Carbon Market Watch submission to the California ARB, regarding the use of REDD credits

16 November 2015

EXECUTIVE SUMMARY

Deforestation and forest degradation are significant contributors to global greenhouse gas emissions. To help address the climate crisis, it is essential that emissions from deforestation and forest degradation (REDD) are rapidly reduced and reversed, in time, through ecosystem restoration. One proposal to assist in this aim is to include REDD in the California Cap-and-Trade system. The idea is that trading in credits from REDD activities in areas such as Chiapas and Acre can contribute to reducing net emissions in the state.

If California decided to go ahead in doing so, it would be the first compliance market to allow REDD credits to be used to offset fossil emissions. Other compliance markets, such as the EU ETS, have been notably reticent to include REDD, or other land use credits, in their trading schemes for a variety of reasons, including the special characteristics of biological carbon, compared with fossil carbon.

Biological carbon is a much less secure store of carbon than fossil carbon (which has been stably stored in geological formations for over 300 million years), and so operates in a far more dynamic part of the carbon cycles, making its permanence highly questionable, especially in the context of climate change. Biological carbon accounting is far less certain and more difficult and relies on projected baselines that require a lot of estimations, or even guess work, across many variables to develop. With trade in wood and other forest products often operating at a global level, the issue of leakage is considerable for forest credits. Carbon leakage is the term used to describe emissions that occur outside an offset project boundary, that are caused by, or attributable to, the offset project activity. For example, an offset project that prevents a forest from being logged in one area could simply result in trees being harvested elsewhere. This can potentially lead to the emission reductions benefit of an offset project being negated by increases in emissions occurring elsewhere. If this occurs, then the overall result is no net atmospheric benefit. And in the case of Acre in particular, Brazil has publicly stated that it does not consider double counting to be an issue, so any credits removed from Acre would not be removed from the national registry, resulting in the double counting of the emissions reduction effort, again, for no net atmospheric benefit.

In Carbon Market Watch's view, and for the reasons outlined in this submission:

1. The California Air Resources Board should reject the use of REDD+ offset credits in the state's Cap-and-Trade program on the following grounds:
   - **Fossil carbon and biological carbon cannot be considered to be fungible**, as they are fundamentally different in the ways that they move through the biogeosphere, and thereby have fundamentally different properties
   - **Accounting for fossil carbon is more exact** and relies less on estimates, such as for tree density and carbon content and from inadequately detailed remote sensing data. It also requires less of the expensive groundtruthing that forests require to try and address these considerations
   - **Projecting baselines for forest carbon has unacceptably high uncertainties against which to generate plausible credits**: it relies on projecting historical data across many complex variables into the future to produce a counter-factual business-as-usual scenario against which the emissions reductions can be calculated

- **Fossil carbon is geologically stable and therefore permanent**; reducing emissions by not burning these resources ensures permanence of carbon storage. **Forest carbon is subject to reversibility** through human impacts (agricultural expansion, logging), and climate impacts (greater risks of fires through forest drying, risks of reversals through insect attacks)
- **Leakage can occur locally, nationally, regionally or internationally and is** notoriously difficult to quantify. Between 0-95% of the emissions avoided by a REDD+ project can be emitted elsewhere
- **Double counting is a significant risk** and will lead to no net climate benefit from the purchase of any credit claimed by a purchaser and not removed from the host country inventory

2. To contribute to providing finance for REDD initiatives, the ARB could consider establishing a levy on trading of credits, such as the 2% levy of the Climate Development Mechanism that helps to finance the Adaptation Fund

INTRODUCTION

Forests cover about 30% of the global land area, a total of 4 billion hectares[1] (FAO, 2010). Between 1990 and 2000, over 8 million hectares of forests were lost per year, and deforestation and forest degradation continues, leading to about 12% of global greenhouse gas emissions coming from this source[2].

To help address the climate crisis, as well to sustain the broader goods of the forests, including biodiversity conservation, and soil and hydrology protection, it is essential that emissions from deforestation and forest degradation are stopped.

The question then arises on what is the best means to raise the finance to address the drivers of deforestation. One proposal has been to include land use/ forest carbon in the carbon markets, treating it as fungible with fossil carbon.

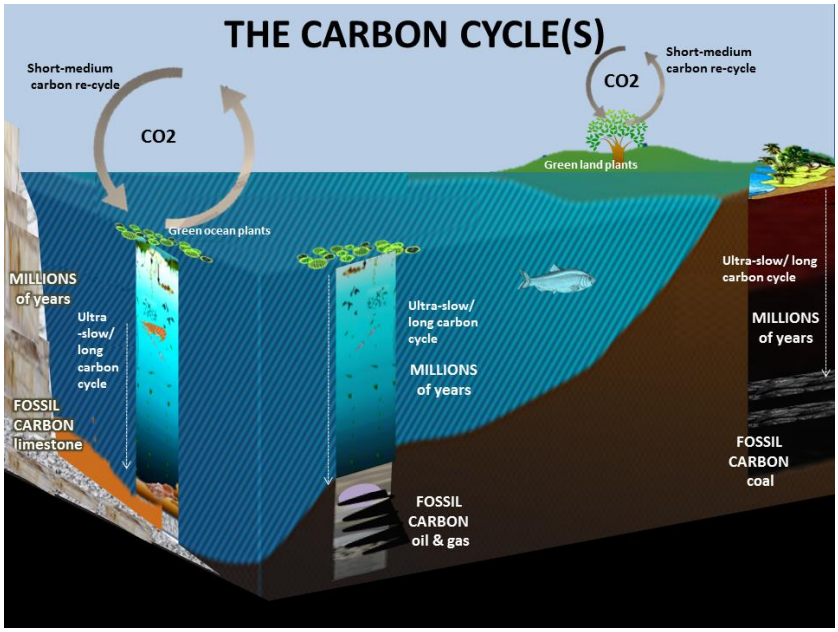
As well as questioning whether that basic fungibility assumption, this submission also outlines our concerns regarding technical considerations, such as additionality and baseline setting, permanence, leakage and the potential for corruption and perverse incentives. Some concerns regarding double counting of credits are also outlined.

Why fossil and biological carbon are not fungible

In terms of what the atmosphere sees at a given point in time, a tonne of greenhouse gas is indeed a tonne: the interaction of solar radiation with a tonne of a given GHG is the same regardless of its source, and this is the foundation for accounting for what is emitted into the atmosphere, or absorbed by sink. However, this is a very incomplete view of the carbon fluxes from the different sources and sinks across the different carbon cycles; in particular, it ignores the timescales for fluxes in different parts of the overall carbon cycle. This is important for any consideration of fungibility between the cycles.

[1] FAO (2010) Global Forest Resources Assessment. Main report

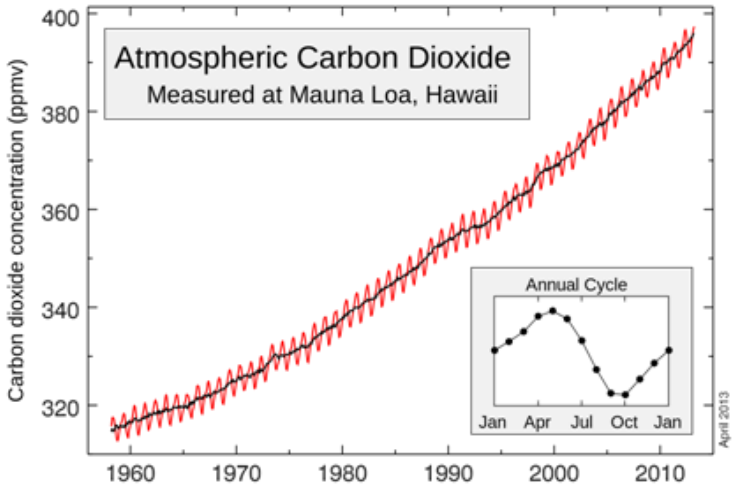
[2] van der Werf, Morton DeFries, Olivier, Kasibhatia, Jackson, Collatz and Randerson, 2009, CO_2 emissions from forest loss, Nature Geoscience, **2**, 737-738



Biological and fossil parts of the carbon cycle operate in different cycles, on different timescales.[3]

The fossil carbon found in fossil fuels was mostly laid down in the carboniferous period 359.2 to 299 million years ago, and is only now being released through their anthropogenic use. The large scale weathering of carbon back into the geosphere takes place also on geological time scales (thousands to millions of years).

In contrast, the fluxes of carbon through the biosphere operate over much shorter timescales than the geological ones, allowing rapid emissions - through land use changes, fires, insect attacks and reactions to rising temperatures. Photosynthesis allows uptake of CO_2 over a period of years, instead of millions of years: indeed it is the photosynthetic cycles of the northern boreal forests that does much to explain the annual fluctuations in atmospheric CO2 in the famous Moana Loa graph of atmospheric CO_2 concentration[4]:



[3] http://www.climate-change-knowledge.org/uploads/EPA_long_4_fossil_2.png
[4] nl.wikipedia.org

This difference in timescales, and its policy implications, is something well recognized in earth science, but not so among climate policy makers. For instance, a recent paper[5] stated:

> "We bookkeep fossil fuel and deforestation carbon separately, because the larger fossil fuel term is known more accurately and this carbon stays in the climate system for hundreds of thousands of years. Thus fossil fuel carbon is the crucial human input that must be limited".

Additionality and baseline setting

Offsets should represent greenhouse gas (GHG) emission reductions or removals that exceed any greenhouse gas reduction or removals otherwise required by law, regulation or legally binding mandate, and that exceed any greenhouse gas reductions or removals that would otherwise occur in a conservative business-as-usual scenario. This concept is commonly referred to as "additionality".

Additionality is difficult to establish for all types of offset projects but is particularly challenging for many REDD projects. This is because REDD projects do not reduce emissions. Instead REDD projects avoid emissions, meaning they avoid the emissions that would have been created if the forest had been cut down. Determining if a forest would have indeed been cut down if it had not been turned into an offsetting project is in many cases difficult or impossible.

The baseline defines *how much* carbon would have been emitted without the offset payment. Determining how many emissions are avoided requires assuming a counter-factual business-as-usual scenario against which the emissions reductions can be calculated. This scenario is usually determined by using historical data and then extrapolating into the future. Such baseline modeling is the Achilles heel of REDD+ offsets, as very large amounts of offsets can be generated by creative modeling.

Permanence

Because of the potentially rapid fluxes in biological carbon, relying biological carbon emission reductions to offset fossil carbon carries real risks of reversibility, so that biological carbon stocks rapidly get released to the atmosphere. A recent study[6] found that for every degree Celsius of warming, the Amazon and other tropical forests will release 53 ±17 billion tonnes of carbon. Intended Nationally-Determined Contributions pledged into the UNFCCC so far, if implemented, would imply warming of a concerning 2.7ºC. Further, another recent study[7] found that many forests won't be able to absorb as much CO_2 as previously projected, as they'll have a shortage of another vital nutrient: nitrogen. The IPCC[8] also noted "Carbon stored in terrestrial ecosystems is vulnerable to loss back to the atmosphere, resulting from increased fire frequency due to climate change and the sensitivity of ecosystem respiration to rising temperatures". Not burning fossil fuels is a permanent means of not increasing atmospheric loading of CO_2.

In the CDM, eligible land use, land use change and forestry (LULUCF) activities have tried to overcome the permanence issue by issuing temporary Certified Emissions Reduction (tCER) credits, but these have

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[5] Eg Hansen, Kharecha, Sato, Masson-Delmotte, Ackerman, Beerline, Hearty, Hoegh-Guldberg, Hsu, Parmesan, Rockstrom, Rohling, Sachs, Smith, Steffen, Van Susteren, Karina, Zachos, 2013, PLOS ONE, *Assessing 'Dangerous Climate Change': Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature:*

[6] Cox, Pearson, Booth, Friedlingstein, Huntingford, Jones, Luke, 2013, Nature, *Sensitivity of tropical carbon to climate change constrained by carbon dioxide variability*

[7] Meiyappan, Jain, House, 2015, *Global Biogeochemical Cycles,* ***Increased influence of nitrogen limitation on CO_2emissions from future land use and land-use change.***

[8] IPCC, 2014, Working Group 2: Impacts, Adaptation and Vulnerability

proved unpopular in the marketplace: afforestation and reforestation (A/F) projects represent 0.8% of the total number of projects to date[9].

Leakage

'Carbon leakage' describes emissions that occur outside an offset project boundary, that are attributable to the project activity. An offset project that prevents a forest from being logged in one area could simply result in trees being harvested elsewhere, potentially leading to the emission reductions benefit of an offset project being negated by increases in emissions occurring elsewhere. Leakage occurs when REDD+ activities do not address the underlying drivers of deforestation but focus on enforcement of protection of an area.

Leakage can be primary ('activity-shifting'), caused by people living in the immediate surroundings of a REDD+ project, and secondary ('market') leakage caused by outsiders, induced by price changes[10]. Primary leakage occurs, for example, if local, illegal charcoal producers move to another forest to continue their production after enforcement in a REDD+ area is increased. Secondary leakage occurs, for example, if cattle exports from one area reduced due to REDD+ and as a result investors start to push cattle expansion in other forest areas worldwide. Leakage is notoriously difficult to quantify.

Research shows that market leakage rates for REDD+ projects addressing commercial drivers can vary tremendously: between 0-95% of the emissions avoided by a REDD+ project can be emitted elsewhere[11][12]. One researcher pointed out that: "We thus do not really know how large REDD leakage is" and "asking for credible leakage estimates or leakage-proof design recipes is premature. It is helpful to play around with the numbers, but prediction ranges remain unacceptably wide"[13]. Leakage can be especially problematic for REDD+ projects avoiding illegal, commercial timber production by increasing enforcement, as the illegal loggers cannot be monitored and can be expected to move to other forest areas quickly. High levels of leakage can nullify all emission reductions from REDD+ projects.

Double Counting

With developing countries as well as developed countries taking on Nationally-Determined Commitments under the Un Framework Convention on Climate Change, defining which emissions reduction belongs to which country becomes increasing complex. Under the Kyoto Protocol, developed countries had targets and could buy credits from developing countries mitigation activities. Since developing countries had no specific targets to meet, there was no double counting of these credits. However, with developing countries taking on mitigation commitments, whether economy wide or across certain sectors only, there is a risk that if credits are issued from these sectors where obligations exist, but that they are not subtracted from the national green house gas registry, then the credits are double counted, while only yielding climate benefit (as best) once.

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[9] http://www.cdmpipeline.org/cdm-projects-type.htm

[10] Aukland, L., Costa, P. M., & Brown, S. (2003). A conceptual framework and its application for addressing leakage: the case of avoided deforestation. Climate Policy, 3(2), 123–136. doi:10.3763/cpol.2003.0316

[11] Sathaye, J. A., & Andrasko, K. (2006). Special issue on estimation of baselines and leakage in carbon mitigation forestry projects. Mitigation and Adaptation Strategies for Global Change, 12(6), 963–970. doi:10.1007/s11027-006-9057-2

[12] Gan, J., & McCarl, B. A. (2007). Measuring transnational leakage of forest conservation. Ecological Economics, 64(2), 423–432. doi:10.1016/j.ecolecon.2007.02.032

[13] Wunder, S. (2008). How do we deal with leakage. Moving ahead with REDD: issues, options and implications, 65-75. Bogor, Indonesia. CIFOR.

This is especially concerning for the California ARB's intrest5 in using credits from Acre. Brazil has publicly stated that it does not believe double counting is an issue, and that it will not subtract sub nationally-traded emissions units from its national inventory. This means that credits purchased from Acre will still count towards Brazil's economy-wide target and so will have no worth as emissions reductions. Unless there are obligations for such accountancy to be mandatory, there is a significant risk that this will be an issue from other host countries also.

RECOMMENDATIONS

In Carbon Market Watch's view, and for the reasons outlined in this submission:

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    - **Accounting for fossil carbon is more exact** and relies less on estimates, such as for tree density and carbon content and from inadequately detailed remote sensing data, than does forest carbon. It also requires less of the expensive ground truthing that forests require to try and address these considerations
    - **Projecting baselines for forest carbon has unacceptably high uncertainties against which to generate plausible credits**: it relies on projecting historical data across many complex variables into the future to produce a counter-factual business-as-usual scenario against which the emissions reductions can be calculated
    - **Fossil carbon is geologically stable and therefore permanent**; reducing emissions by not burning these resources ensures permanence of carbon storage. **Forest carbon is subject to reversibility** through human impacts (agricultural expansion, logging), and climate impacts (greater risks of fires through forest drying, risks of reversals through insect attacks)
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