Briefing Note on ISO draft guidance standard on radiative forcing management (ISO/NP 14082)

1. Introduction

The International Organisation for Standardisation (ISO) is currently preparing a draft guidance standard on "radiative forcing management" ("Draft RFM Guidance" or "draft"), for use in climate change accounting and for the verification and validation of climate change plans and projects based on changes in radiative forcing, rather than changes in greenhouse gas emissions.[1] Copies of the draft, totalling nearly 70 pages of definitions, methodological guidance, and detailed equations, demonstrate that this process is in advanced stages of development. To date, however, the ISO process and its potential outcomes have received little public attention and virtually no external scrutiny. Given the intentional secrecy with which ISO standard-setting is undertaken, this lack of public input is unsurprising—but it is also unacceptable.

Some elements of the draft address legitimate gaps in how the international community accounts for the near and medium-term temperature impacts of greenhouse gas emissions and other climate forcers—including black carbon, methane and tropospheric ozone precursors created by fracking operations and other activities.

Significantly and dangerously, however, the system envisioned by the draft would also promote and facilitate the widespread deployment of risky and controversial geoengineering technologies in a manner that circumvents ongoing scientific and policy debate on these techniques, contravenes decisions to restrict geoengineering by relevant international bodies and risks undermining the targets and commitments negotiated in the context of the UN Framework Convention on Climate Change and the Paris Climate Agreement. Explicit references to geoengineering technologies and approaches in the draft demonstrate that their inclusion is neither inadvertent nor incidental but an intrinsic aspect of the accounting and trading scheme being developed.

The present briefing note outlines a number of serious concerns with respect to the draft, the process through which it is being developed, and its potential implications for climate action, global geoengineering governance, human rights and global ecosystems. The draft itself, designated "Working Draft 2", is extensive, wide-ranging, and highly technical in nature. This note does not attempt a detailed, section by section analysis of the draft. Rather, it is intended as a guide for non-specialists to highlight issues of particular concern and promote wider discussion of the draft and the process both within and beyond the ISO.

1 ISO/NP 14082. GHG management – Guidance for the quantification and reporting of radiative forcing based climate footprints and mitigation efforts (Working Draft 2) (hereinafter "Draft RFM Guidance" or "draft").

In summary, the key concerns are that this proposed new international standard:

- Creates duplicative and potentially conflicting standards that could undermine the greenhouse gas emissions and temperature targets within the UNFCCC and the Paris Agreement in lieu of broader guidelines based on "radiative forcing".
- Promotes and facilitates the deployment and commercialization of internationally controversial, risky and uncertain geoengineering activities, such as solar or earth radiation modification technologies (e.g. stratospheric aerosol injection, marine cloud brightening) and carbon dioxide removal technologies (such as ocean fertilisation) to be validated as methods of addressing climate change.
- Sets up the conditions for a market system in which these kinds of projects can receive credits for supposedly offsetting ongoing GHG emissions and explicitly promotes the creation of these markets.
- Moves discussions on geoengineering from multilateral UN fora and legal frameworks into a technical standard-setting body, outside of the public gaze, that is neither designed nor equipped to address such contentious and highly political issues from a broader perspective.
- Circumvents and/or contravenes broader, more transparent and more relevant international standards and policy processes better suited to evaluate the implications, risks and policy choices entailed in controversial geoengineering activities.

The ISO

The ISO, or International Organisation for Standardisation is a non-governmental international organisation that describes itself as developing voluntary, consensus-based specifications for products, services and systems. It is made up of members from the national standards bodies of 164 countries. International standards are developed in technical committees, established by the organisation's Technical Management Board and made up of technical experts nominated by members. The ISO's website states that the ISO does not decide when to develop a standard but responds to a request from industry or other groups, adding "Typically, an industry sector or group communicates the need for a standard to its national member who then contacts ISO."[2] The ISO policy on communication of committee work states that committee and working group documents shall not be shared externally and reproduction and distribution of content from draft standards at all stages of development is not permitted.[3] While these standards effectively limit public awareness of or input into ISO processes, industry input into these same processes is often extensive. As the ISO explains, "Industry experts drive all aspects of the standard development process, from deciding whether a new standard is needed to defining all the technical content."[4]

2 https://www.iso.org/developing-standards.html.
3 https://www.iso.org/publication/PUB100382.html Section C 1and 3.
4 https://www.iso.org/get-involved.html.

2. Competing and Conflicting Standards

The introduction to the draft asserts that "many" climate scientists have concluded that the Paris agreement's maximum temperature targets will not prevent irreversible climate change and describes the Paris agreement's focus on temperature targets as "problematic".[5]

As the IPCC itself warned in its Special Report on 1.5C in October 2018, the Earth is already experiencing serious and mounting impacts from climate change, and even 1.5 degrees of warming will have devastating consequences for human communities and natural systems around the world and only immediate and dramatic action might keep accumulated warming below that level. It is for this reason that scientists, advocates and a growing number of political leaders have called on the parties to the UNFCCC to dramatically increase their ambition when they meet to review progress under the Paris Accord in 2020.

In lieu of accelerating action within the agreed UN Framework, however, the draft proposes to create a new standard and a potentially competing system in which progress is defined not by reducing greenhouse gas emissions, but by the "management" of radiative forcing (RF) to "stabilize" the global climate at a new and as yet undefined temperature.

Drawing on the IPCC's Fifth Assessment Report, the ISO defines radiative forcing as a change in radiative flux (the difference between incoming radiation from the sun and outgoing radiation after reflection from either the atmosphere or the Earth itself) due to a change in an external driver of climate change.[6] Such drivers—or "climate forcers"—include carbon dioxide and other greenhouse gases, which increase radiative forcing and warm the atmosphere. But they also include "climate coolants" like sulphur dioxide and other aerosols that reduce radiative forcing by blocking incoming sunlight or reflecting more of it back into space, thus offsetting the impact of greenhouse gases—if only temporarily.

The concept of radiative forcing is widely used by the IPCC and the climate science community to understand the interlinkages between disturbances of the climate system and changes to temperatures at global or regional scales. As noted in the introduction, moreover, better accounting for the impacts of short and medium-lived climate pollutants with significant near-term global warming potential—including black carbon, methane and tropospheric ozone precursors--may provide a useful complement to the present system, which measures the climate impact of pollutants on hundred year timelines.

The problem--and the controversy--lies in the ISO's proposal to use radiative forcing, rather than greenhouse gas reductions as its critical measure of climate action and the basis on which climate targets are set, projects developed, and outcomes assessed. This poses serious risk of undermining the existing focus on greenhouse gas emissions reductions within the climate governance system of the UNFCCC, giving rise to duplicative, disjointed and potentially conflicting systems of climate accounting and climate accountability.

5 Draft RFM Guidance § 0.3 second paragraph, p 7.
6 Draft RFM Guidance §3.1.1.1, p 2.

A major problem with the methodological approach taken by the ISO proposal is that it requires expressing all emissions reductions from various mitigation technologies as simply a reduction in radiative forcing using CO2 emission equivalents.[7] But there is no linear relationship, either in any given year or into the future, between emissions and radiative forcing. The amount of radiative forcing for each ton of emissions depends non-linearly on the conditions of the oceans, land, biosphere, and air all over the world during each year in the past and future. This is why the IPCC uses complex general circulation models of the atmosphere coupled to land and ocean models to model different hypothetical emissions scenarios. As a result, the impact on radiative forcing of each emissions reduction that occurs in any given year in the future cannot simply be added up as the ISO proposes, and assumed to be correct for all future years.

3. Facilitating Risky and Controversial Geoengineering Technologies

Notably, the draft includes only three substantive references to the UNFCCC,[8] none of which define a clear relationship between actions undertaken in compliance with the UNFCCC and plans or projects adopted under the proposed ISO guidance, and all of which allude to undefined temperature targets "significantly below" 1.5C. As discussed more fully below, the confusion is further compounded by the ISO's encouragement to develop distinct temperature targets for broadly defined "high risk zones".[9]

More troublingly, in the absence of clear and explicit limitations to the contrary, this terminology would open the door to both governmental plans and individual projects that purport to address the climate crisis not by reducing the greenhouse emissions that cause climate change, but by temporarily masking greenhouse warming by injecting "climate coolants" that have an opposite radiative effect on the atmosphere (known as solar radiation management or modification) or by relying on direct air capture, ocean fertilization or other carbon dioxide removal techniques to pull CO2 from the atmosphere after it's already emitted.

For many such technologies, large-scale deployment or even outdoor experimentation are untried, untested and inherently risky. For example, a recent report by the Center for International Environmental Law noted that, with respect to carbon dioxide removal:

> "*the IPCC cautioned…in the Summary and throughout the report 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."*[10]

7 Draft RFM Guidance S5.2.3 p18.
8 Draft RFM Guidance §§ 0.4-0.6. (The draft also includes two references to the Paris Accord, (§ 0.3) which serve only to describe the Paris temperature targets and, as noted above, assert that both the 2.0C and 1.5C targets are "problematic").
9 Draft RFM Guidance §§ 0.5; 1; A.4.2.
10 *Fuel to the Fire, How Geoengineering Threatens to Entrench Fossil Fuels and Accelerate the Climate Crisis, by the Center for International Environmental Law* (hereafter *Fuel to the Fire)* pp. 7-8.

The IPCC also expressed concern regarding climate models that rely heavily on Bioenergy with CCS (BECCS), which faces profound uncertainties with respect to scalability, sustainability, and social acceptability, due to its potential impacts on ecosystems, food security, land rights, and human rights.[11]

For similar reasons, solar radiation modification (SRM) measures are not included in any of the available assessed pathways in the IPCC reports. In explaining its decision to exclude SRM from the pathways in the 1.5 C report, the IPCC cautioned that: "Although some SRM measures may be theoretically effective in reducing an overshoot, they face large uncertainties and knowledge gaps as well as substantial risks and institutional and social constraints to deployment related to governance, ethics, and impacts on sustainable development."[12]

After an extensive review of geoengineering approaches and their potential impacts on natural and biological systems, the Convention on Biological Diversity (CBD) recommended in 2010 that all States party to the convention place a moratorium on geoengineering unless and until its risks were fully assessed and effectively regulated under an agreed global governance regime. In the ensuing years, the CBD has continued its examination of geoengineering and repeatedly reaffirmed and extended its decision on the moratorium. [13] Similarly, ocean fertilisation, another controversial geo-engineering technique, has been specifically prohibited under the London Convention on the Prevention of Marine Pollution because of its potentially significant risks to marine ecology.[14]

In light of the significant risks and profound uncertainties posed by geoengineering, the cautionary notes sounded by IPCC and precautionary measures adopted by the CBD and London Convention are well-founded and well-justified. Indeed, the permissibility and appropriate governance of geoengineering technologies remains the subject of ongoing and vigorous debates within both the CBD and the United Nations Environment Assembly, with hundreds of civil society organizations and a growing number of States calling for a continued moratorium or outright ban on the deployment or open-air testing of geoengineering technologies.

Accordingly, the fact that all these approaches have the potential to impact on radiative forcing and so fall within the terms of the draft standard is deeply troubling. The operative provisions of the draft explicitly envision that RF accounting will apply to—and RF projects and management plans may incorporate- not only reductions in "climate pollutants" like

11 *Fuel to the Fire* p 31.
12 IPCC, 2018: Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. {Hereafter IPPC Policymakers summary]In Press Section C.1.4, page 12. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf
13 See https://www.cbd.int/climate/geoengineering/.
14 Resolution LP.4(8) on the Amendment to the London Protocol to Regulate the Placement of Matter for Ocean Fertilization and Other Marine Geoengineering Activities LP.8. LC 35/15. Annex 4. Annex 5. 2013.

carbon dioxide, but the use of a potentially unlimited array of “climate coolants” and “carbon dioxide removal” technologies.

Both “solar radiation management (SRM)” and “Earth radiation management (ERM)” are included in the Glossary of Terms incorporated as Annex A to the draft. A list of short-lived climate forcers with negative (cooling) impacts includes: sulfate aerosols and mineral dust aerosols, both considered prospects for use in Stratospheric Aerosol Injection; sea salt aerosols (used in marine cloud brightening technologies); and dimethyl sulphide (a substance linked to ocean fertilization efforts).[15] The draft describes substances like sea salt, water and dimethyl sulphide as “negligible impact coolants" even though their use covers cloud brightening, which could have significant effect on rainfall patterns across regions at scale.[16] Direct air capture is included in the draft[17], as are large-scale Carbon Capture and Storage (CCS) approaches (which are currently mainly used for enhanced oil recovery or enhanced coal bed methane, creating further CO2 emissions in complete contradiction to the need for early and rapid phase out of fossil fuels).[18]

The proposed standard also appears to make it possible to count the substitution of coal with nuclear energy, or the construction of more efficient coal plants as contributions to decreased radiative forcing levels.[19]

The draft expressly covers projects deployed at a scale which would create uncertain and risky impacts for the wider global system.[20] This is despite the fact that the IPPC notes with high confidence that most current and potential CDR measures could have significant impacts on land, energy, water or nutrients if deployed at large scale.[21] Thus, while the draft does attempt to address legitimate gaps, such as accounting for short lived climate pollutants like black carbon[22] it goes far beyond this and arguably the ISO’s remit, into dangerous territory.

4. Markets

Having reframed action on climate change to include deeply risky and uncertain geoengineering projects, the draft then sets the basis for a new market framework to facilitate their promotion.[23]

While a limited number of carbon dioxide removal technologies such as carbon capture and storage may be eligible for carbon credits under existing carbon markets within the UNFCCC regime (or through unregulated, voluntary markets), they remain highly controversial. The proposed new ISO standard introduces an entirely new approach – the radiative forcing metric, as discussed above—and explicitly envisions the creation of markets built on

15 Draft RFM Guidance § 5.3.1, Table 1—Examples of Key Climate Forcers.
16 *Fuel to the Fire* p 38 and Draft RFM Guidance § 5.2.2.5.
17 Draft RFM Guidance § 3.1.2.7.
18 *Fuel to the Fire* p 1.
19 See, e.g., Draft RFM Guidance §§ 5.4.11 (Example and Figure 2); § 3.1.2.20 (Note 1).
20 See, e.g., Draft RFM Guidance § B.3.1, A.2.6.
21 IPCC Policymakers summary C.3.4.
22 Draft RRM guidance § 5.2.2.2.
23 See Draft RFM Guidance §0.6 last indent.

exchanges of RF reduction credits. This would create a new and potentially significant market incentive to deploy SRM and other geoengineering technologies.

The impacts of this market system are compounded by accounting and project selection criteria prioritizing "cost-effective"[24] approaches to achieving climate stabilization targets. For decades, proponents of geoengineering have argued that deployment of SRM and other geoengineering technologies could be more cost effective than making necessary emissions reductions, particularly in the near term.

The guidelines also encourage project proponents to calculate indirect benefits from RF Management projects. The examples provided—such as extrapolating the reduction in GHG emissions that might result if an RF intervention lowered local temperatures enough to reduce air conditioning use in an area[25] -- suggest the system would be subject to the same vague standards, double counting and loopholes that have been widely criticized in relation to existing carbon markets.

The draft clearly maximizes attention on purported benefits of RF projects, while as discussed more fully below, it minimises the attention to their possible "costs" in terms of wider environmental and human rights impacts.

5. Remit

As discussed above, the ISO is a technical, industry and standards-based body, originally designed for and driven by the interests and agendas of industry actors. However, as drafted the standard encompasses "entities" that include sub-national governmental actors. The draft refers to "organization and government-entity level RF climate footprints."[26] This clearly brings in governmental and substate actors into the reach of the standard, further complicating the legal and political dynamics affecting the continued negotiation and effective implementation of targets and commitments under the UNFCCC. Again, it appears highly inappropriate for a relatively closed industry-based process to develop standards impacting on governmental entities without any democratic or public engagement.

6. International law

The draft contains a link explaining that ISO standards are voluntary and do not include contractual, legal or statutory requirements. It adds "Voluntary standards do not replace national laws, with which standard users are understood to comply and which take precedence."[27] As discussed in the preceding sections, however, the draft as currently formulated puts the ISO and implementing entities in potential operational conflict with the UNFCCC and likely contravention of the moratoria adopted under the CBD and the London Convention. Other international legal conventions on which this standard may impinge include the UN Convention on the Law of the Sea, the UN Convention on Environmental Modification (ENMOD), regional environmental treaties such as the Aarhus and ESPOO

24 See Draft RFM Guidance § 5.1.2 last indent and 0.6 second indent.
25 See Draft RFM Guidance § 5.3.2.
26 See Draft RFM Guidance § 5.2.
27 https://www.iso.org/foreword-supplementary-information.html referred to in Foreword to draft RFM Guidance.

Conventions and a range of international human rights treaties. The foregoing institutions and their associated legal and institutional frameworks are far more appropriate for controversial, multifaceted issues best discussed in open and democratic fora with opportunities for engagement by a wide range of stakeholders.

7. High risk zones

The draft encourages actors to develop and implement distinct and targeted RF management for "high risk zones"[28], defined as:

> "A region that is experiencing a sustained RF level higher than the global RF, a sustained regional mean temperature significantly higher than the global mean temperature on a consistent basis (over at least 5 years), or that is at extreme risk from sea level rise, climate-change induced wildfires, or other catastrophic climate change related impact endpoints."[29]

"High risk zones" include to a high degree countries and regions that did the least to contribute to climate change but are suffering its most significant effects. The principle of equity, a cornerstone of the international climate process, applies to countries in these regions, meaning that they are due financial and technical assistance and support to help them adapt to and mitigate the consequences of climate change, as well as to cover loss and damage relating to impacts they cannot adapt to.

While special consideration to the unique impacts of greenhouse emissions or short-lived climate forcers on particularly vulnerable regions is warranted, however, the language of the draft again suggests a more proactive and interventionist approach to radiative forcing. For example, it suggests a government might seek to restore "regional mean temperature to 1950 levels" in a high risk zone.[30]

Carrying out highly risky and uncertain projects, that experiment further with the climate in these regions, runs entirely counter to the principle of equity, enshrined in the international climate framework. Those primarily responsible for causing climate change would be interfering with global systems in a way which could further jeopardise the lives and livelihoods of those least responsible and most impacted.

8. Human rights and Environmental Standards

The draft refers to the need to determine adverse "trade-offs" related to human health and the environment.[31]. However, proposed procedures include only a very top level assessment of the consequences of the type of project overall, and vague standards at project-specific levels.[32] This ignores that the very nature of the projects themselves carry potentially huge risks for environmental and human health and highlights that the ISO is simply the wrong

28 See for example Annex A § 4.2 "General Principles of Quantification of Radiative Forcing in High Risk zones."
29 Draft RFM Guidance §3.1.2.22.
30 Draft RFM Guidance, Annex B § 3.2.
31 See e.g. Draft RFM Guidance § 1. Scope and 5.33.
32 See Draft RFM Guidance Principles, § 4.10, § 5.4.12.

body to be looking at these matters. The requirements for transparency are minimal and relate primarily to investors and project proponents.[33]There is no requirement on the composition of the groups of people producing plans under the draft to have any expertise in addressing social, environmental or human rights impacts.[34] Communities are only mentioned as possible parties to be involved in project level implementation and the specific rights of indigenous communities are ignored.[35] This is a world away from directly engaging with communities on a local level and equity and justice-based solutions in accordance with human rights obligations and legal principles such as equity and polluter pays. In taking an approach deeply at odds with these principles and existing institutions within which they are held in value, the draft charts a dangerous course for humanity, the climate and our planet.

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33 See e.g. Draft RFM Guidance § 5.4.2.
34 Draft RFM Guidance § 5.1.2.
35 Draft RFM Guidance § 5.4.1.