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RE: Comment on **Requirements for the development and assessment of Article 6.4 mechanism methodologies** and **Article 6.4 validation and verification standard for projects** in advance of Supervisory Body meeting starting October 30

Dear Article 6.4 Supervisory Body:

The University of California, Berkeley Carbon Trading Project is dedicated to the rigorous study of carbon offset quality and has developed systematic methods for performing comprehensive quality assessment at the methodology level.

I would first like to share with you our assessment of three sets of offset methodologies: REDD+ (reducing emissions from deforestation and forest degradation), efficient cookstoves, and improved forest management (IFM), (studies are also attached). These studies show widespread over-crediting from these significant categories of projects on the voluntary (all three project types), UN (cookstoves), and California (IFM) offset markets.

Over-crediting is significant and pervasive across all three project types. In our study of REDD+ methodologies, we cite one Science article, West et al. (2023), which assesses REDD+ project baselines, estimating that the greenhouse gas (GHG) benefits of their sample of 17 REDD+ projects was less than a thirteenth the number of credits they generated. Our study found systematic and substantial over-crediting across all methodology elements we assessed: baselines, leakage, forest carbon accounting, and permanence/durability. We also found that the safeguards policies were largely check-boxing exercises. Our quantitative assessment of five cookstoves offset methodologies, covering two methodologies developed for the CDM and three by Gold Standard, found six (average) and nine (total) times over-crediting across the study sample, which had generated 37% of total credits from this project type. Our study of eight IFM offset methodologies developed by three voluntary market offset registries and California's compliance program also found that the methodologies commonly do not reflect published science resulting in substantial over-crediting across multiple quality factors. California's methodology, generating the majority of IFM credits on the offset market, over-credits from baselines (two studies found little evidence that the projects had much effect at all on forest management; Coffield et al., 2022; Stapp et al., 2023), leakage (50-82% of credits do not represent real emissions reductions; Haya, 2019), insufficient buffer pool deductions especially taking into account expected increased risk with climate change (Anderegg et al., 2020; Badgley et al., 2022), and perverse incentives to increase carbon stocks in forests in the US pacific northwest that are already over-stocked and recommended for fuels reduction (Herbert et al., 2022). See more articles and discussion in the IFM section of our Repository of Articles on Offset Quality.

Our recent findings are consistent with earlier studies of the first major carbon offset program, the UN's Clean Development Mechanism (CDM), that found that the large majority of UN projects are most likely non-additional (Haya, 2010), that only 2% of projects have a high likelihood of being

additional and not over-credited (Cames et al., 2016), and that CDM's tool for assessing additionality was not effective at preventing non-additional crediting (both studies). Over-crediting has also been documented for California's livestock digester methodology under which projects unlikely to be additional were able to register (Pierce & Strong, 2023) and a series of articles on Australia's offset program.

It is striking how common and substantial over-crediting is across methodologies, projects, and quality factors.

Our REDD+ study examines why over-crediting is so prevalent. We found that the methodologies allow for substantial flexibility in the methods used to estimate emissions reductions, that developers consistently made methodological choices that led to more credits rather than being conservative as required, and that third-party auditors did not enforce conservativeness and sometimes did not even enforce reasonable compliance with the methodologies. We conclude that several fundamental and inherent characteristics of the offset market work together creating the perfect conditions for poor quality. These are uncertainty, aligned interests, complexity, and the market system. High levels of uncertainty are inherent to offset programs because they must measure emissions reductions against a counterfactual (baseline) scenario representing what would likely have happened without the offset program. This scenario never happened and so is immeasurable and is highly uncertain for many project types. This uncertainty is deliberated by a set of market actors that all benefit from more credits, and therefore from poor quality. Methodologies are commonly written by project developers. Project developers benefit from generating more credits from less investment. Credit buyers benefit from lower cost credits. Third-party auditors are hired directly by the project developers and benefit from doing less and judging leniently so they are more likely to be hired again. Methodologies and the credit generation system is often highly complex buffering projects from external scrutiny. The overall market system is built on the idea that all credits are equivalent and creating the incentive to find the least cost credits. This creates a race to the bottom; rigorous methodologies will result in higher-priced credits driving buyers to the less rigorous methodologies.

Effective regulation of quality is imperative for a stable effective market. Growing involvement of major corporations in the offset market and increasing public understanding of the urgency of climate mitigation and the insufficiency of global efforts to date has brought increased interest in the offset market by academic researchers and the media. Current offset markets are standing on houses of cards that is not fortified with sound methodology is at risk of collapse with increased scrutiny.

To develop a solid effective offset market, the UN would need to create a system different from previous offset program, that ensures quality and addresses the core causes of poor quality to date. To do this, UN could:

(1) Ensure that methodologies are conservative and do not over-credit across the portfolio of participating projects
   - All methodologies should include a literature review, summarizing the peer reviewed literature and white papers and comparing all important methodological elements with that literature to justify their conservativeness.
   - Quality evaluations should be at a methodology level rather than project level, recognizing the inevitability that some participating activities will be over-credited or non-additional. A methodology avoids over-crediting if under-crediting due to conservativeness embedded in the methodologies counterbalances over-crediting. This analysis should recognize adverse selection whereby projects that can generate the most

credits from the least change are the most likely to register. Our comprehensive cookstoves article (mentioned above) provides a good example of how to perform such a quantitative over/under crediting analysis including comprehensive review of literature and comparison of methodological elements with that literature. Our REDD+ and IFM studies are good examples of how to do such an analysis qualitatively. I'm attaching a procedure document for doing such an analysis which I developed for the University of California. The Carbon Credit Quality Initiative (CCQI) has also developed methods for doing a similar analysis.

(2) Ensure that validation and verification is truly impartial
   - DOEs could be chosen and hired by an independent UN body rather than directly by the project developers; developers can still pay for those auditing services.
   - When developers have flexibility in GHG calculations, DOE teams should be required to enforce the conservativeness of methodological choices and have the necessary sectoral, regional, and scientific expertise to do so.

(3) Ensure that project information and the impact calculations are transparent to the public so that independent analysist and credit buyers can assess credit quality, which is necessary to maintain trust in the market

Many CDM projects provided detailed emissions calculation spreadsheets and discussion of assumptions that go into them; such disclosure should be required by all 6.4 projects with the exceptional option of redacting confidential information with clear and narrow definitions of what may be considered confidential.

I discuss some of these recommendations below as they relate to the draft documents under consideration by the Subsidiary Body for the mechanism established by Article 6, paragraph 4 of the Paris Agreement prior to its 30 October 2023 meeting.

Requirements for the development and assessment of Article 6.4 mechanism methodologies

Specific suggestions on draft text

- Paragraph 26: Review of literature. I suggest adding in one more methodology requirement:
  (g) Including a review of published literature, including peer review articles and white papers where appropriate, as background and to justify the accuracy or conservativeness of methodological approaches, including emissions factors, modelling approaches, the baseline approach, leakage assessment where appropriate, reversal risk where appropriate, and additionality assessment.
- 5. Additionality:
  I strongly advise against the use of an additionality test that relies on investment and barriers analyses. Is has been well documented that the investment analysis is not accurate on a project-by-project basis since it has been possible to strategically choose input assumptions that can show that a cost effective projects is not cost effective (Cames et al., 2026, Haya, 2010). The barriers test is even more manipulatable, since all projects have barriers of some form. The investment and barriers analysis can help credit buyers individually vet projects, but has been disproven to be sufficient in demonstrating additionality. Instead, negative and positive lists should be used allowing only carefully determined categories of projects that are unlikely to be developed on their own and for which offset income can significantly affect project returns, while also ensuring that methodologies include sufficient under-crediting to

counterbalance inevitable over-crediting from some projects taking into account adverse selection. Quality should be assessed programmatically across the entire portfolio of projects.

- 6. Leakage:
  Leakage has been an important quality issue for forest methodologies. Most methodologies use leakage rates far below findings in the research literature (Haya, 2019; Haya & Stewart, 2019; Haya et al., 2023). The two most used methodologies also have an important timing discrepancy whereby projects are credited for large reductions in harvesting at the project start, but deduct leakage associated with that reduction over 100 years leading to over-crediting for the first decades of a project (Haya, 2019). I recommend including explicit language on leakage requiring:
  - the timing of leakage deduction to coincide with associated credited reductions and removals, and
  - that leakage deductions shall conservatively reflect published literature
- Baselines:
  Projects should use best practice in baseline setting as documented in the research literature if feasible or otherwise show that all permitted baseline approaches are conservative compared to that best practice.

Article 6.4 validation and verification standard for projects

Section 4.2 Impartiality
When DOEs are hired and chosen by the project activity developers themselves they compete for lower prices creating incentives to perform a less rigorous review in order to charge less. They also have incentives to be lenient in order to be hired again by the same or other project activity developers.

To avoid such impartiality, the UN system can create a process for choosing and hiring DOEs. The project developer can still pay the cost of verification, but the DOE is chosen and hired by the independent UN body.

Thank you for considering these comments.

Most sincerely,
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