reliance on geoengineering will increase the likelihood (or even acceptance of) overshoot with the risks that that poses. As noted in the 2016 Update on Climate Geoengineering in relation to the CBD[48]:

> …the stabilization of concentrations of atmospheric greenhouse gases does not necessarily result in stability for all climate system components. *Any overshoot is therefore likely to have additional environmental consequences that may not be reversible on decadal to centennial timescales – and, if species extinctions are involved, irreversibility is absolute.* (para 108, page 50 emphasis added)

IV: The implications of the international climate change regime for the development and use of geoengineering technologies

91. We understand that those who advocate or envisage the use of geoengineering technologies to address the risks posed by climate change may proceed on the basis that the international

[48] Williamson, P., & Bodle, R. (2016). Update on Climate Geoengineering in Relation to the Convention on Biological Diversity: Potential Impacts and Regulatory Framework. Technical Series No.84. Secretariat of the Convention on Biological Diversity, Montreal, 158 pages

climate regime does not explicitly restrict their use, at least in relation to CDR.[49] Some have even suggested that SRM could form part of a state party's NDC.[50]

92. The development of the international climate regime is a matter governed by international law, and falls primarily to the state parties to the UNFCCC and the Paris Agreement, acting through the COP.[51] **The international climate change regime focuses on achieving deep reductions in greenhouse gas emissions. To that end, it makes explicit reference to the conservation of sinks and reservoirs (in particular forests). The regime does not, however, explicitly address geoengineering technologies. This does not mean, however, that the development and deployment of such technologies is not impacted by the application of the requirements of the existing legal rules and regime to prevent dangerous climate change. To the extent that there is evidence that the use of such technologies may undermine actions to cut emissions, lock in dependency on fossil fuels and/or have an adverse impact on the protection of sinks and reservoirs, it is strongly arguable that the deployment of such technologies runs counter to the aims and purposes of the UNFCCC/PA. This is all the more so in our view in light of current concerns as to the emissions and production gaps (see below).**

93. **Aim of UNFCCC/PA**: There is a range of views as to the extent to which the UNFCCC/PA regime addresses geoengineering. The 2012 CBD Regulatory Study (which predates the PA) notes that the objective of the UNFCCC is the **stabilisation of GHG emissions** which might include CDR but not SRM.[52] Neither Article 2 UNFCCC, nor the framing of the strengthened response objective laid down in Article 2 PA indicates in our view that geoengineering is required to meet these objectives. Furthermore, the emphasis on mitigation in both instruments indicates that geoengineering, <u>in particular SRM</u>, was not contemplated as a means of delivering the overall objectives. The PA's emphasis on mitigation is clear:

> recognizing that deep reductions in global emissions will be required in order to achieve the ultimate objective of the Convention and emphasizing the need for

[49] See Craik and Burns, Climate Engineering under the Paris Agreement: A Legal and Policy Primer, CIGI 2016, page 1 and footnote 2.
[50] Jessie Reynolds argues that state parties to the PA could incorporate solar geoengineering activities into their NDC and in their required adaptation plans, see Reynolds, Jesse L. (2019): Solar geoengineering to reduce climate change: a review of governance proposals. In Proceedings of the Royal Society A. Mathematical, physical, and engineering sciences 475 (2229), p. 20190255. DOI: 10.1098/rspa.2019.0255.
[51] See Article 16 of the PA.
[52] See page 127.

urgency in addressing climate change… (Preamble to Decision 1 CP.21, by which the UNFCCC Parties adopted the PA)

The key elements of the strengthened global response as regards mitigation are set out in Article 4(1) PA:

> In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with [BAS], so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty. (emphasis added)

94. The language of Article 4(1) PA clearly links rapid reduction of emissions with the achievement of what is referred to in shorthand as 'net zero' emissions, 'so as to achieve' the stated objective. We address the issue of removal by sinks further below, concluding that the more plausible view is that Article 5's focus on forests indicates that only natural sinks are envisaged. We note that the IPCC Glossary (see para 11 above) refers to CDR as a 'special type of mitigation'. In our view, this language does not detract from the emphasis on the rapid reduction of emissions in the PA itself nor does it constitute a legal interpretation of the language of the UNFCCC/PA. What is clear however is that the IPCC has indicated the concerns in the scientific community as to the potential adverse impacts of CDR, both in general terms and in relation to specific technologies.

95. Three key elements are reflected in the language and structure of the adopting Decision and in the substantive provisions of PA itself:
    a. the need for international cooperation in order to accelerate the reduction of global greenhouse gas emissions given the current significant emissions gap;
    b. the recognition that deep reductions in global emissions are required;
    c. the emphasis on the urgency of the need to close the emissions gap and meet the temperature goals in order to significantly reduce the risks and impacts of climate change.

96. Any policy or measure which undermines that imperative response to the threat of climate change may be said in our view to run counter to the PA. In so far as there is concern that

geoengineering (or specific technologies) risk undermining the international mitigation effort and/or causing other serious harm this should not be regarded as consistent with the PA. The level of caution adopted by the IPCC towards geoengineering is noteworthy in this context (see para 11 above).

97. The language of the PA and the context for its adoption (as reflected in the adopting Decision), together with the science presented by the IPCC and UNEP (see below), indicate that cutting emissions is intended as the primary means for delivering the climate change objectives, together with the conservation and enhancement of sinks and reservoirs so as to increase removals. We note that CBD Decision XI/20 emphasizes that:

> …climate change should primarily be addressed by reducing anthropogenic emissions by sources and by increasing removals by sinks of greenhouse gases under the [UNFCCC], noting also the relevance of the [CBD] and other instruments

98. Given the content of this and other decisions of the parties to the CBD this paragraph also indicates in our view that 'removals by sinks' refers to sinks which are natural processes (see further below).

99. There is therefore a strong argument in our view that SRM was not envisaged as a means to deliver the objectives in the adoption of the PA. The position may be more arguable as regards (some forms of) CDR, although the principles of precaution, BAS and human rights protection remain relevant to, and restrictive of, the conduct of CDR (see **Section III** above and **Section V** below). Furthermore the caution towards the inclusion of CDR, including BECCS, shown by the IPCC in its SR 1.5 Report confirms that deep emissions reductions and energy transition are indicated by the BAS as the primary means to achieve the PA goals.

100. ***Urgenda***: In this context we note that in relation to the potential role of technologies which remove CO2 from the atmosphere, the Hague Court of Appeal, giving judgment in the *Urgenda* case, held that:

> the Court assumes that the option to remove CO2 from the atmosphere with certain technologies in the future is highly uncertain and that the climate scenarios based on such technologies are not very realistic considering the current state of affairs. AR5 might thus have painted too rosy a picture, and it cannot be assumed outright that

the 'multiple mitigation pathways' listed by the IPCC in AR5 (p. 20) can lead to the 2º C target… (para 49, emphasis added)[53]

101. The Court of Appeal's judgment was subsequently upheld by the Supreme Court of the Netherlands which held on this point:

> AR5 does contain new scenarios to achieve by 2050 and 2100 the reductions in greenhouse gas concentrations deemed necessary. These are largely based on the premise that there will not be a sufficient reduction in greenhouse gas emissions and that the concentration of greenhouse gases will therefore have to be reduced by taking measures to remove these gases from the atmosphere (see 2.1(12) above). It is certain, however, that at the moment there is no technology that allows this to take place on a sufficiently large scale. Therefore, as the Court of Appeal held in para. 49, these new scenarios cannot be taken as a starting point for policy at this time without taking irresponsible risks by doing so. Taking such risks would run counter to the precautionary principle that must be observed when applying Articles 2 and 8 ECHR and Article 3(3) UNFCCC (see 5.3.2 and 5.7.3 above). It does not appear, therefore, that these new scenarios have been taken as a starting point for subsequent decisions at climate change conferences.[54] (para 7.2.5, emphasis added)

102. ***The Production Gap***: There is a further factor which provides important context for the interpretation of the PA and its implications for the use of geoengineering technologies. That context is the international recognition, taking into account the BAS on what is required to achieve the PA temperature goals, that there is not only an emissions gap (a failure to take sufficient steps to limit global warming in line with PA temperature goals) but also a 'production gap', in the sense that states continue to invest in oil and gas production that locks in fossil fuel use and, in this way, undermines the international effort to prevent dangerous climate change.

103. The first UNEP Emissions Gap Report, published in 2010, considered whether the pledges made by states were sufficient to limit global warming to 2 degrees or 1.5 degrees. The 2019 UNEP Emission Gap Report concluded that:

[53] Judgment of 9 October 2018 available at https://www.urgenda.nl/wp-content/uploads/ECLI_NL_GHDHA_2018_2610.pdf

[54] Judgment of 20 December 2019, English translation available at https://www.urgenda.nl/wp-content/uploads/ENG-Dutch-Supreme-Court-Urgenda-v-Netherlands-20-12-2019.pdf.

> The summary findings are bleak. Countries collectively failed to stop the growth in global GHG emissions, meaning that deeper and faster cuts are now required…
>
> …There is no sign of GHG emissions peaking in the next few years; every year of postponed peaking means that deeper and faster cuts will be required. By 2030, emissions would need to be 25 per cent and 55 per cent lower than in 2018 to put the world on the least-cost pathway to limiting global warming to below 2°C and 1.5°C respectively" (Executive Summary pp IV-V)[55]

104. In 2019 UNEP published its first Production Gap Report which assesses the discrepancy between government plans for fossil fuel production and global production levels consistent with 1.5°C and 2°C pathways. The Report states that:

> Governments are planning to produce about 50% more fossil fuels by 2030 than would be consistent with a 2°C pathway and 120% more than would be consistent with a 1.5°C pathway.[56]

In respect of oil and gas specifically, the Report finds that:

> Oil and gas are also on track to exceed carbon budgets, as countries continue to invest in fossil fuel infrastructure that "locks in" oil and gas use. The effects of this lock-in widen the production gap over time, until countries are producing 43% (36 million barrels per day) more oil and 47% (1,800 billion cubic meters) more gas by 2040 than would be consistent with a 2°C pathway.[57]

105. The UNEP Production Report notes that the: "global production gap is even larger than the already-significant global emissions gap, due to minimal policy attention on curbing fossil fuel production. The issue was again highlighted in the UNEP Production Gap Special Report of 2020 which found that:

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[55] In December 2020 UNEP published its most recent Emissions Gap Report which concludes that: 'Although 2020 emissions will be lower than in 2019 due to the COVID-19 crisis and associated responses, GHG concentrations in the atmosphere continue to rise, with the immediate reduction in emissions expected to have a negligible long-term impact on climate change', United Nations Environment Programme (2020). Emissions Gap Report 2020. Nairobi, Executive Summary at page XIV.

[56] SEI, IISD, ODI, Climate Analytics, CICERO, and UNEP. (2019). *The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C.* http://productiongap.org/. See Executive Summary at page 4.

[57] See Executive Summary at page 4.

> To follow a 1.5°C-consistent pathway, the world will need to decrease fossil fuel production by roughly 6% per year between 2020 and 2030. Countries are instead planning and projecting an average annual increase of 2%, which by 2030 would result in more than double the production consistent with the 1.5°C limit…This translates to a production gap similar to 2019, with countries aiming to produce 120% and 50% more fossil fuels by 2030 than would be consistent with limiting global warming to 1.5°C or 2°C, respectively…[58]

106. These findings have a number of implications for the assessment of whether the deployment of geoengineering technologies is consistent with the UNFCCC/PA:

- Any action by states which exacerbates the current production gap (and increases the risk of GHG emissions 'overshoot) by facilitating the lock in of fossil fuels through continued support for new fossil fuel production <u>on the basis of an expectation that this can be 'mitigated' by the future use of geoengineering technologies</u> should be avoided as a breach of good faith efforts to cooperate to achieve the goals of the PA[59] particularly where this increases the risk of overshoot;[60]
- Any state action which prioritises the deployment of geoengineering technologies, which pose potentially grave risks, over policies which promote the transition away from fossil fuel use and towards renewables which do not pose equivalent risks, is also open to challenge on the basis that this will frustrate the PA goals and is inconsistent with the principles of customary international law outlined in **Section III**;
- Any state action which promotes geoengineering technologies which may pose risks to human rights (see **Section V** below), particularly at the expense of alternative policies such as the promotion of renewables which do not pose such risks and the conservation of existing sinks and reservoirs, is likely to breach human rights laws and is inconsistent with indication in the Preamble to the PA that Parties should, when

[58] See The Production Gap Report: 2020 Special Report. http://productiongap.org/2020report, Executive Summary page 4.

[59] We note the concern raised in the June 2020 Briefing to the UN Special Rapporteur on human rights and the environment referred to above that geoengineering promotes climate inaction and diverts resources away from much needed mitigation and adaptation, citing *Fuel to the Fire: How Geoengineering Threatens to Entrench Fossil Fuels and Accelerate the Climate Crisis* CIEL 2019.

[60] Defined by the IPCC as the temporary exceedance of a specified level of global warming. See Jutta Wieding, Jessica Stubenrauch, and Felix Ekardt, *Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios*, Sustainability 2020, 12, 8858; doi:10.3390/su12218858, at pp. 9-10 (2020). The authors argue that the Paris Agreement does not allow for overshoot scenarios taking into account the wording of Article 2(1) PA.

taking action to address climate change, respect, promote and consider their respective obligations on human rights;

- Any state investment which diverts resources towards geoengineering and away from low emission technologies and renewables raises questions as to consistency of that action with the climate finance provisions of the PA, including Article 2(1)(c) and Article 9.

107. These issues should be approached on the basis of the underlying duties of the parties to the UNFCCC/PA, including the obligation to cooperate in good faith to address the threat of dangerous climate change and to act on the basis of BAS. The clear indication in Article 4(1) PA is that emissions are to be cut in order to meet the PA goals: emissions are to 'peak as soon as possible' (recognising that this will take longer for developing countries) with rapid reductions undertaken thereafter.

108. Further, the provision in the PA for Parties to act progressively (Article 3 and 4(3) PA) and on the basis of their highest possible ambition in making their nationally determined contribution to the achievement of the PA goals (Article 4(3) PA) tends to support the view that the priority is to be placed on reducing GHG emissions (and conserving sinks and reservoirs, see below), rather than on the deployment of technologies that might pose serious environmental, social and economic risks.

109. Notwithstanding the strong basis for doubting whether the actions outlined above are consistent with the UNFCCC/PA, it must be recognised that the lack of explicit language on SRM and other geoengineering technologies in the PA leaves open the issue of the lawfulness of their deployment. The IPCC has included certain CDR technologies its pathways, albeit that it has also expressed doubt as to their potential contribution and impacts (see para 11 above). We note that it is particularly important to obtain clarity in relation to SRM as the technology has immediate effects and is difficult to reverse. However the risks posed by the deployment of some CDR technologies are also significant and need to be addressed as indicated by the decisions taken in other fora (see **Section II)**.

110. A number of commentators seek to draw a distinction between the implications of CDR and SRM in the context of considering their implications under the PA. Others have stated that such technologies are not an alternative to mitigation of GHG emissions but rather:

must be implemented as part of a portfolio of responses that would provide greater efficiency and flexibility, as well as potentially avoiding some of the more severe impacts associated with large average temperature increases. Nevertheless, there remain concerns that the prospect of implementing climate engineering in the future will reduce the incentives for states to implement mitigation and adaptation measures (Craik and Burns)

111. The acceptance that geoengineering 'must be implemented' as part of a portfolio of responses is open to doubt in our view, for the reasons outlined above. We note the concerns raised as to the extent to which geoengineering technologies may lead to further lock-in of fossil fuel infrastructure, in a way that undermines the achievement of international climate goals:

> Geoengineering threatens this transition by entrenching the exact systems that need redesigning. Proponents and experts of CDR techniques acknowledge that the "main advantage of sequestration is its compatibility with existing fossil fuel *infra*structure."... SRM, in addition to posing enormous unknown risks, is acknowledged even by its supporters as a perfect excuse for inaction…[61]

112. In the context of the emissions/production gap, the legality of actions which maintain or exacerbate those gaps is a matter that needs to be considered. Actions which serve to reinforce policies that could undermine the achievement of the PA goals - by slowing transition to net zero, or locking in GHG emissions - fall to be addressed by reference to the principles of prevention, precaution and in conjunction with principles of equity and human rights. The inclusion of technologies which pose serious potential risks <u>in place of policies which do not</u> cannot be assumed to be a matter of simple choice under the UNFCCC/PA and other relevant international law in our view.

113. **PA references to 'sinks'**: The term 'sink' is used by the IPCC to refer to any process, activity or mechanism that removes a greenhouse gas (GHG), an aerosol or a precursor of a GHG or aerosol from the atmosphere (AR5 Glossary).[62]

[61] CIEL 2019 at page 10 and see sources cited therein.

[62] SR 1.5 Glossary provides the following definition: A reservoir (natural or human, in soil, ocean, and plants) where a greenhouse gas, an aerosol or a precursor of a greenhouse gas is stored. Note that UNFCCC Article 1.8 refers to a sink as any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.

114. The interpretation of the reference in Article 4 PA to 'removal by sinks', and the extent to which CDR technologies are within the scope of Article 4, falls to be considered in the light of the principles laid down in the PA as discussed above. Article 4 expressly provides for parties to act 'on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty'. In this context, the decisions on geoengineering adopted in other fora which also address sustainable development and equity such as the CBD and LCLP are clearly relevant.

115. It is arguable in our view that the conservation of sinks and reservoirs in Article 5 primarily refers to natural processes (see below). This also appears to be the way in which the phrase is used in CBD Decision XI/20 (see above). Article 5(1) of the PA provides that:

> Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1 (d), of the Convention, including forests.

There is also explicit emphasis on Article 5(2) on the sustainable management of forests and on the non-carbon benefits to be gained from such approaches.

116. Those who advocate greater deployment of at least some geoengineering technologies within the framework of the PA acknowledge that Article 5 may limit permitted CDR technologies to those related to natural processes.[63] The IPCC has defined CDR to include existing and potential anthropogenic enhancement of biological or geochemical sinks and direct air capture and storage, but excludes from the definition of CDR natural CO2 uptake not directly caused by human activities (IPCC SR 1.5 Glossary).

117. CBD Decision XI/20 refers to certain geoengineering techniques in para 5 in the context of reaffirming para 8(w) of CBD Decision X/33. It is therefore open to doubt that geoengineering techniques which fall within the scope of para 5 including: 'Deliberate intervention in the planetary environment of a nature and scale intended to counteract anthropogenic climate change and/or its impacts', fall within the scope of Article 5 of the PA. Inclusion of those techniques within the scope of the PA would bring techniques which pose a clear risk to biodiversity (taking into account paras 6 and 7 of CBD Decision II/20) within the

[63] Craik and Burns, Climate Engineering under the Paris Agreement: A Legal and Policy Primer, CIGI 2016, page 7.

scope of Article 5 PA, as those requiring 'conservation and enhancement' (see further on coherence below).

118. **It is clearly important in this context to have regard to duties arising under general international law and applicable international agreements which seek to protect and conserve the natural environment, including the CBD**. The parties to the UNFCCC/PA, most of whom are also parties to the CBD, are required to have regard to obligations of, and decisions adopted under, the CBD in respect of geoengineering (see **Section II** above).

119. A number of commentators take the view that SRM techniques do not fall within the definitions of 'sink' or 'emissions reduction at source', as they do not target the 'stabilization of greenhouse gas concentrations in the atmosphere' as required under the objectives of the UNFCCC.[64] In our view that appears to be correct in the light of the language of the UNFCCC/PA, and taking also into account the considerations outlined above as to the risks posed by SRM.

120. **ITMOs**: Article 6 of the PA addresses voluntary cooperation by parties in the achievement of their NDCs. Article 6(2) provides:

> Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes [**ITMOs**] towards [NDCs], promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties [**CMA**] to this Agreement.

121. Article 6(4) of the PA establishes 'a mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development' under the authority and guidance of the CMA for use by Parties on a voluntary basis. The mechanism is to be supervised by a body designated by the CMA. The aims of the mechanism are set out as follows:

[64] *Climate Engineering and International Law: Last Resort or the End of Humanity*? Gerd Winter RECIEL 20 (3) 2011. ISSN 0962 8797

(a) To promote the mitigation of greenhouse gas emissions while fostering sustainable development;

(b) To incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorized by a Party;

(c) To contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its [NDC];

(d) To deliver an overall mitigation in global emissions

122. The CMA is to adopt rules, modalities and procedures for the mechanism referred to in Article 6(4) (Article 6(7). We note that negotiations for these rules are ongoing.

123. HBF are concerned that proposed language for the implementation of Article 6(4) may pave the way for the inclusion of SRM within its scope. We are not asked to advise on specific language but, in our view, in framing the definition of Article 6(4) ERs, Parties will need to consider the scope of the PA and the issue of whether SRM constitutes mitigation within the meaning of the PA as discussed above, and taking into account the exclusion of SRM from the pathways presented by the IPCC.

124. In agreeing the language for a CMA decision on the rules, modalities and procedures for the mechanism established by Article 6(4) PA, Parties will need to have regard to the context of the regime as a whole, the BAS, as well as the specific requirements of Article 6(2), and taking into account the relevant rules of international law which apply between the Parties, having regard to the precautionary principle, BAS and existing human rights obligations, together with other relevant international principles (see **Sections II, III and V**). To the extent that there is any doubt, the Parties could clarify the matter by providing explicitly for the exclusion of SRM from the scope of Article 6 PA.

125. We note that whereas the June 2019 draft text[65] included bracketed provision for emission removals to be included within the scope of Article 6(4) ERs (in addition to emission reductions which were not bracketed), the December 2019 draft text states that the activity:

[65] DRAFT TEXT on SBSTA 50 agenda item 11(b) Matters relating to Article 6 of the Paris Agreement: Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement Version 2 of 26 June 15:30 hrs (edited) (June 2019) available at www.unfccc.int/documents

> …Shall be designed to achieve mitigation of GHG emissions, including, emission reductions, *increasing removals*, including mitigation co-benefits of adaptation actions and/or economic diversification plans (hereinafter collectively referred to as emission reductions) and not to lead to an increase in global emissions... (emphasis added)[66]

126. In agreeing the scope of Article 6(4) ERs, Parties will need to address the uncertainties and concerns raised in relation to CDR, including those set out by the IPCC as discussed above.

127. **The IPCC**: We note that the scale and deployment of CDR varies across different pathways presented by the IPCC and that the inclusion of CDR technologies in particular BECCs, has been a source of controversy.[67] The legal implications of scientific uncertainty as set out above in **Sections II** and **III** are that the precautionary principle is relevant both in the context of MEAs and as a matter of customary international law, and in relation to concerns as to adverse social and economic implications, human rights law is also relevant (see **Section V** below). In addition, the implications for delivery of the goals of the international climate change regime, as set out in this section, should be addressed.

128. In CBD Decision XI/20 it was noted that:

> … the [IPCC]… considers, in its Fifth Assessment Report, different geoengineering options, their scientific bases and associated uncertainties, their potential impacts on human and natural systems, risks, research gaps, and the suitability of existing governance mechanisms, [the Parties then requested] the Subsidiary Body on Scientific, Technical and Technological Advice to consider the Synthesis Report when it becomes available in September 2014 and report on implications for the [CBD] to the Conference of Parties.

129. In its SR 1.5, the IPCC notes that:

[66] DRAFT TEXT on Matters relating to Article 6 of the Paris Agreement: Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement Version 3 of 15 December 1:10 hrs, available at www.unfccc.int/documents.

[67] See the discussion in Beck S, Mahony M (2018). The politics of anticipation: the IPCC and the negative emissions technologies experience. Global Sustainability 1, e8, 1–8. https://doi.org/ 10.1017/sus.2018.7 at page 4 and the references therein.

All pathways that limit global warming to 1.5°C with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100–1000 GtCO2 over the 21st century. CDR would be used to compensate for residual emissions and, in most cases, achieve net negative emissions to return global warming to 1.5°C following a peak (*high confidence*). CDR deployment of several hundreds of GtCO2 is subject to multiple feasibility and sustainability constraints (*high confidence*)…

Significant near-term emissions reductions and measures to lower energy and land demand can limit CDR deployment to a few hundred GtCO2 without reliance on bioenergy with carbon capture and storage (BECCS) (*high confidenc*e). {2.3, 2.4, 3.6.2, 4.3, 5.4} (SPM C.3)

130. The IPCC has also stated:

CDR deployed at scale is unproven, and reliance on such technology *is a major risk in the ability to limit warming to 1.5°C.* CDR is needed less in pathways with particularly strong emphasis on energy efficiency and low demand. The scale and type of CDR deployment varies widely across 1.5°C pathways, with different consequences for achieving sustainable development objectives (high confidence). Some pathways rely more on bioenergy with carbon capture and storage (BECCS), while others rely more on afforestation, which are the two CDR methods most often included in integrated pathways. Trade-offs with other sustainability objectives occur predominantly through increased land, energy, water and investment demand. Bioenergy use is substantial in 1.5°C pathways with or without BECCS due to its multiple roles in decarbonizing energy use. {2.3.1, 2.5.3, 2.6.3, 4.3.7} (emphasis added)

…1.5°C pathways that include low energy demand (e.g., see P1 in Figure SPM.3a and SPM.3b), low material consumption, and low GHG-intensive food consumption have the most pronounced synergies and the lowest number of trade-offs with respect to sustainable development and the SDGs (high confidence). *Such pathways would reduce dependence on CDR*. In modelled pathways, sustainable development, eradicating poverty and reducing inequality can support limiting warming to 1.5°C (high confidence). (Figure

SPM.3b, Figure SPM.4) {2.4.3, 2.5.1, 2.5.3, Figure 2.4, Figure 2.28, 5.4.1, 5.4.2, Figure 5.4} (SPM D.4.2) (emphasis added)

…1.5°C and 2°C modelled pathways often rely on the deployment of large-scale land-related measures like afforestation and bioenergy supply, *which, if poorly managed, can compete with food production and hence raise food security concerns* (high confidence). The impacts of carbon dioxide removal (CDR) options on SDGs depend on the type of options and the scale of deployment (high confidence). *If poorly implemented, CDR options such as BECCS and AFOLU options would lead to trade-offs*. Context-relevant design and implementation requires considering people's needs, biodiversity, and other sustainable development dimensions (very high confidence). (Figure SPM.4) {5.4.1.3, Cross-Chapter Box 7 in Chapter 3} (SPM D.4.3) (emphasis added)

131. As a paper published by CIEL in 2019 has noted with respect to CDR, the IPCC has cautioned:

> …that the economic and technological uncertainties associated with these approaches, the long projected timelines for their deployment at any meaningful scale and the moderate to high likelihood of negative social and environmental impacts made reliance on these technologies inherently speculative. [68]

The CIEL report also notes that the IPCC has also expressed concern regarding climate models that rely heavily on BECCS, which faces profound uncertainties with respect to scalability, sustainability, and social acceptability. For similar reasons, SRM measures are not included in any of the available assessed pathways in the IPCC reports. As the human rights briefing of June 2020 notes, deploying BECCS 'would necessitate "massive displacements of land and people, with global implications for food supply, land rights, and environmental justice" (Beck & Mahony, 2017)'.

[68] Fuel to the Fire by CIEL https://www.ciel.org/news/fuel-to-the-fire-how-geoengineering-threatens-to-entrench-fossil-fuels-and-accelerate-the-climate-crisis/Fuel to the Fire see pages 6-8.

132. We also note that the IPCC did express caution as to the use of BECCS to address climate change and chose to highlight a non-BECCS scenario as its most ambitious scenario Pathway 1.[69] **The IPCC has thus indicated the 'major risk' in relying on CDR deployed at scale in the ability to limit warming to 1.5°C and referred to the uncertainties associated with the feasibility and impacts of deploying CDR, including BECCS (and even more so in the case of SRM which is not included in any of the available pathways (see para 12 above[70])**. **A critical question from a legal perspective will be to what extent alternative strategies (such as those outlined in SPM D.4.2) which present a greater chance of meeting the international temperature goal and pose less risk of harm and or of breaching relevant standards are available to parties**. This also raises the question as to the extent and scale of resources that are being committed, including by states, to alternative strategies which pose fewer risks and/or provide greater certainty as to their impacts. In addressing the technical and policy choices to be made in determining these issues, Parties will need to address the goals and requirements of the international climate regime together with international environmental and human rights regimes and principles which require precaution, the prevention of harm, assessment of risk and that human rights are respected, as discussed in this Opinion.

133. In 2018 the Parties to the LCLP referred to the IPCC special report on Global warming 1.5°C and noted that:

> The report stated that "*all pathways that limit global warming to 1.5°C with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100–1000 Gt CO2 over the 21st century*". Marine geoengineering was one of the ocean-based mitigation solutions addressed. The report also highlighted the London Protocol, stating that the treaty had "asserted authority for regulation of ocean fertilization, which is widely viewed as a "de facto moratorium" on commercial ocean fertilization activities."

134. A recent article discusses the implications of the IPCC adopting a 'solution oriented' approach to assessment:

[69] A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used. See also CIEL at page 31

[70] The impacts and uncertainties associated with CDR, both in general and in relation to specific technologies including BECCS and DACCS are examined in more detail in Chapters 2, 3, 4 and 5 of the SR1.5.

In AR3, the definition of geoengineering included carbon capture and storage (CCS). With AR4, the IPCC excluded CCS from the geoengineering group of options, and normalized it into mitigation options. With AR5, BECCS was included in the category of mitigation, and thus excluded from the category of geoengineering. In order to enable the models to limit temperature rise below 2 C, NETs were introduced toward the end of the century. IAMs in general and RCPs in particular have served to make NETS politically legible and actionable. IPCC performed an important legitimating function for the speculative technology of BECCS, pulling it into the political world, and making previously unthinkable notions—like overshoot and net zero emissions—more mainstream and acceptable, as well as perhaps pushing it ahead of alternative policy options (such as radical mitigation), and thus raising new questions about the neutrality of climate science (Beck & Mahony, 2018)...

…The RCP2.6 example demonstrates that the development of pathways is not simply about assessing scientific facts about the causes and trajectories of climate change. Projections of climate futures that provide the scientific ingredients of policy architectures are themselves based on, and products of, former political choices (Low, 2017). Pathways define the spectrum of political choices in the future by including options such as BECCS or excluding options such as nonovershoot pathways (Vervoort & Gupta, 2018). In this way, they are sites where future decisions about policy choices are anticipated and preempted, and perhaps prefigured.[71]

135. To the extent that the IPCC is shifting towards a solutions or policy based approach, the legal considerations set out above may need to be addressed directly, including the interpretation of the PA and other relevant agreements and principles. An analysis of international legal standards and principles could be helpful in assisting the IPCC in navigating these complexities. The legal standards and principles bind states in their decision-making on climate change under the UNFCCC/PA and other relevant agreements.

136. **Adaptation**: The IPCC has stated that SRM does not fall within the definition of adaptation.[72] In the event that it is argued that any other form of geoengineering constitutes adaptation within the scope of Article 7 of the PA it should be noted that the issues relating

[71] *The IPCC and the new map of science and politics* Silke Beck and Martin Mahony WIREs Clim Change. 2018;9:e547. wires.wiley.com/climatechange https://doi.org/10.1002/wcc.547 at page 8.
[72] IPCC SR 1.5 at page 558 (Glossary definition of SRM).

to the likely impact of the technology on mitigation action will have to be addressed (see above) together with the extent to which geoengineering is capable of meeting the conditions laid down in Article 7 of the PA including those set out in paragraph (5):

> Parties acknowledge that adaptation action should follow a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, with a view to integrating adaptation into relevant socioeconomic and environmental policies and actions, where appropriate.

137. **To the extent that geoengineering undermines or breaches PA duties and goals relating to mitigation, these technologies cannot be considered to fall within the scope of the provisions on adaptation laid down in the PA. Furthermore, the extent to which such techniques are capable of meeting the considerations laid down in paragraph (5) appears to be highly doubtful, as addressed below by reference to international human rights law.**

138. **Coherence**: In the light of the concerns outlined above and those raised in other fora including the CBD and LCLP, it will be important to ensure that decisions on geoengineering taken in other fora are respected when bodies/parties to the UNFCCC/PA take relevant decisions. This extends to decisions that address accounting for emissions and reduction of emissions, as well as those addressing the content of NDCs or finance flows.

139. The 2013 Resolution LP4(8) emphasises that ocean fertilization and other marine geoengineering activities 'should not be considered as a substitute for mitigation measures to reduce carbon dioxide emissions' (Preamble). That Resolution also notes the fact of 'ongoing work on geoengineering' within the IPCC and the Fifth Assessment Report.

140. The requirements for public participation and transparency under Articles 12 and 13 of the PA are also relevant to arguments in favour of increased scrutiny of geoengineering activity/investment, particularly to the extent that this diverts resources away from mitigation and adaptation measures expressly required under the PA.

141. **The decisions already adopted under the CBD, in particular Decision X/33, XI/20, and the LCLP Resolutions recognise serious concerns as to the potential impacts of geoengineering on biodiversity, including the marine environment, as well as on the rights of indigenous peoples and local communities**.

142. **A starting point for clarifying the legal position under the UNFCCC/PA could be a decision of the Parties which: (1) acknowledges the decisions taken under the CBD and LCLP (as well as any other relevant decisions or actions); (2) notes the caution expressed by the IPCC as to these technologies, and confirms that such technologies must not developed or deployed in any way which undermines the objectives of the PA or breaches other international regimes or principles of international law protecting the environment and or human rights law; and (3) affirms the relevance of precaution in the light of the findings of the IPCC**.

V: The implications of international human rights law and principles of public participation for the development and use of geoengineering technologies

Human Rights and Environment

143. Human rights law is clearly relevant to the issue of geoengineering and, in view of the risks posed to a range of rights including the right to health, the right to an adequate standard of living (including the right to food) and the right to a livelihood, supports a restrictive approach and potentially a moratorium. The right to life offers particularly strong protection as it is not subject to derogation. The recent adoption by the Human Rights Committee of a revised General Comment on the Right to Life (No 36) explicitly addresses risks posed by climate change and environmental issues; it confirms that international environmental law and human rights law are to be interpreted and applied in a mutually informed way.[73] Paragraph 62 provides that state obligations under international environmental law 'should thus inform the contents of article 6 [ICCPR], and the obligation of States parties to respect and ensure the right to life should also inform their relevant obligations under international environmental law.'

[73] See *A mutually informed approach: the right to life in an era of pollution and climate change* Kate Cook European Human Rights Law Review E.H.R.L.R. 2019, 3, 274-290

144. The range of rights which apply to a specific situation are likely to vary to a degree, depending on which technology is at issue and the risks it poses to specific interests, however it appears evident that a wide range of human rights are engaged by the potential impacts of geoengineering technologies. The current lack of regulation without doubt raises issues of compliance with human rights law.

145. Framing the issue as a matter of human rights law tends to reinforce anthropocentric values at the expense of ecological considerations. However recent human rights jurisprudence, including the 2017 Advisory Opinion of the Inter-American Court of Human Rights, has indicated that forests, rivers and seas could be protected in their own right, irrespective of known direct harms to particular individuals:

> The Court considers it important to stress that, as an autonomous right, the right to a healthy environment, unlike other rights, protects the components of the environment, such as forests, rivers and seas, as legal interests in themselves, even in the absence of the certainty or evidence of a risk to individuals. This means that it protects nature and the environment, not only because of the benefits they provide to humanity or the effects that their degradation may have on other human rights, such as health, life or personal integrity, but because of their importance to the other living organisms with which we share the planet that also merit protection in their own right… In this regard, the Court notes a tendency, not only in court judgments... but also in Constitutions… to recognize legal personality and, consequently, rights to nature. [74]

146. **Human Rights Bodies and Mechanisms**: The issue of geoengineering could be usefully addressed by a range of human rights bodies. We note that the Special Rapporteur on Human Rights and the Environment has made reference to geoengineering strategies involving the largescale manipulation of natural systems and cautioned against their use, given the lack of understanding as to their potentially significant impacts on human rights. In December 2018, independent experts including the UN Special Rapporteurs and Special Procedures Mandate holders presented a joint statement on climate change and human rights[75] to the 24th UNFCCC

[74] English translation available at elaw.org/system/files/attachments/publicresource/English%20version%20of%20AdvOp%20OC-23.pd. See discussion at https://www.asil.org/insights/volume/22/issue/6/inter-american-court-human-rights-advisory-opinion-environment-and-human

[75] https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=23982&LangID=E

COP, raising concern about the human rights implications of climate change. In September 2019, five human rights committees issued a joint letter on human rights and climate change.[76] Given the human rights implications of geoengineering and the implications of the UNFCCC/PA for the deployment of geoengineering, it would be useful for mandate holders to address these issues.

147. This issue is particularly urgent in our view given the apparent increase in experimental research. As we understand the position, a number of geoengineering projects are already announcing open air experiments including SCoPEx and Ice911 in the US, and Oceaneos in Chile and Peru. This trend also provides a concrete issue for the human rights bodies to engage with rather than the important but more theoretical (at present) risks posed by full deployment.

148. **Free, Prior Informed Consent (FPIC):** The principle of FPIC may be argued to be an element of other human rights and (to a degree) of other international treaty obligations. The Expert Mechanism on the Rights of Indigenous People (A/HRC/27/66) has noted that, in the context of disaster risk reduction (**DRR**):

> …it becomes clear that indigenous peoples are entitled to participate in disaster risk reduction processes and that States have the obligation to consult with them and to seek to obtain their free, prior and informed consent concerning risk reduction measures that may affect them …

The study goes on to state that:

> [FPIC] is of fundamental importance for indigenous peoples' participation in decision-making and establishes the framework for all consultations relating to projects affecting indigenous peoples, including in the area of [DRR]. The duty of States to obtain indigenous peoples' [FPIC] entitles indigenous peoples to effectively determine the outcome of any decision-making that affects them, not merely to a right to be involved in such processes.

149. Furthermore, there is a range of human rights jurisprudence which supports the argument that deployment of geoengineering must be subject to public consultation and consent, as well as principles of transparency, to the extent that human rights protections are potentially impacted. In the case of *Sarayaku v Ecuador*, (judgment of 27 June 2012) the Inter-

[76] https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=24998&LangID=E

American Human Rights Court (IACtHR) looked at cases decided in the Americas and elsewhere and concluded that the obligation to consult 'in addition to being a treaty-based provision, is also a general principle of international law.' (Para 164).

150. There is a good argument in our view that FPIC should inform the implementation of Article 7(5) PA, in so far as geoengineering can be characterised as adaptation, as some have argued. However in view of the risks posed by geoengineering technologies the wider issues of the legal implications of the UNFCCC/PA should be addressed first (see **Section IV** above).

151. **Land use change issues:** The current Special Rapporteur on Human Rights and the Environment has also highlighted the potential of poorly implemented CDR to displace other types of land use and to cause impacts on food security, biodiversity and human rights (and see the IPCC's observations cited at para 11 above).[77] This is an area that could usefully be addressed further in the CBD and the UNFCCC.

152. Geoengineering is an issue that should also be considered under the UN Guiding Principles on Business and Human Rights (**UNGP**), bearing in mind state's duties to:

> …protect against human rights abuse within their territory and/or jurisdiction by third parties, including business enterprises. This requires taking appropriate steps to prevent, investigate, punish and redress such abuse through effective policies, legislation, regulations and adjudication. (UNGP1)

153. The specific technologies that have the greatest potential impact on the specific rights of indigenous people as protected under Article 8(j) CBD in particular should also be considered, bearing in mind the focus on the potential impact on indigenous peoples and local communities in CBD Decision X/33.

154. **Emergency powers**: Declarations of a climate emergency, which may be said to be well justified in view of the scientific evidence presented by the IPCC and others, may potentially be used by some states and others to seek to justify the deployment of

[77] A/74/161 http://srenvironment.org/report/a-safe-climate-human-rights-and-climate-change paragraph 21 [Hereafter SR report on Safe Climate]

geoengineering, possibly in reliance on the use of emergency powers.[78] National laws and international human rights instruments make provision for derogations and exceptions to legal protections during emergencies. For example, Article 15 of the European Convention on Human Rights[79] (ECHR) provides:

> (1) In time of war or other public emergency threatening the life of the nation any High Contracting Party may take measures derogating from its obligations under this Convention to the extent strictly required by the exigencies of the situation, provided that such measures are not inconsistent with its other obligations under international law…
>
> (2) No derogation from Article 2, except in respect of deaths resulting from lawful acts of war, or from Articles 3, 4 (paragraph 1) and 7 shall be made under this provision…

155. In the context of geoengineering, Article 15 ECHR, Article 4 ICCPR, and similar provisions, may be relied upon by states to provide exceptional legal justification for removing human rights standards which would normally apply to the expropriation of land and requirements for impact assessment and public participation (property rights, access to information and the right to be consulted). These are areas which may be relevant to future state implementation of geoengineering strategies for afforestation, the use of SRM and so on. Pollution standards may also be disapplied so as to facilitate SRM or cloud seeding. States may seek to override protections arising from the risks to health posed by geoengineering (in particular SRM) by relying on emergency powers, although some rights, including in most cases the right to life, are not subject to the derogation powers. One key issue which may arise is whether such geoengineering measures which are characterised by the state as emergency measures are proportionate, given the existence of alternatives carrying fewer risks, and taking into account transboundary effects and implications.

156. It is important to note that in order to fall within the highly limited scope of Article 15 ECHR, measures need to be *strictly required* by the "exigencies" of the situation and must not be inconsistent with other international law obligations. Given that geoengineering technologies have impacts beyond the national level; that concern has been expressed about

[78] Winter considers this issue in the context of counter-measures, *Climate Engineering and International Law: Last Resort or the End of Humanity? RECIEL 20 (3) 2011. ISSN 0962 8797 see page 284.*

[79] The International Covenant on Civil and Political Rights (ICCPR) Article 4 also provides for derogations where there is a public emergency threatening the life of the nation 'and the existence of which is officially proclaimed'.

geoengineering in various multilateral environmental fora; and that geoengineering measures themselves have potentially severe human rights impacts: it appears doubtful that a state would, consistent with its obligations under international law, be completely free to adopt and apply far-reaching, unilateral emergency powers legislation in order to justify being able to proceed to authorise and carry out geoengineering activities.

157. The American Association of the International Commission of Jurists adopted the 1985 Siracusa Principles on the Limitation and Derogation Principles in the ICCPR. These provide indicative guidance on the use of emergency powers under A 4 ICCPR and state in particular that:

> The severity, duration, and geographic scope of any derogation measure shall be such only as are strictly necessary to deal with the threat to the life of the nation and are proportionate to its nature and extent (para 51)

158. In the light of the risks, including transboundary risks, posed by geoengineering technologies and the existence of alternative responses to the threat of climate change which do not pose those risks and are mandated by the UNFCCC/PA (including deep reductions on greenhouse gas emissions), it is not apparent that deployment of such technologies would meet the requirements set out in the Siracusa Principles. In the case of SRM, there is the added risk of termination shock if the deployment is ended.

159. **Right to science:** The 'right to science' is protected under Article 15 (1) (b) of the ICESCR which expresses 'the right of everyone to enjoy the benefits of scientific progress and its applications'. The Venice statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications [the Venice Statement], was developed by UNESCO and other stakeholders, with the aim to clarify the normative content of the right.[80]

160. Article 15(1)(b) ICESCR may be relevant to the issue of geoengineering and could be relied on to support greater transparency and public participation in the debates around its use, whilst not as such supporting an outright ban on all research in the absence of clear and significant risks. The Venice Statement also addresses the need for protection from the

[80] The meeting notes make clear that the ideas and opinions expressed in the Venice statements are those of the experts involved and do not necessarily reflect the view of UNESCO or other IGOs, or commit them. https://unesdoc.unesco.org/ark:/48223/pf0000185558/PDF/185558eng.pdf.multi P11-12

harmful effects and misuse of science through the use of due diligence and impact assessment.[81] Other human rights, including the right to life and the right to health, may offer stronger protection. Article 7 of the ICCPR provides:

> No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. *In particular, no one shall be subjected without his free consent to medical or scientific experimentation*. (emphasis added)

Public Participation and Transparency at the International Level

161. As pointed out by HBF and others in the June 2020 briefing to the UN Special Rapporteur, discussions around geoengineering are often technical and scientific, promoted by particular, often commercial, interests, and with little opportunity for meaningful public engagement.

162. A number of international principles and agreements are relevant in this context. The environmental rights to information, participation and access to justice, as set out in Principle 10 of the Rio Convention in 1992, have been enshrined in a number of treaties, including the UN/ECE Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, and the ECLAC Escazú Agreement. The importance of public participation and access to information is given specific recognition in the climate context through Article 6 of UNFCCC and Article 12 of the PA.

163. Principle 10 and Article 3(7) of the Aarhus Convention require promotion of the principles of the Convention in international environmental decision-making processes and relevant international organizations, requirements further fleshed out in the Almaty guidelines. Article 4(12) of the Escazú agreement also deals with public participation in international forums.

164. Concerns as to public participation may extend to the IPCC. As discussed in a recent article, the shift towards a focus on solutions has led the IPCC into areas of controversy including in relation to geoengineering (see above in **Section IV**). The authors notes that:

> There are broader questions too as to whether the "audience" and "owners" of IPCC assessments should continue to just be nation-state parties to the UNFCCC, or

[81] Hubert p17

whether the IPCC should be more directly accountable to the broader set of (nonstate) actors such as the local and regional authorities, civil society groups and private companies that now participate actively in the governance of climate (Kuyper, Bäckstrand, & Schroeder, 2017). Due to its intergovernmental status, the IPCC defines public engagement as a task of nation states. The [PA] and its decentralized architectures may entail some boundary work in terms of the rearrangement of interactions between the IPCC and publics at different levels of decision-making. This implies an opening up of perceptual horizons to recognize different models of "ownership" (state/nonstate/UN) and to legitimize multiple knowledges and diverse standards of evaluation (see Endfield & Morris, 2012).[82]

165. Application of international legal standards relating to public participation and transparency and the recognition of the potential for issues to impact human rights and rights under international environmental law may be useful and important in resolving some of these issues.

VI: Conclusions

166. States should seek to ensure that there is a **coherent approach** to geoengineering across the range of relevant international treaty obligations, and fora. This flows from the general duty of states to cooperate, and the principles that treaties are to be interpreted in the light of other relevant rules of international law applicable in relations between the parties (Article 31(3)(c) VCLT). Accordingly, decisions adopted by Parties to the CBD and LCLP should be integrated by other fora, including the UNFCCC and PA, and taken into account by bodies addressing geoengineering, including the IPCC.

167. The technical and policy analysis undertaken by the IPCC towards different technologies should address the practical implications of the CBD and LCLP decisions. This leads on to a broader issue which is the extent to which the **IPCC** should, if it is to adopt a solutions-oriented approach, **acknowledge and engage with the legal restrictions** imposed on geoengineering including on research studies, taking into account customary international law, human rights law and relevant international treaties and decisions adopted by the parties to those treaties, including those adopted under the CBD and LCLP.

[82] *The IPCC and the new map of science and politics,* Silke Beck and Martin Mahony, WIREs Clim Change. 2018;9:e547. wires.wiley.com/climatechange https://doi.org/10.1002/wcc.547 at page 10.

168. Parties to the UNFCCC/PA should address the implications of the CBD and LCLP decisions and the broader question as to whether or not the PA includes geoengineering as an alternative to mitigation in the form of deep emissions reductions and the conservation of natural sinks and reservoirs. **Such consideration should take into account the environmental and social risks posed by geoengineering, including the risk that these technologies lock in dependency on fossil fuels. The risks should be assessed by reference to all relevant legal frameworks, including those laid down under the relevant rules of international law, including treaties and agreements relating to the environment and to human rights.**

169. In addressing geoengineering, States are also required to meet their obligations in the field of **human rights,** including in relation to proposed research projects. The full range of relevant rights, including the fundamental right to life and the principle of free prior and informed consent (FPIC)) should be considered. States and businesses should adhere to the UNGP in this regard**.**

170. States should ensure that all decisions about geoengineering including in relation to the potential impact on the environment and on human rights be addressed by reference to a **rule of law approach,** namely one that is open and transparent, complies with relevant international standards and principles, and ensures full participation by all stakeholders.

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Matrix

26 March 2021