Submission from the Center for International Environmental Law (CIEL) on the "Call for Input 2022 – activities involving removals under the Article 6.4 Mechanism of the Paris Agreement"

Key Takeaways

- Because drastic emissions reductions are urgently needed to keep global temperature rise below 1.5°C, the principal focus of the Article 6.4 mechanism, which is designed to facilitate increased ambition, should be incentivizing and supporting enhanced *reduction* of emissions in the near-term.
- Rapidly phasing out all fossil fuels is the only safe path to achieving those reductions.
- Failure to take ambitious action will result in overshooting 1.5°C, which will have significant and potentially irreversible consequences for people and ecosystems.
- Return from overshoot may not be possible. Irreparable harms and tipping points will be passed in a way that cannot be undone.
- Relying on removals, and in particular engineered removal technology, both delays immediate reduction of emissions and presents independent risks to human rights and the environment, some of which remain poorly understood.
- Land-based carbon sequestration activities, such as restoration or reforestation, if done with respect for human rights including the rights of Indigenous Peoples could contribute to mitigation, but would require significant regulation and monitoring especially with relation to permanence of removals. However, these approaches are limited by the amount of available land and cannot offset ongoing fossil fuel emissions.
- Engineered removals, such as bioenergy with carbon capture and storage (BECCS) and direct air carbon capture and storage (DACCS), are speculative, cannot be deployed at scale, and pose significant risks to human rights and the environment, including threats to the rights of Indigenous Peoples, land rights, the rights to food, water, health, and culture, as well as the right to a healthy environment.
- Carbon Capture and Storage (CCS), an enabling component for BECCS and DACCS, poses significant risks and uncertainties related to the capture, compression, transport and storage of CO2 and prolongs reliance on fossil fuels. On its own, CCS is not a removal technology; it is designed to reduce emissions from a polluting facility and primarily serves to prolong the facility's operation.
- The London Protocol to the London Convention regulates marine geoengineering already and is taking steps to consider additional regulations. The UNFCCC, and the bodies created under it, should not overstep decisions taken in other international bodies and instead should take note of these ongoing processes and not sanction activities that are prevented, or being regulated, elsewhere.
- Any activity recognized under Article 6.4 must not harm the environment, must be compliant with human rights, and be accountable for that compliance.
- The Supervisory Body should prioritize establishing the policies needed to protect human rights, including the rights of indigenous peoples, and safeguard the environment, from the adverse impacts of any Article 6.4 activities, including by establishing a robust and accessible independent grievance redress mechanism.

Introduction

Since 1989, the Center for International Environmental Law (CIEL) has used the power of law to protect the environment, promote human rights, and ensure a just and sustainable society. Throughout its history, CIEL has engaged in the UNFCCC and the development of the international climate regime.

According to the Paris Agreement, Article 6 is designed to allow Parties to engage in cooperative activities "to allow for higher ambition." However, to date, markets largely have proven to be inadequate mechanisms to increase ambition as offsets do not substantially reduce emissions. If there is going to be a mechanism, such as the Article 6.4 mechanism, designed to facilitate increased ambition, its principal focus should be to incentivize and support enhanced reduction of emissions, urgently needed in the near-term. As Article 6.4 states, the mechanism's purpose is "to contribute to the mitigation of greenhouse gas emissions and support sustainable development." Its aim is "to contribute to the reduction of emission levels … and; (d) To deliver an overall mitigation in global emissions." In a context in which countries have done nowhere near enough to address the principal drivers of climate change –fossil fuel production and use and deforestation– and have not even elaborated plans sufficient to keep global temperature rise below 1.5°C, as evidenced by the current Nationally Determined Contributions (NDCs), the emphasis of the Parties must be on proven measures to reduce emissions.

Focusing on potential "removals" sometime in the future is a dangerous distraction that risks easing the pressure for urgently needed action to curb emissions now.[1] Moreover, the IPCC's Working Group I and Working Group II reports (as part of the Sixth Assessment Report (AR6)) recognize that responses to climate change, such as carbon dioxide removal (CDR) and solar radiation management (SRM), not only may fail to meet their climate objectives, but also may introduce significant risks and unintended consequences for human and natural systems, exacerbating the impacts of warming and undermining adaptation.[2]

Emissions Reductions and Overshoot

The science is clear: climate change is already causing significant harm and every fraction of a degree of warming brings with it more and more risk. In the reports from Working Groups I, II, and III of the Sixth Assessment Report, the IPCC has once again warned that climate change will continue to pose a threat to the realization of numerous human rights of present and future generations, including the rights of Indigenous Peoples, the rights to life, health, food, water, and culture, as well as the right to a healthy

[1] *See generally* CIEL, *Fuel to the Fire. How Geoengineering Threatens to Entrench Fossil Fuels and Accelerate the Climate Crisis* (2019), https://www.ciel.org/reports/fuel-to-the-fire-how-geoengineering-threatens-to-entrench-fossil-fuels-and-accelerate-the-climate-crisis-feb-2019/.

[2] *See* CIEL & Heinrich Böll Stiftung, *Beyond the Limits: New IPCC Working Group II Report Highlights How Gambling on Overshoot is Pushing the Planet Past a Point of No Return*, pp. 1, 2, 6 (Feb. 28, 2022), https://www.ciel.org/wp-content/uploads/2022/02/CIEL_HBF_IPCC-WGII-Key-Messages-28Feb2022.pdf [hereinafter CIEL & HBF, *Beyond the Limits*]; IPCC, *Working Group II Contribution to the IPCC Sixth Assessment Report on Climate Change Impacts, Adaptation and Vulnerability* [AR6 WGII], Summary for Policymakers [SPM], paras. B.5.4, B.5.5 at SPM-19-20 (2002), https://www.ipcc.ch/report/ar6/wg2/; AR6 WGII, Technical Summary [TS], TS.C.11.10 at TS-40.

environment, among others.[3] "Limiting warming to 1.5°C is not safe, but it is safer than limiting warming to 2°C."[4] The current levels of warming have already led to irreversible impacts that are undermining humans' resilience and the ability to adapt.[5] Temperature rise has also led to more frequent and intense extreme weather impacts causing loss and damage around the world.[6] These risks will only worsen as temperatures continue to rise.

Exceeding 1.5°C of warming will result in severe and irreversible impacts that will threaten human rights and limit our ability to adapt.[7] The science is clear that we need to prevent emissions as much as possible by maximizing emissions reductions and curtailing the main drivers of climate change: the production and use of fossil fuels and deforestation.[8]

Failure to take ambitious action to reduce emissions will result in overshooting not only 1.5°C, but possibly also 2°C, which would have even more catastrophic consequences than are currently being seen. A return from overshoot through so-called "removals" is far from certain. Temperature overshoot may lead to irreversible harms and passing tipping points in a way that cannot be undone. The climate effect of carbon dioxide removal at scale remains unknown and is not equivalent to the climate effect of avoiding the same quantity of carbon dioxide emissions. As the IPCC pointed out in its Special Report on 1.5°C, "[l]imits to our understanding of how the carbon cycle responds to net negative emissions increase

[3] *See, e.g.*, Five UN human rights treaty bodies issue a joint statement on human rights and climate change, Joint Statement on "Human Rights and Climate Change" (Sept. 16, 2019), https://ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=24998&LangID=E#_edn5; The UN Special Rapporteur on Human Rights and the Environment (officially UN Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment) has emphasized the links between climate change and human rights, for example, noting the ". . . greater the increase in average temperature, the greater the effects on the right to life and health . . .". Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, at paras. 23-39, 65, 68, U.N. Doc. A/ HRC/31/52 (Feb. 1, 2016); UNFCCC, Structured expert dialogue on the second periodic review of the long-term global goal under the Convention (2020–2022) [UNFCCC, SED2], *Synthesis report by the co-facilitators of the structured expert dialogue*, U.N. Doc. FCCC/SB/2022/3, para. 14 (Sept. 20, 2022), https://unfccc.int/sites/default/files/resource/sb2022_03_adv.pdf.

[4] UNFCCC SED2, *supra* note 3, at para. 28.

[5] AR6 WGII, SPM, *supra* note 2, at B.1

[6] AR6 WGII, TS, *supra* note 2, at TS.B.2 at TS-13.

[7] *See* AR6 WGII, SPM, *supra* note 2, at.B.6, B.6.1 at SPM-20; *see also* UNFCCC SED2, *supra* note 3, at para. 28 ("Achieving the long-term global goal without overshooting the 1.5 °C limit is imperative in order to avoid the most catastrophic impacts. Limiting warming to 1.5 °C is not safe, but it is safer than limiting warming to 2 °C. Avoiding temperature overshoot reduces the risk of crossing tipping points and triggering irreversible impacts. Though it is difficult to quantify such impacts, the higher and longer the overshoot, the higher the risk of crossing such tipping points").

[8] *See, e.g.*, AR6 WGII, TS, *supra* note 2, at TS.E.4.5 at TS-85 ("Deep cuts in emissions will be necessary to minimise irreversible loss and damage (high confidence)"); *see also* UNFCCC SED2, *supra* note 3, at para. 26 (stating "Temperature overshoot – where the warming limit is exceeded but temperature returns to below it at a later time – could trigger ongoing and unstoppable sea level rise, even with rapid CO2 removal. Rapidly reducing GHG emissions significantly decreases the chance of triggering irreversible instabilities in ice sheets that could substantially increase sea level rise, as well as decreases the likelihood of triggering impacts in ecosystems, such as the release of methane from thawing peatlands, that could lead to substantial additional GHG emissions. Some systems, such as the ocean, may have already surpassed a tipping point. For these systems, warming beyond 1.5 °C would exacerbate the deterioration").

the uncertainty about the effectiveness of CDR to decline temperatures after a peak. Limitation on the speed, scale, and societal acceptability of CDR deployment also limit the conceivable extent of temperature overshoot."[9] Given that CDR both may be ineffective in reversing temperature rise following overshoot and that it is unproven at scale, the IPCC, in its Special Report on 1.5, found that to limit warming to 1.5°C it is risky to rely on such technology rather than to rely on energy efficiency and low-demand strategies that drastically reduce greenhouse gases in the near term.

The recently released UNFCCC Synthesis Report from the co-facilitators of the Structured Expert Dialogue on the long-term global goal under the Convention picks up on many of the findings of the IPCC, stating: "Delaying action to reduce emissions could lead to adverse impacts that may take many centuries to reverse or be irreversible. Warming has already set in motion the slow component of the climate system, that is systems such as the ocean and cryosphere that have a long response time to variations in external forcing. Even without additional warming, glaciers will continue to melt for decades or centuries. Changes in global ocean temperature and deep ocean acidification and deoxygenation are irreversible over even longer timescales of centuries or millenniums."[10] This underscores the IPCC's warnings that "this 'overshoot' entails severe risks and irreversible impacts to many natural and human systems (e.g. glacier melt, loss of coral reefs, loss of human lives due to heat)."[11] Pathways that involve even temporary overshoot, in which warming exceeds 1.5°C for several decades and then returns to or below 1.5°C, "imply severe risks and irreversible impacts in many ecosystems (high confidence)."[12]

Overshoot is not inevitable. The IPCC has found that it is still possible to limit warming to 1.5 with limited or no overshoot,[13] through steep and immediate reductions in the production and use of fossil fuels, rapid replacement of fossil fuels with renewables and energy demand reduction. This was also emphasized by the UNFCCC Second Structured Expert Dialogue on the long-term global goal: "It is possible to limit warming to 1.5 °C with no or limited overshoot. CO2 emissions must be cut roughly in half by 2030 (compared with the 2010 level) and reach net zero around 2050, with a concurrent strong reduction in non-CO2 emissions, such as methane, and reductions must be sustained beyond the end of

[9] IPCC, *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 Emissions Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*, Ch. 2, ES, at 34 B.5 (2018), https://www.ipcc.ch/sr15.
[10] UNFCCC SED2, *supra* note 3, at para. 25.
[11] AR6 WGII, TS, *supra* note 2, at TS.C.13.1 at TS-42; *see also* CIEL & HBF, *Beyond the Limits*, *supra* note 2.
[12] AR6 WGII, TS, *supra* note 2, at TS.C.2.5 at TS-26.
[13] CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized: Unmasking Clear Warnings on Overshoot, Techno-fixes, and the Urgency of Climate Justice*, p. 9 (Apr. 21, 2022), https://www.ciel.org/wp-content/uploads/2022/04/IPCC-Unsummarized_Unmasking-Clear-Warnings-on-Overshoot-Techno-fixes-and-the-Urgency-of-Climate-Justice.pdf ("The Working Group III findings confirm that it is both technically and economically feasible to pursue rapid fossil fuel phaseout immediately, through scenarios that limit warming to 1.5°C, rather than overshoot it by gambling on the possibility of return. Included among the potential pathways forward for reducing emissions of the greenhouse gasses that cause global warming are measures that would reduce energy demand, replace fossil fuels with renewables, and massively increase electrification. [See Box TS.5, TS-39-40; Ch. 1, 1-36 (describing the IMPs, including IMP-Ren, which involves heavy reliance on renewables, and IMP-LD, which emphasizes energy demand reductions).") [hereinafter CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized*].

the century. Scenarios show that failure to reduce non-CO2 emissions lowers the probability of limiting warming to 1.5°C. Mitigation action is thus needed across all sectors and GHGs."[14]

In this context, relying on removals is risky and also stands in direct contradiction to States' legal obligations under international law. Existing human rights obligations read in conjunction with multilateral environmental agreements and principles of international environmental law, including the precautionary principle and the duty not to cause transboundary harm, require States to pursue climate actions that have the greatest chance of preventing further foreseeable human rights violations due to climate change and that pose the least risk of harm to human rights.[15] Such actions include available, proven measures like fossil fuel phaseout, switching to renewable energy, and energy demand reduction.

Land-Based Removals

Any introduction of removals under Article 6.4 demands extreme caution. Land-based removal activities, such as restoration, reforestation, or rewilding among others, if done with respect for human rights including the rights of Indigenous Peoples could potentially contribute to mitigation (as well as adaptation and enhanced resilience). However, land is under increasing stress from climate change, which has exacerbated desertification and degradation as well as led to more frequent and severe wildfires.[16] Thus, relying on land for removals has to be done with caution given not only these stressors, but the limited land available for such activities.

These stressors underscore one of the fundamental problems with relying on land-based removals, which is their impermanence. As has been seen, these activities face serious risk of reversal especially due to wildfire as well as changes in governmental policies that may result in renewed deforestation. The devastating wildfires seen in the EU, the United States, and Australia, among other places, drought in the US and Africa, and floods in Pakistan illustrate the temporary nature of land-based removals and how quickly these "removals" can be undone.

Additionally, there is very limited ecosystem capacity to capture carbon over the course of the century with recent estimates suggesting that these removals would be less than 400 Gt CO_2 in total over

[14] UNFCCC, SED2, *supra* note 3, at para. 29.
[15] CIEL, ETC Group, Heinrich Böll Foundation & Third World Network, "Response to Questionnaire on the impact of new technologies for climate protection on the enjoyment of human rights", pp. 9-10 (2022), https://www.ohchr.org/sites/default/files/2022-06/Joint-submission-to-HRCAC-GeoengieeringHumanRights-CIEL-ETC-HBF-TWN.pdf; *see also* Philippe Sands & Kate Cook, *Joint Opinion*, secs. III, IV, V (Mar. 26, 2021), https://www.ohchr.org/sites/default/files/2022-06/Annex-SubmissionCIEL-ETC-HBF-TWN-Geoengineering-Opinion.pdf (provided as an Annex to Submission on the Response to the Questionnaire on the impact of new technologies for climate protection on the enjoyment of human rights); Margaretha Wewerinke-Singh et al, Submission by members of the network of academics for an International Non-Use Agreement on Solar Geoengineering, p. 6-7 (May 27, 2022), https://www.ohchr.org/sites/default/files/2022-05/20220527-wewerinke-singh-leiden-university-SolargeoNUA%20.pdf.
[16] UNFCCC, SED2, *supra* note 3, at para. 13.

the next 75 years, which is nowhere near the amount of emissions reductions needed.[17] Any such activity, therefore, would need careful consideration and monitoring to ensure not only that there are no reversals, but also that rights were upheld and that the activity is additional, there was no leakage, and it could be verified, among other considerations. Additionally, land-based removals *cannot* be used to compensate for fossil emissions. Any land-based removals under the 6.4 mechanism would have to be additional and accounted for separately and on their own.

Engineered Removal Technologies: BECCS and DACCS

Prioritizing removals not only delays the immediate reduction of emissions that are urgently needed now, but it also presents independent risks to human rights and the environment, as documented by the IPCC, some of which remain poorly understood. This is especially true of speculative technologies meant to create engineered removals. These geoengineering technologies largely do not exist, and to the extent that they do, they cannot be deployed at scale and bring numerous ecological and social risks. As noted in the synthesis note from the UNFCCC's Structured Expert Dialogue on the Long-Term Goal, "[t]he feasibility of most CO2 removal technology is highly uncertain. Options vary in terms of cost, potential and side effects. Moreover, overshoot could cause adverse impacts that may either take decades or even centuries to reverse or prove irreversible."[18] Additionally, many removal technologies are dependent on carbon capture and storage (CCS), a technology that has been around for decades, been mostly used to produce more fossil fuels, and has consistently overpromised and underdelivered on emissions reductions. In fact, in its working group III report, the IPCC calls CCS among the highest-cost mitigation measures with the least potential to reduce emissions by 2030.[19]

Courts have also recognized that carbon removal technologies are currently unreliable.[20] For instance, in finding that the Netherlands was not taking sufficient action to reduce greenhouse gas emissions, the Supreme Court of the Netherlands recognized that "at the moment there is no technology that allows [carbon removal] to take place on a sufficiently large scale," and that climate pathways that rely on such technologies, based on unproven assumptions about such technologies, "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 3 ECHR and Article 3(3) UNFCCC."[21] Such decisions underscore that States' human rights obligations and the precautionary principle mean that Parties should favor available and existing measures to mitigate greenhouse gas emissions instead of relying on dangerous unproven geoengineering technologies.[22]

---

[17] Kate Dooley et al., Carbon removals from nature restoration are no substitute for steep emission reductions. *One Earth* 5, pp. 812-24 (2022).
[18] UNFCCC SED2, *supra* note 3, at para. 30.
[19] *See generally* CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized*, *supra* note 13; *see also* IPCC, Working Group III Contribution to the IPCC Sixth Assessment Report on Mitigation of Climate Change [AR6 WGIII], Summary for Policymakers [SPM], Fig. SPM.7 at SPM-50 (2022), https://www.ipcc.ch/report/ar6/wg3/..
[20] *See, e.g.*, Neubauer, et al. v. Germany, Federal Constitutional Court of Germany (29 April 2021), case no. BvR 2656/18/1, BvR 78/20/1, BvR 96/20/1, BvfR 288/20 (English translation), paras. 33, 226-27.
[21] The State of the Netherlands v. Urgenda Foundation, Supreme Court of the Netherlands (20 December 2019), case no. 19/00135 (English translation), para. 7.2.5.
[22] *See* CIEL, ETC group, Heinrich Böll Foundation & Third World Network, *supra* note 15.

The Information Note presented at the Supervisory Body's Second Meeting as well as the Secretariat's presentation primarily focused the discussion of engineering removals on DACCS and BECCS. However, BECCS and DACCS (or Direct Air Capture (DAC)) remain primarily speculative, with financial cost, energy intensity, land use, and other input requirements putting sharp constraints on their ability to meaningfully and/or permanently "remove" atmospheric carbon dioxide.

These techniques, as well as others mentioned in the Information Note, pose significant risks to human rights and the environment.[23] Several of those risks are tied to the drivers of emissions (e.g., fossil fuels), which as noted above undermine human rights. Others relate to the significant inputs required, including, in the case of BECCS, amounts of land unavailable without dramatically infringing on human rights, including the rights of Indigenous Peoples to free, prior and informed consent, and threatening food sovereignty and ecosystem integrity.[24] The IPCC and human rights experts have warned that reliance on these carbon dioxide removal technologies like DACCS and BECCS could impact food sovereignty, biodiversity, and land rights, among others, and could overburden future generations.[25] For example, BECCS will require vast amounts of land at a scale estimated to be 2 to 4 times larger than the amount of land area designated as marginal or abandoned and therefore potentially available for such activities.[26] Moreover, land so designated may, in fact, serve other functions such as subsistence and biodiversity protection.[27] Bioenergy production also requires significant amounts of water.[28] Working Group II of the IPCC noted that "Deployment of afforestation of naturally unforested land, or poorly implemented bioenergy, with or without carbon capture and storage, can compound climate-related risks to biodiversity, water and food security, and livelihoods, especially if implemented at large scales, especially in regions with insecure land tenure (high confidence)."[29] Thus, BECCS could lead to land grabbing and deforestation and would have significant consequences on land rights as well as on the rights to water and food.

---

[23] *See* CIEL, Earthrights International, Fian International, Heinrich Böll Stiftung, IBON International, Indigenous Environment Network & IWGIA, *Submission to the First Global Stocktake: Human Rights-Based Climate Action*, pp. 16-17 (Aug. 2022), https://climaterights.org/wp-content/uploads/2022/08/19-August-2022_Joint-Submission-to-the-First-Global-Stocktake-Human-Rights-Based-Climate-Action.pdf.

[24] *See, e.g.*, Corporate Europe Observatory, *The Deadly Climate Gamble: Dirty Energy Bets on Unproven 'Carbon Removals' to Keep Fossil Fuels Flowing* (Oct. 2022), https://www.corporateeurope.org/en/DeadlyClimateGamble.

[25] CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized*, *supra* note 13, at pp. 24-32; Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, Report to the UN General Assembly on a safe climate, UN Doc. A/74/161 Annex, para. 21 (July 2019), http://srenvironment.org/sites/default/files/Reports/2019/CC%20Good%20Practices%20Annex.pdf.

[26] William C.G. Burns, Human Rights Dimensions of Bioenergy With Carbon Capture and Storage: A Framework for Climate Justice in the Realm of Climate Geoengineering, *in* Randall Abate, *Climate Justice: Case Studies in Global and Regional Governance Challenges*, pp. 158-59 (Environmental Law Institute, 2016), *available at* https://www.ohchr.org/sites/default/files/2022-04/WIL-BURNS-BECCS-HR-Abate-Book-Chapter.pdf.

[27] CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized*, *supra* note 13, at p. 31.

[28] FERN, Six Problems with BECCS (2022), https://www.fern.org/fileadmin/uploads/fern/Documents/2022/Six_problems_with_BECCS_-_2022.pdf.

[29] AR6 WGII, SPM, *supra* note 2, at SPM B.5.4 at SPM-19.

DAC also requires enormous amounts of land, water, materials, and chemicals.[30] As the IPCC notes, powering DAC at a scale capable of removing 10 gigatons of CO2 per year–approximately a quarter of current global annual CO2 emissions–would require an amount of energy equivalent to current total global electricity production and one-sixth of total energy supply.[31] DAC's land and water requirements, too, could significantly impact food prices and consequently food sovereignty.[32] Beyond those inputs, deploying DAC at a gigaton-scale would require enormous quantities of chemicals, such as sodium hydroxide, ammonia, or ethylene oxide, many times greater than current production levels.[33] The production and use of those chemicals, as well as the energy required to produce them and to power DAC, would involve its own pollution impacts and health and environmental risks. Moreover, neither DAC nor BECCS could begin removing atmospheric carbon dioxide at any significant scale until 2050 or later – well after the period during which emissions need to be effectively eliminated to avoid overshooting 1.5°C.[34]

Carbon capture and storage (CCS) is an enabling component for DACCS, BECCS and many other Carbon Dioxide Removal technologies. For decades, CCS has been touted as a "climate solution," but has consistently failed to meet its intended goals. CCS projects have a long history of underperformance and cost overruns, despite promises and projections from project proponents.[35] Importantly, CCS itself, regardless of whether it works, is not a "removal." As a purported pollution control technology, CCS is attached to an underlying polluting facility such as a fossil fuel-fired power plant or factory, to keep it operating. In this way, CCS primarily serves to enable the continuation of business as usual and to prolong the reliance on fossil fuels. Thus, by design, no amount of investment in CCS can accelerate the transition away from fossil fuels.

Further, in its latest report, the IPCC identified CCS as among the highest cost, lowest mitigation potential options for reducing emissions by 2030, with its potential to achieve reductions far lower than wind and solar while costing substantially more.[36]

Rather than reducing emissions, CCS projects can, in fact, have the opposite effect due largely to their energy penalty. Carbon capture and compression processes are extremely energy-intensive and generate their own on-site emissions and increase upstream emissions. One study that calculated the lifecycle emissions associated with carbon capture used for energy production from fossil fuels found that "the equipment captured the equivalent of only 10-11 percent of the emissions they produced, averaged

[30] CIEL, ETC group, Heinrich Böll Foundation & Third World Network, *supra* note 15, at p. 9; *see also* CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized*, *supra* note 13, at 29-30 & the sources cited therein.
[31] AR6, WGIII, *supra* note 19, at Ch. 12, 12.3.1.1, 12-44.
[32] AR6 WGII, *supra* note 2, at Ch. 4, 4.7.6, at 4-131.
[33] Sudipta Chatterjee & Kuo-Wei Huang, Unrealistic energy and materials requirement for direct air capture in deep mitigation pathways, Nat Commun 11, 3287 (2020).
[34] See CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized*, supra note 13, at p. 26 & n. 35.
[35] See generally IEEFA, The Carbon Capture Crux: Lessons Learned (2022), https://ieefa.org/resources/carbon-capture-crux-lessons-learned.
[36] CIEL & Heinrich Böll Stiftung, *IPCC Unsummarized*, *supra* note 13, at p. 10; AR6 WGIII, *supra* note 19, at Fig. SPM.7 at SPM-50.

over 20 years."[37] In practice, CCS projects have repeatedly failed to meet optimistic and ambitious CO2 capture targets set by proponents.[38] In July 2021, Chevron, operator of Australia's only commercial- scale CCS project, admitted that the project failed to meet its five-year capture target of 80% CO2, and is now seeking a deal with regulators on how to make up for millions of tons of CO2 emitted.[39] Other high-profile projects, including Archer Daniel Midland's Illinois Industrial Carbon Capture Project,[40] the Petra Nova,[41] and Boundary Dam[42] projects at coal-fired power plants and the Quest and Air Products capture projects at hydrogen plants,[43] have all missed capture targets advertised by proponents, have claimed high capture rates by only capturing a minute fraction of total facility emissions, or both.

Further, CCS projects may also serve to extend the economic life of an underlying emitting source and therefore increase lifetime emissions even while reducing emissions intensity.[44] For example, one of the two coal plants with CCUS operations in North America, the Boundary Dam power station was planning to close, but instead was retrofitted with CCUS and is now expected to continue operating for several more decades.[45] Even though the total and per-unit energy emissions may be lower from the retrofitted facilities because they are "capturing" or "removing" carbon, the overall emissions are greater than what the plant would have emitted had it been shut down (i.e., none).

---

[37] Taylor Kubota, Stanford Study casts Doubt on Carbon Capture, *Stanford News* (October 25, 2019), https://news.stanford.edu/2019/10/25/study-casts-doubt-carbon-capture/ (citing Mark Z. Jacobson, The health and climate impacts of carbon capture and direct air capture,12 Energy Envt. Sci. 3567 (2019), https://pubs.rsc.org/en/content/articlelanding/2019/ee/c9ee02709b/unauth#!divAbstract).

[38] *See* IEEFA, *The Carbon Capture Crux: Lessons Learned*, *supra* note 35; *see also* U.S. Government Accountability Office, Carbon Capture and Storage: Actions Needed to Improve DOE Management of Demonstration Projects (2021), https://www.gao.gov/assets/gao-22-105111.pdf.

[39] Michael Mazengarb, Chevron admits failure of $3 billion CCS facility in Western Australia, *IEFFA* (July 19, 2021), https://ieefa.org/chevron-admits-failure-of-3-billion-ccs-facility-in-western-australia/.

[40] *See* Jonathan Hettinger, Despite hundreds of millions in tax dollars, ADM's carbon capture program still hasn't met promised goals, *Midwest Center for Investigative Reporting* (Nov. 19, 2020), https://investigatemidwest.org/2020/11/19/despite-hundreds-of-millions-in-tax-dollars-adms-carbon-capture-programstill-hasnt-met-promised-goals/.

[41] *See* Nichola Groom, Problems plagued U.S. CO 2 capture project before shutdown: document, *Reuters* (Aug.6, 2020), https://www.reuters.com/article/us-usa-energy-carbon-capture/problems-plagued-u-s-co2-capture-project-before-shut%20down-document-idUSKCN2523K8.

[42] *See* Carlos Anchondo, CCUS 'red flag?' World's sole coal project hits snag, *E&E News* (January 10, 2022), https://www.eenews.net/articles/ccs-red-flag-worlds-sole-coal-project-hits-snag/.

[43] See David Schlissel et al., Institute for Energy Economics and Financial Analysis, Blue Hydrogen: Technology Challenges, Weak Commercial Prospects, and Not Green (2022), https://ieefa.org/wp-content/uploads/2022/02/Blue-Hydrogen-Presentation_February-2022.pdf.

[44] *See, e.g.*, Nicholas Kusnetz, In a Bid to Save Its Coal Industry, Wyoming Has Become a Test Case for Carbon Capture, but Utilities are Balking at the Pricetag, *Inside Climate News* (May 29, 2020), https://insideclimatenews.org/news/29052022/coal-carbon-capture-wyoming/.

[45] Karin Rives, Only still-operating carbon capture project battled technical issues in 2021, *S&P Global* (Jan. 6, 2022), https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/only-still-operating-carbon-capture-project-battled-technical-issues-in-2021-68302671.

Carbon capture projects also face significant feasibility risks, owing to the substantial costs[46] and land use footprint associated with CCS infrastructure, and its serious environmental, public health, and safety risks.[47]36 One study estimates that to scale, the CCS build-out—including the pipelines and infrastructure required to capture, compress, transport, and store CO2—will need to be 2 to 4 times larger than the current global oil industry.[48]

Other Geoengineering Technologies

The Information Note provided at the last meeting of the Article 6.4 mechanism Supervisory Body also discussed ocean fertilization and ocean alkalinization as engineering based removal activities. These activities, like other speculative removal technologies, present significant risks, as recognized in discussions held by Parties to the London Protocol to the London Convention. The London Protocol to the London Convention regulates marine geoengineering already and is taking steps to consider additional regulations.[49] The London Protocol to the London Convention has already noted that ocean fertilization activities that are not for legitimate scientific research should not be allowed. In a recent decision, the Report of the Working Group on Marine Geoengineering acknowledged that marine geoengineering should not replace emissions reductions and that they may have adverse environmental effects and thus should be further evaluated with the goal of devising proper regulations under the London Convention and London Protocol.[50] The Working Group determined that it would prioritize evaluating two carbon dioxide removal techniques (enhancing ocean alkalinity and macroalgae cultivation and other biomass for sequestration including artificial upwelling) and two solar radiation management techniques (marine cloud brightening and microbubbles/reflective particles/material). Given "the potential for these techniques to have deleterious effects" and that these effects "may be widespread, long lasting or severe," Parties have been urged to follow the precautionary approach and to take the "utmost caution."[51] The UNFCCC, and the bodies created under it, should not overstep and instead should take note of these ongoing processes elsewhere and not sanction activities that are precluded or are subject to regulation in other international fora.

---

[46] *See* Hélène Pilorgé et al., Cost Analysis of Carbon Capture and Sequestration of Process Emissions from the U.S. Industrial Sector, 54(12) Envtl. Sci. & Tech. 7524-7532 (2020), https://pubs.acs.org/doi/abs/10.1021/acs.est.9b07930.

[47] Sandra Steingraber, Carbon capture and storage fails to mitigate the dangers of fracking, *in Concerned Health Professionals of New York and Physicians for Social Responsibility, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking and Associated Gas and Oil Infrastructure* (Eighth Ed., 2022), https://www.psr.org/wp-content/uploads/2022/04/compendium-8.pdf*; see also* Beth Warden, Government report on CO2 pipeline leak in Mississippi could affect South Dakota Pipelines, *Dakota News Now* (June 11, 2022), https://www.dakotanewsnow.com/2022/06/12/government-report-co2-pipeline-leak-mississippi-could-affect-south-dakota-pipelines/.

[48] N. Mac Dowell et al., The role of CO2 capture and utilization in mitigating climate change, 7 Nature Climate Change 243 (2017), https://www.nature.com/articles/nclimate3231.

[49] Marine geoengineering techniques identified for further evaluation (Oct. 10, 2022), https://www.imo.org/en/MediaCentre/PressBriefings/pages/Marine-geoengineering.aspx (explaining in the "Background Information" that the LP and LC first regulated ocean fertilization in 2008 and adopted further regulations in 2010 and 2013 to regulate and control marine geoengineering) .

[50] *Id.*

[51] *Id.*

These risks are why other international legal bodies have also acted to regulate or prevent engineered removals. The multilateral environmental agreement that has engaged with and considered geoengineering for the longest time is the Convention on Biological Diversity (CBD), which first discussed it in 2007. Since first doing so at the Ninth Conference of the Parties (COP), the Parties to the CBD have adopted decisions on geoengineering at five consecutive COPs. Significantly, at COP10 in 2010, the Parties to the CBD took Decision X/33(w), which established a moratorium on all geoengineering activities.[52] In 2008, the CBD had previously adopted a moratorium on ocean fertilization. Thus, it takes a precautionary approach to prevent harm from occurring.

Human Rights Compliance and Grievance Redress

Any activity promoted or recognized under Article 6.4 must be compliant with human rights, and not harmful to the environment, and must be accountable for that compliance. States have an obligation to implement measures that are proven and safe and that do not violate human rights. Past experience of market-based activities, including under the Clean Development Mechanism, includes numerous projects that have undermined human rights and harmed communities and their environment. For example, land sector offsets bring huge risks and negative impacts, including harm to communities and ecosystems. In recognition of those risks, Parties rightly included a provision in the rules adopted at COP26 specifying that Article 6.4 activities must avoid negative environmental and social impacts and that the Supervisory Body should adopt requirements and processes to operate the mechanism, including requirements related to human rights including the rights of Indigenous Peoples and robust environmental and social safeguards.

Ensuring that activities pursuant to Article 6.4 respect rights includes ensuring respect for environmental procedural rights, which are enshrined in regional agreements such as the Aarhus and Escazu Conventions. The Human Rights Council has recognized that "the exercise of human rights, including the rights to seek, receive and impart information, to participate effectively in the conduct of government and public affairs and in environmental decision-making and to an effective remedy, is vital to the protection of a clean, healthy and sustainable environment."[53] In addition, these rights have also been recognized as the procedural elements of the Right to a Healthy Environment by the UN Special Rapporteur on Human Rights and the Environment, whose report in this area states that ensuring broad, inclusive and gender-sensitive public participation not only fulfills human rights obligations but results in better outcomes.[54] Critically, Article 6.4 activities must respect the rights of Indigenous Peoples, especially their right to free, prior and informed consent (FPIC) before any decision is taken that will

[52] Convention on Biological Diversity, Climate-related Geoengineering and Biodiversity, https://www.cbd.int/climate/geoengineering/; Sands & Cook, *supra* note 15, at para. 18.
[53] UN Human Rights Council Resolution 48/13, The human right to a clean, healthy and sustainable environment, UN Doc. A/HRC/RES/48/13, preamble (Oct. 2021), https://undocs.org/A/HRC/RES/48/13.
[54] Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, Right to a healthy environment: good practices, UN Doc. A/HRC/43/53, pp. 7, 17 (Dec. 2019), https://undocs.org/A/HRC/43/53.

impact their lands or territories. Further, the Supervisory Body needs to develop the procedures and guidelines for the independent grievance process to enable realization of the right to remedy.

Rather than focusing on how to include risky removals in the market activities, Parties should be focusing on what policies need to be in place to protect human rights, including the rights of indigenous peoples, and safeguard the environment. Central to those policies is the establishment of a robust and accessible independent grievance redress mechanism that can provide remedy to those harmed by any activities registered by the Article 6.4 Supervisory Body, and address fraud, misrepresentation, or greenwashing related to the generation, use, or exchange of an Article 6, paragraph 4, emission reduction (A6.4ER). While the grievance mechanism is relevant beyond the discussions of rules for removals, it is a critically important piece of the infrastructure that must be in place before any activities take place and is largely absent from considerations thus far. It is welcome that the most recent "In-meeting working document on 'Recommendations for activities involving removals under the Article 6.4 mechanism" states in paragraph 26, "A removal activity shall be so designed that it does not have negative impacts on biodiversity, land and soils, health of the ecosystems, food security, human health, local livelihoods and the rights of the indigenous peoples." Further work will have to be done to ensure that these requirements are understood and complied with. Such policies and processes must be developed prior to any activities taking place.

Conclusion

Any and all activities pursued under the Article 6.4 mechanism could have real and potentially severe consequences for people and ecosystems. For the reasons outlined above, this risk is especially acute with respect to removals. It is critical, therefore, that things are done right (as acknowledged at the last Supervisory Body meeting by at least one member). The Supervisory Body must not do things quickly to just get them done. The urgency of the climate crisis does not justify expediency or eliminate the need for precaution in matters related to human rights and the environment.