Important aspects of sinks for linking emission trading systems

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Important aspects of sinks for linking emission trading systems

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16. Abstract

The discussion on how to design policy instruments to reduce emissions and enhance removals from land use, land use change, and forestry is likely to be a key feature of a future global climate protection framework and will also influence the design of an emerging global carbon market. By analyzing different ETSs it turns out that very specific provisions are in place to deal with carbon sinks. Different instruments, eligible activities and standards reflect the prevailing emissions profile and cultural preferences of a geographic area. The inclusion of forestry in a cap, for instance, makes provisions on additionality and non-permanence obsolete, but increases the relevance of other issues such as accounting and enforcement.

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16. Zusammenfassung Wie sind Politikinstrumente zur Minderung von Treibhausgasen und zur Steigerung von Senkenkapazitäten, die im Zuge der Landnutzung, Landnutzungsänderungen und im Forstsektor entstehen, auszugestalten? Die Antwort auf diese Frage wird die zukünftige globale Klimapolitik und die Weiterentwicklung des internationalen Kohlenstoffmarktes entscheidend mitbestimmen. Die Analyse verschiedener Emissionshandelssysteme in der vorliegenden Studie verdeutlicht, dass unterschiedliche Vorkehrungen bestehen, um Kohlenstoffsenken in einzelnen Handelssystemen zu berücksichtigen. Anrechenbare Aktivitäten und Standards spiegeln hierbei nicht zuletzt auch das vorherrschende regionale Emissionsprofil und die spezifische geographische Bedeutung von Senkenkapazitäten wider. Die Einbeziehung des Forstsektors zur Erreichung eines Minderungsziel kann beispielsweise Bestimmungen zur Zusätzlichkeit oder Dauerhaftigkeit obsolet machen, gleichzeitig aber die Relevanz anderer Fragen wie der Anrechenbarkeit und Umsetzung steigern.		
17. Schlagwörter Emissionshandel, LULUCF, REDD, Verknüpfung von Emissionshandelssystemen		
18. Preis	19.	20.

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List of abbreviations

AAU	Assigned Amount Unit
ACESA	American Clean Energy and Security Act
A/R	Afforestation and Reforestation
ARD	Afforestation, Reforestation and Deforestation
ATFS	American Tree Farm System
AB 32	California Global Warming Solutions Act
BAU	Business-As-Usual
CA	Canada
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
COP	Conference of the Parties
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalents
COATS	CO_2 Allowance Tracking System
ERU	Emission Reduction Unit
ETS	Emission Trading System
EUA	European Unit of Allowance
EU ETS	Emission Trading System of the European Union
FPP	Forest Project Protocol
FSC	Forest Stewardship Council
GHG	Greenhouse Gas
GIZ	German Gesellschaft für Internationale Zusammenarbeit
IFCI	International Forest Carbon Initiative

JI	Joint Implementation
lCER	long-term Certified Emission Reduction
LUCAS	Land Use and Carbon Analysis System
MRV	Monitoring, Reporting and Verification
NCAS	National Carbon Accounting System
NCAT	National Carbon Accounting Toolbox
NGO	Non-Governmental Organization
NIR	National Inventory Report
NZ	New Zealand
NZ ETS	New Zealand Emission Trading System
NZU	New Zealand Emission Unit
PIA	Project Implementation Agreement
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RGGI	Regional Greenhouse Gas Initiative
RMU	Removal Unit created by LULUCF activity in Annex B countries
SFI	Sustainable Forestry Institute
SFM	Sustainable Forest Management
tCER	temporary Certified Emission Reduction
TDERU	Tropical Deforestation Emission Reduction Unit
UNFF	United Nations Forum on Forests
US	United States of America
WCI	Western Climate Initiative

Introduction

Land use and forest protection has become an increasingly important climate change issue in the past decade, as deforestation alone contributes to about 20 percent of global greenhouse gases (GHG). According to the FAO 32,300 hectares of forests are destroyed or degraded each day – equalling to 13 million hectares per year between 1990 and 2005. The IPCC (2007) estimates emissions from deforestation in the 1990s to be at 5.8 GtCO2/year. Especially in the tropics, the lack of success in preventing tropical deforestation is partly caused by the steady decline in international financial support for sustainable forest management (UN ECOSOC 2009).

The IPCC and the Stern-Report, among others, outlined forest-related mitigation activities can considerably reduce CO2 emissions and increase CO2 removals by 'sinks' at low costs, and can be designed to create synergies with adaptation and sustainable development strategies. To this end, further development of financial incentives – national and international – are discussed to reduce deforestation, to increase forest areas, and to maintain and manage existing forests. Today, Reducing Emissions from Deforestation and Forest Degradation (REDD or REDD+)[1] is the most prominent example of such debates on Payment for Ecosystem Services (PES) limited to carbon sequestration. Accordingly, calls for the inclusion of credits from land-use, land use change and forestry (LULUCF) and REDD+ climate activities into the overall market approach for climate protection are getting louder. This study aims at outlining the relevance of the discussion on LULUCF and REDD+ activities for existing and emerging emissions trading schemes with a specific focus on the potential implications for their linking. To this end, we briefly outline the meaning of carbon emissions and removals from LULUCF and REDD+ activities for international climate policies and we describe the main arguments for and against the inclusion of sinks in emission trading schemes. We then analyse under which provisions respective activities have been developed in different trading schemes describing how trading schemes in the EU, Australia, Canada, the US, and New Zealand are dealing with the issue. Against this backdrop we discuss the potential relevance for linking efforts including potential alternative ways to strengthen climate protection in the land use sector without the direct inclusion in the emerging global carbon market.

As a matter of fact, literature is often not very precise regarding the definition of 'sinks' or 'carbon sinks'. UNFCCC, e,g., defines 'sink' as "any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere" (UNFCCC 1992). For practical reasons, we use in this study the term

[1] In this study we will use the term REDD+ which comprises issues relating to reducing emissions from deforestation and forest degradation *as well as* the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (see also chapter 1.2).

“sink” and “carbon sink” somehow loosely in this study, referring to carbon removals as well as emissions from activities from LULUCF and REDD+. In looking at the role of “sinks” in different emissions trading systems, this study means issues arising from carbon sequestration as well as from carbon emissions.

1 Relevance of LULUCF and REDD+ for international climate policy

Already in Article 4 of the United Nations Framework Convention on Climate Change references are included to the land use, land-use change, and forestry sector when commitments by parties to mitigate climate change are defined. First, it is required that parties need to develop, periodically update, publish, and make available national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases (GHGs) also including from the LULUCF sector. In addition, Art. 4, para 1(d) asks the parties to promote sustainable management as well conservation and enhancement, as appropriate, of sinks and reservoirs of all GHGs which also includes biomass, forests as well as other terrestrial, coastal, and marine ecosystems. With the discussion on legally binding emission reduction commitments leading to the Kyoto Protocol, more concrete activities in the LULUCF sector have also gained in importance.

1.1 Kyoto Protocol: General framework for LULUCF

The Kyoto Protocol entails provisions for Annex I parties on how LULUCF can be used to meet their commitments under Article 3.1: Under Article 3.3 of the Kyoto Protocol, Parties decided that GHG removals and emissions through afforestation, reforestation, and deforestation since 1990 are accounted for in meeting the Kyoto Protocol's emission targets. Under Article 3.4 of the Kyoto Protocol, Parties could elect additional human-induced activities related to LULUCF, specifically, forest management, cropland management, grazing land management and re-vegetation, to be included in its accounting for the first commitment period.

Under Article 6 of the Kyoto Protocol, an Annex I Party may – under the umbrella of Joint Implementation, implement projects that increase removals by sinks in another Annex I country. The removal units (RMUs) generated from such projects can be used by the former to meet its emission reduction target.

Under Article 12 of the Kyoto Protocol only afforestation and reforestation project activities are allowed. After extended controversy, discussion Annex B Parties were allowed to conduct afforestation and reforestation CDM projects (A/R) in Non Annex I countries and to offset one percent of their 1990 emissions during the first commitment period. At COP 9 in Milan, a detailed set of rules regarding the inclusion of projects from A/R was adopted. Different from other projects under CDM, CERs from A/R activities have a limited life span and are not transferable to the next commitment period. Certificates from A/R projects include tCERs (temporary CERs) and lCERs (long-term CERs): tCERs expire at the end of the period subsequent to the one in which they are issued, while lCERs expire at the end of the crediting period of the project (up to 60 years). LCERs also expire if carbon is released due to natural hazards, such as fires or disturbances or human activities (harvest). The responsibility for replacement of credits, which became void due to such circumstances, lies with the entity that acquired the certificate (Tuerk et al. 2008). However, as of August 1st 2010,

only 56 out of 5365 CDM projects in the pipeline focus on A/R (UNEP/Risoe CDM/JI Pipeline 2010). The low number of projects might be due to relatively high transaction costs, controversial environmental integrity, and exceedingly complex procedures associated with these projects.

1.2 The discussion on REDD+

International climate change negotiations have recently intensified the discussion on how to address deforestation in developing countries. The debate has moved to address how to design policy instruments to reduce emissions from forests and how such instruments may be integrated into the post 2012 framework.

The discussion about deforestation in developing countries was introduced as part of COP 11 in Montréal in 2005 by the Coalition of Rainforest Countries. Two years later, the Conference of the Parties in Bali (COP 13) adopted a decision on "Reducing emissions from deforestation in developing countries: approaches to stimulate action" (REDD). The document specifically encourages parties to "to explore a range of actions, identify options and undertake efforts, including demonstration activities, to address the drivers of deforestation relevant to their national circumstances, with a view to reducing emissions from deforestation and forest degradation and thus enhancing forest carbon stocks due to sustainable management of forests" (Decision 2/CP 13, 3), a portion of the decision that has come to be known as REDD+ highlighting explicitly the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.

In response to this result of the international negotiations, various institutions have launched initiatives to address the issue:

The FAO, UNDP, and UNEP launched UN-REDD, which has invested US $42.6 million in nine pilot countries: Bolivia, Democratic Republic of Congo (DRC), Indonesia, Panama, Papua New Guinea, Paraguay, United Republic of Tanzania, Viet Nam and Zambia**.** The Interim REDD+ Partnership, established in May 2010 during a conference in Oslo, is a voluntary, non-legally binding framework to improve effectiveness, efficiency, transparency and coordination of REDD+ initiatives and financial instruments. As an interim platform it should help partners to scale up REDD+ actions and finance.

The World Bank has set up a number of initiatives addressing forest issues in developing countries. The Forest Carbon Partnership Facility (FCPF), launched in Bali in 2007 has the objective of building capacity for REDD+ in developing countries and testing a program of performance-based incentive payments in selected pilot countries to set the stage for a much larger system of positive incentives and financing flows in the future. The BioCarbon Fund, set up by its Carbon Finance Unit in 2004, generates carbon for purchase from a variety of land use and forestry projects.

Various governments have set up REDD+ initiatives on a bilateral basis. Norway has committed US$600 million a year towards REDD+ activities, including its high profile activities in Indonesia. Australia is active in the Southern Pacific, and GIZ is active with REDD+ projects in Indonesia and Laos.

It is however unclear on how to encourage further REDD+, reforestation, afforestation, etc. activities in a post 2012 architecture. Various international discussions have proposed options to finance REDD+ activities, a fund, carbon trading, or a mixture of the two. Some parties as well as NGOs are afraid that a simple integration into the exsiting carbon trading efforts will lead to a flooding of the carbon market with too many certificates. The fund approach would have the weakest linkage to the overall carbon market structure. They may be financed by governments from funds derived from the auction of emission allowances in the ETSs, but also may be financed by developmental assistance funds or other funds (as the example of Norway shows). In this case, one option could be that each country would set up its own strategy to invest these funds, however doubts remain if this approach provides enough scale, efficiency, or efficacy (Viana 2009).

While Indonesia is working closely with Norway on a bilateral fund basis, some developing countries with large forest areas may find that they have an interest in integrating their forest management into a potential REDD+ mechanism as part of a carbon trading system in a post 2012 framework. The current situation outside the international negotiation may, however, pose some difficulties. Even if this interest on the part of developing countries were to materialize, it is not clear that other parties either with already existing emissions trading schemes, or in the process to establishing one would be so enthusiastic, e.g. because of fears regarding a flooding of the carbon market with too many and too cheap certificates (see the analysis in chapters 2 and 3 below).

As a result of these different positions, innovative hybrid approaches have been proposed that aim to balance competing interests by establishing a parallel market structure for sink credits (see, e.g., Greenpeace 2008; CCAP 2007; Viana 2009). One suggestion is to impose a quota on emission reduction targets that can be offset by sink credits (Viana (2009) suggests 10 percent of carbon offsets). This approach may help to avoid volatility, price-drops, and flooding of the carbon market contribution to increased environmental integrity.

Instead of a rigid quota, a more flexible form of credit system in terms of upper and lower boundaries for deployment of sink credits, may be applied (Greenpeace 2008). The Greenpeace proposal suggests, for example, establishing a hybrid market based on the introduction of a new “currency” such as Tropical Deforestation Emission Reduction Units (TDERUs) (Greenpeace 2008). CCAP (2007) proposes an alternative proposal for supporting REDD+ actions - the so called REDD Dual Markets Approach. This proposal would create a new market for the sale of REDD+ credits post-2012, separate from any post-2012 carbon market. Parties would establish a maximum percentage of emission reductions commitment could choose to achieve through the new REDD+ market. In case they fail to meet their REDD+ goals, parties would be allowed to use a possible post-2012 allowance after a given commitment period. The approach would give a theoretical REDD+ mechanism more time to develop and stabilize before any linking of the two markets. At the same time, the Dual Market system ensures that there is some demand for financing for developing country REDD+ actions while protecting the integrity of the existing carbon market.

In variably, there are a number of issues that must be addressed with any kind of trading system, or hybrid market or partly funds (see European Tropical Forest Research Network 2008; Scholz/Schmidt 2008). These include:

- *monitoring*: assessing emissions and removals by collecting detailed and specific data, and building the confidence needed for a robust market system;
- *baseline setting*: calculating the amount of emissions and removals that would occur without REDD+;
- *sale management structure*: designing a national and international financial mechanism for carbon trading (decide on the interchangeablility with other types of credits under the Clean Development Mechanism);
- *distribution of revenues*: managing the flow of funds/revenues to recipients (allocation of revenues, form of payments and timing, purpose of revenue use, organization of local stakeholders' participation, necessary institutional, and legal arrangements);
- *diversity of local conditions*: reflecting and taking into account the very different
    - local (community forest-related rights, land tenure, traditional forest and land use practices, land tenure) and
    - national conditions (large forest areas in Brazil and Indonesia, smaller areas in other countries, and differing deforestation rates due to conservation measures already taken) in a global systems;·
- *management of transaction cost*: providing for the upfront investments needed and keeping transactions costs low (monitoring systems, legal procedures, management costs of comprehensive losses and failures, e.g. due to forest fires).

2 Relevance of carbon sinks for emission trading systems

The complex discussion on how to integrate sinks into the overall Post-2012 architecture already indicates that there is a wide variety of perspectives on several key issues such as the resulting economic and ecological consequences. The impacts on economic efficiency and environmental effectiveness are especially relevant for the overall functioning of emission trading systems.

2.1 Economic efficiency

Deforestation and agriculture constitute major emission sources, contributing together to about 30 percent of total anthropogenic GHG emissions (IPCC 2007). According to the flagship report of Nicolas Stern on the "Economics of Climate Change", reducing deforestation represents a mitigation option almost as cost-effective as energy efficiency (Stern 2006). Additional recent economic analysis also shows that

afforestation, sustainable forestry and reducing deforestation constitute a possibility for particularly cost-effective GHG abatement (McKinsey 2009). From such a perspective LULUCF/REDD mechanisms are considered as an option to be flexible in terms of mitigation strategies in order to keep costs down.

Since concern about associated costs has always been an obstructive barrier to implementing effective climate policies, many actors in industrial countries highlight the opportunity to reduce abatement costs by integrating credits from carbon sinks in emission trading (Anger/Sathaye 2007). Owners of large industrial plants, e.g. in the EU, who have been required to buy and sell permits to release carbon dioxide into the atmosphere, argue that the inclusion of these credits in international and national ETSs would buy time for other abatement options to become more effective; for instance, learning curves for low carbon technologies (renewables) predict decreasing costs in the industry due to learning by doing over the next few decades.

As additional advantages of an inclusion into ETSs compared to fund-based approaches reference is made to cost-effectiveness, flexibility, and the involvement of financial resources including those from private sector and private investment (Sukhdev 2008; IEED 2009). The market approach is considered to generate predictable longterm financing compared to the set up of a fund (CCAP 2007: 10). Additionally, if credits coming from sinks are integrated into the carbon market this allows for achieving stricter emission reduction goals at the same (carbon) price. For instance, including REDD could theoretically increase environmental effectiveness by enabling industrialized countries to tighten their carbon constraints without increasing mitigation costs (Anger/Sathaye 2007).

In contrast to these optimistic perspectives on the potential of the inclusion of sinks, there is also some criticism towards this option – based not only on concerns regarding environmental effectiveness (see below) but also with respect to the impact on carbon markets. According to this perspective, the inclusion of REDD will lead to a flooding of the carbon market with credits, thus damaging carbon price. Sink credits may crowd out alternative abatement options and investment in renewable technologies. However, in order to avoid decreasing demand and decline in prices on the carbon market the overall reduction targets could be strengthened as mentioned above (Anger/Sathaye 2007, Karousakis and Corfee-Morlot 2007). Furthermore, another point of criticism is the high transaction costs associated with the inclusion of sinks and their accounting complexity (see also 2.2, Uncertainty aspect). It is argued that, given a carbon credit price of $50 per tCO2 or less, only carbon sinks in the tropics are capable of competing with actual emission reductions and thus, are attractive. Transaction costs may amount up to one-quarter or more of the costs of providing nature services (including p.e. opportunity costs of preserving nature in a certain way) like ARD projects and therefore, downsize the cost-efficiency of carbon sinks (van Kooten 2008).That is to say, there is evidence against the frequently mentioned argument of cost-effectiveness of sink enhancement, especially in Europe where costs for sinks could range between $50-$280 per tCO2 due to transaction costs, slower rates of tree growth, and higher land prices (van Kooten 2007). Substantially cost-effective are merely the bulk of sink credits in tropical regions.

2.2 Environmental effectiveness

There are a number of concerns regarding the inclusion of sinks in the emission markets from an environmental perspective.

2.2.1 Scale / Crowding out

The big scale of possible sink credits is an issue because broad inclusion would possibly crowd out emission reductions in the other sectors (e.g. energy and industry). Particularly, the potential of credits from reduced tropical deforestation (between 2008-2012 an amount of 40 Gt CO2) is vast (Stern 2006) (see above).

2.2.2 Non-Permanence

Any CO2 removal (e.g. AR-project) or any CO2 emission reduction (e.g. reduced deforestation) can be reversed. Risk factors such as man-induced deforestation but also external shocks like natural disasters or harvest pests can often not be controlled or mitigated. In other words, non-permanence means leakage over time. This is different from other offset categories, where reductions are permanent in principle.

2.2.3 Additionality (BAU reference emissions level)

There is an issue of credibility which only occurs in the case of an offset-regime and not in a cap approach (the forestry sector could be included into an ETS by imposing a cap on the sector or by allowing crediting of emissions reductions from that sector). The integration of REDD in an offset mechanism is a matter of controversial discussion, not least because it is difficult to assess if a forest would have been deforested in the future. *Business as usual* (BAU) baselines based on models and predictions contain uncertainties and may be “manipulated”, since the baseline scenario never actually occurs. Granting credits for assumptions on potential future developments can undermine the credibility of an offset program or mechanism (Türck et al. 2008). Additionality is subject to controversial debates with regard to CDM projects in general, and in the case of credits from carbon sinks AR CDM, the issue is even more complex.

2.2.4 Measurability / Uncertainty

Estimation of CO2 emissions and removals related to carbon sinks is difficult to assess. In order to sell the saved CO2 emissions in form of carbon credits, a certain amount of CO2 has to be derivable from a certain area of land/forest. However, there are numerous factors influencing the capacity of possible CO2 emissions and removals in a forest, such as its density, its forest species, whether it is primary or secondary forest, etc. Exact amounts of emissions and removals have to be estimated according to IPCC GL, 2003 and 2006 using inter alia statistical models, remote sensing and forest inventories. Input-data and parameters are very diverse, numerous (soil quality, ground vegetation, etc) and difficult to categorize and compare. For instance, the average annual rate of carbon uptake of a tropical forest is twice as capacious as of a

temperate forest and more than seven times bigger as the capacity of boreal forests. The same applies to the average carbon stock contained in the various forest types (IPCC 2000). In addition, an inclusion of forests and other sinks in emission trading not only requires the exact measurement of current removals and emissions, but also projections for the future.. However, assessments of future emissions and removals are problematic. Mathematical models can be used, although traditional modeling techniques, where parameters are estimated from empirical measurements, are usually limited by a lack of field data. For example, estimates of carbon residency times in vegetation and soil are not generally available, nor are they easily measured. Alternative methods are required (Roxburgh 2006). Monitoring and stock issues are especially relevant and problematic in some developing countries that lack essential (technological) infrastructure to conduct such tasks effectively.

2.2.5 Accounting

Hesitation to include carbon sinks in emission trading is also linked with the challenge of accurate accounting. First of all, it is important to keep in mind that ecosystems can store carbon, but they can also be a considerable source of carbon emissions. Due to the complexity and lack of an accurate scientific base, accounting in the LULUCF sector is often pragmatically governed by setting exceptional rules rather than precise measuring of actual removals and emissions. In that sense, the prevailing rules of the Kyoto Protocol determine that Annex I countries need to account for all emissions in the energy-, industry, waste- and agricultural sector, but have more leeway with the accounting of emissions and removals in the LULUCF sector. Only changes of carbon stocks due to afforestation, reforestation and deforestation need to be taken into account, whereas the inclusion of additional activities specified by Art. 3.4 is only optional (see chapter 1.1). In addition, the rules specified 2001 by the Marakkesh Accords on the maximum offset to be generated by forest managment activities allows only for a limited accounting for removals and emissions from this area within the first commitment period of the Kyoto Protocol (Cienciala et al. 2004).

The current regulatory framework does not give the effective incentives for carbon reductions or the improvement of sinks. For example, the current IPCC guidelines neglect negative reciprocal effects between LULUCF and bioenergy. They define the use of biomass for energy generation and as biofuel as a carbon neutral activity, therefore not taking into consideration that bioenergy projects – most often taking place in developing countries - are often accompanied with land use change producing a considerable release of carbon. Therefore, accounted emission reductions from bioenergy projects will often be higher than the actual reductions. Furthermore, IPCC guidelines assume that in the event of timber felling, the complete CO_2 captured by the wood is released to the atmosphere. However, this does not take into account that harvested wood is often used for the production of timber products and may store carbon for centuries (WBGU 2008).

These accounting discrepancies are lively discussed in international negotiations laying the framework for the post-2012 climate regime, whereas many of the regional and national ETSs analyzed in this study do not yet address such issues or do so only superficially. Against this backdrop the discussion on the inclusion of sinks into ETS in

the future, argues that removals and emissions should be equally accounted for. In addition, internationally diverging accounting standards should be addressed when it comes to linking different ETS or to define a global set of rules for credits related to carbon sinks.

2.2.6 Leakage

Given that in national and regional ETSs, sinks are or would be included via offsets, there can be a dislocation of emissions. In other words, emission removals from sinks can be simply foiled by emissions in a different regional area and still be credited as emission reductions (Karousakis and Corfee-Morlot 2007). Concerns about leakage was one of the primary reasons that deforestation was not allowed for CDM in the first Kyoto commitment period and REDD+ will not be designed as a project based mechanism but as a national one.. National reference levels are core of the discussed REDD+ mechanism. As a step towards a national mechanism, a subnational approach might be taken as an interim step. In general, international leakage will take place as long as not all countries are part of a climate regime.

2.2.7 Social and environmental impact

Finally, forests in particular tropical forests contribute to human well being not only by sequestering carbon but also in various additional aspects (biodiversity, watershed and landslide protection, indigenous people´s rights, local and regional climate etc.). The idea of benefiting from all of them by including LULUCF/REDD into climate strategies increases the general value of such an inclusion. However, overall environmental integrity has to be ensured. This may entail costs and requires specific measures related to the additional benefits of ARD by including environmental and social safeguards as discussed in the negotiations.

3 Comparison of approaches to sinks in existing and planned ETSs

The following chapter gives an overview on the different existing and planned ETSs and the treatment of carbon sinks in those systems.

3.1 European ETS

Overview

The EU ETS is the world's largest emission trading system covering emissions of 27 EU countries. It started with a first trading period from 2005-2007, and is currently in its second phase from 2008 to 2012. A third phase is scheduled for 2013-2020. Regarding its emission reductions trajectory, the EU agreed in 2008 to unilaterally reduce its emissions by at least 20 percent by 2020 compared to 1990 levels. Moreover, it is ready to scale up this reduction to 30 per cent provided that other developed countries commit themselves to comparable emission reductions and that economically more advanced developing countries contribute adequately according to their responsibilities and respective capabilities consistent with staying below a 2°C temperature rise (EU submission to UNFCCC, 2009). With regard to sectoral coverage, the EU ETS currently covers combustion installations over 20 MW, oil refineries, coke ovens, ferrous metal production (excluding aluminum, which will only enter the ETS by 2013), cement, glass and ceramics, and pulp and paper production. The scheme generates its own trading currency, the EUA (European Unit Allowance). Each EUA is backed by an AAU, which refers to one ton of CO2 allocated to Annex I countries under the Kyoto Protocol. As defined in the Linking Directive of 2004 (EC 2004), the system also allows facilities to use international offset mechanisms from the Kyoto Protocol to compensate for some of their emissions. While the quota for offsets in phase II (2008-2012) varies from country to country, the weighted average for the entire EU amounts to 13.4 percent (Flachsland et al. 2008). In phase III (2013-2020), the EU ETS will set the quota for the use of offsets for the whole system by 50 percent of the additional reduction effort in phase II and III. CERs and ERUs both are eligible credits under the EU ETS. However, credits from LULUCF projects are excluded for compliance. In addition to international credits, the EU is considering the allowance of credits from national offset projects in phase III (EP 2008).

Approach to sinks

The EU ETS explicitly excludes credits from carbon sinks. As mentioned above, it allows for the use of CERs and ERUs, except for tCERs, lCERs and ERUs from

LULUCF projects[2]. The majority of EU member states oppose the inclusion of LULUCF credits, expressing concerns related to uncertainty, non-permanence and the stability of the EUA market price. As far as relevant non-governmental actors, positions also differ considerably between organizations. Some highlight the opportunities of the inclusion of sinks in the EU ETS (e.g. EUSTAFOR 2008, Climate Focus 2006), others strictly oppose such an amendment to the present system (e.g. CAN Europe, WWF, Greenpeace, FOE 2007). In conjunction with the adoption of the Linking Directive of 2004, the EU Commission received a mandate to monitor technical process and evaluate options for including LULUCF credits in the EU ETS at a later stage. In 2007, the European Council invited the Commission "to consider, as part of the EU ETS review, a possible extension of its scope to land use, land-use change and forestry (LULUCF)" (EC 2007). In the same year, the EU Commission received a series of submissions requesting the lifting of the ban on LULUCF credits (Tuerk et al. 2008).

In 2009, the European Parliament and the council of the EU adopted a directive with the aim of improving and extending the EU ETS during the third trading period (2013-2020), amending the original emission trading directive of 2003. The 2009 directive urges the establishment of an internationally recognised system for reducing deforestation and increasing afforestation and reforestation, including the development of accurate financing mechanisms, It also recommends that EU Member States should use part of the revenues generated from the auctioning of allowances for measures to avoid deforestation and increase afforestation and reforestation in developing countries as well as for forestry sequestration in the European Community (EU parliament and council 2009). The integration of LULUCF or REDD+ in the ETS, is currently no option for the EU and has been ruled out until 2020. However, the possibility of authorizing companies to use "deforestation credits" to offset a portion of their emissions could be considered after 2020 – provided that an international set of rules with regard to REDD+ has been established by that date (European Commission 2008).

3.2 New Zealand

Overview

New Zealand is party to the KP and committed to a long-term target of a 50 percent reduction in net emissions from 1990 levels by 2050 (NZ submission to the UNFCCC, 2009). A New Zealand ETS, which was created by the Climate Change Response Act of 2002, became effective in January 2008. It will eventually cover all major sectors and all major GHGs mentioned in the KP. The first sector to be included was forestry in 2008; other sectors will follow until 2013. The NZ government will issue a number of emissions units, labeled as 'New Zealand Units' (NZUs), which will represent one ton of CO_2 either released to (emissions) or removed from (carbon sinks) the atmosphere (NZ

[2] In addition to sink projects, the EU ETS also excludes large hydro projects and nuclear energy

Government 2008). The system also allows for the use of CDM and JI for compliance without setting a quota for the import of such credits. Considering that all major sectors will be covered by the cap, there will not be much space for domestic offset credits. New Zealand establishes a strong link between its national ETS and the international carbon market. In this perspective, measurement of emissions and removals will mainly mirror those of the KP and NZUs become generally interchangeable with New Zealand AAUs (Kerr 2008).

Approach to sinks

With respect to international credits, the NZ ETS allows for the importation of credits from UN flexible mechanisms without restrictions on quantity. This includes tCERs and lCERs from AR CDM activities and RMUs from LULUCF JI activities which are capped at 0.2 Mt C per year. Domestic abatement, agriculture and forestry play a critical role in meeting the country's emission reduction objectives. During the first commitment period, agriculture will account for 49 percent of emissions on average. Comparatively, forestry offsets 32 percent of New Zealand's emissions. The reduction of deforestation is likely to be one of the low-cost options for reducing New Zealand's GHG emissions in the long-term. In addition, New Zealand has considerable potential to expand its forested land cover and on average sequester considerable additional carbon (Kerr 2008). This unusual emissions profile for a developed country leads to a very country-specific ETS design. Notably, New Zealand is the first country to begin its emission trading with forestry, limited to AR, and to include agriculture[3] in its cap-and-trade scheme.

The decision to use a market instrument to regulate forest- and agriculture-related emissions and removals was taken for several reasons: First of all, price-based measures are believed to provide farmers and foresters for strong incentives and flexibility in the choice of their response to climate change. Second, the government will be able to pass-on costs of mitigation strategies (MRV, research, administration) to the participants of the ETS. Third, stronger involvement of the private sector will push technology innovation and facilitate transformation in the two sectors. The New Zealand government also highlights benefits for other countries: monitoring technology and models, which are intensively investigated in New Zealand, will be extremely valuable – especially for developing countries.

Taking into consideration New Zealand's obligations under the KP, the NZ ETS includes domestic forest land in two ways: Owners of pre-1990 forest land will automatically become participants in the ETS if they deforest more than two hectares of non-exempt forest land in any five year period, starting 1 January 2008. Considering that forest management was not included in the system, normal harvesting followed by replanting (or regeneration) does not carry any requirement to join the ETS (NZ

[3] Introduction of sectors to the NZ ETS: Forestry in 2008, liquid fossil fuels in 2009, stationary energy and industrial process (non-energy) emissions in 2010, agriculture (includes pastoral and arable farming and horticulture), waste, other sectors in 2013 (NZ Government, 2008)

government 2008). Through the mandatory inclusion of pre-1990 forests in the ETS, the New Zealand government can transfer costs for emerging liabilities under the KP linked to deforestation to forest owners. Owners of post-1989 afforested or reforested forest land can choose to become a participant in the ETS. Entities that enter the scheme will be obliged to take responsibility for the ongoing net changes in the carbon stocks of their forests (Kerr 2008). Participation in the ETS entitles the forest owner to receive NZUs for the increase in carbon stocks from 1 January 2008 onwards. However, it also requires that they repay emission units whenever the carbon stocks fall below a previously reported level or emissions exceed sequestration (NZ government, 2008).

Forestry emissions and removals of New Zealand for the National Inventory Report (NIR) are estimated via the Land Use and Carbon Analysis System (LUCAS) (NIR covers the whole forestry sector whereas the ETS only covers AR). However, the government has not yet decided on how to assess emissions and removals under the ETS in detail. Owners of pre-1990 forests will be required to report annually about any deforested area. Owners of post-1989 forests will only have to submit a carbon stock assessment at the end of the 2008-2012 period, but are free to report more frequently. Entities can choose the sophistication of the carbon estimation methodology, which will influence the potential allocation of NZUs; the more accurate the method, the higher the amount of units possible (Kerr 2008). The fact that forest owners can choose estimation methods bears the risk that assessments under the ETS differ from those for the NIR. However, requiring all entities to use such complex methodologies as under LUCAS would lead to extremely high compliance costs. ETS obligations in the forestry sector will be enforced on the basis of self-assessment and random audits. Moreover, post-1989 forests will require certification by a 'Registered Carbon Certifier' before they can be accepted (Kerr 2008). As participation for these actors (post-1989 forests) is voluntary and all net-removals during the commitment period are eligible to receive credits, this is essentially an offset program with a simple 1990 clear land baseline. With regard to national leakage, forestry will face such problems to a smaller extent due to its national cap. Rather, the industry will benefit from less comprehensive rewards for expanding forestry in other countries. It is also unlikely that foreign forestry sectors will face 'leakage' to New Zealand (Kerr 2008).

The inclusion of forests (limited to AR) in the cap can potentially avoid the issues of additionality and permanence given a more comprehensive monitoring and control. A working paper by Climate Strategies outlines (Tuerk et al. 2008) outlines potential advantages and shortcomings of this approach: in addition to avoiding additionality and non-permanence concerns, inclusion would help to address a larger portion of emissions in the cap. However, the large number of landowners possibly raises the question of administrative feasibility of MRV. Also, traditions of independence from regulation in these sectors could raise difficulties. There is a lack of sophistication and capacity to undertake MRV by small landowners (but they could undertake MRV together with others to become eligible for voluntary inclusion in the cap). The separation of land ownership from land operator is prevalent in many countries. In general, it is too early to evaluate the cap approach; New Zealand is the only example to include forestry in its ETS and the NZ ETS has only recently started operation.

3.3 Australian Carbon Pollution Reduction Scheme (CPRS)

Overview

Since the Labour Party took office in 2007, Australia has pursued a very progressive climate policy. Australia committed to a long-term goal of reducing Australia's GHG emissions to 60 per cent below 2000 levels by 2050. Moreover, it agreed to unconditionally reduce Australia's emissions by 5 per cent below 2000 levels by 2020. In case of a global climate agreement including commitments of developed and key developing countries, it will commit to reduce emissions by up to 15 percent below 2000 levels by 2020 (Australia submission to UNFCCC 2009). After the release of a Green Paper in July 2008 and a White Paper in December 2008, draft legislation for the establishment of the Carbon Pollution Reduction Scheme (CPRS) was published on 10 March 2009. The CPRS is a legislative proposal for the introduction of an ETS in Australia and comprises 11 Bills. However, after having passed the Australian House of Representatives several times, the proposal could not gain the necessary majority to be passed by the Australian Senate. Considering that a compromise between the government and opposition parties still seems unlikely, the Australian Labour government has put its carbon emissions trading plan on hold on 27 April 2010. The need for an ETS in Australia will only be re-examined at the end of 2012 when the Kyoto period expires. The following description therefore reflects the latest version of the Bill as introduced in the Senate on 2 December 2009, but will not take effect in July 2011 as planned and may still be substantially revised if and when the introduction of an ETS is re-examined in Australia.

The draft of the CPRS includes all GHG gases[4] listed under the KP and cover around 75 percent of Australia's emissions. It involves mandatory obligations for facilities emitting 25000 tons of CO2e a year or more, which concerns around 1000 entities in total. There is also a possibility for other entities to voluntarily take on scheme obligations. Sectoral coverage includes stationary energy, transport, fugitive, industrial processes and waste. Emissions from agriculture are initially excluded from the scheme. However, the Australian government considers including this sector at a later date. Reforestation would be included from the beginning, however only on a voluntary basis (Australian government 2008). As a measure of cost control, banking and some possibilities for borrowing of allowances will be allowed in the system. During an initial period, the scheme would also include a transitional safety valve through a price cap, which starts at A$40/t[5] of CO2e and rises by five per cent per year plus adjustment for inflation (Jotzo / Betz 2009).

The system creates its own carbon pollution permits, which are not convertible with Australia's AAUs. With regard to the permitted international trading of credits, the

[4] Carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs)

[5] A$40 corresponds approximately to 24 EUR.

export of Australian credits is excluded in the initial years of the scheme (outside any possible linking arrangement). International Kyoto credits are allowed for compliance without quantitative restrictions. However, the draft CPRS only allows for non-forestry CERs, for ERUs and RMUs. The use of AAUs for compliance is explicitly excluded, at least in an initial period (Jotzo/Betz 2009). Considering the very broad proposed coverage of the CPRS, it leaves very limited scope for the use of domestic offsets - especially, if agriculture iseventually included in the cap. Nonetheless, the Australian government investigates the scope for such credits from 2013, e.g. opportunities to reduce emissions from savanna burning in Northern Australia and the potential for carbon offsets from this activity (Department of Climate Change 2008). International non-Kyoto units will not be accepted for compliance in the scheme until 2013. This position could be reviewed for the time beyond 2013 in the light of future developments in international negotiations.

Approach to sinks

With regard to international credits, the draft CPRS allows the purchase of RMUs for compliance, but excludes the use of tCERs and lCERs. Considering non-bankability of RMUs within the framework of KP rules, these credits (and ERUs converted from RMUs) will not be accepted for compliance in 2013 (after the ending of KP).

The draft CPRS includes reforestation (as defined for the first commitment period of the Kyoto Protocol) in its ETS on a voluntary basis. In order to become eligible for the integration in the ETS, forest entities must satisfy a range of reporting and other obligations. The draft CPRS only covers domestic emission sources and sinks that are counted in Australia's NIR. Therefore, entities would have to demonstrate that their reforestation project is compliant with the rules of the KP. Landholders, certain lease holders and certain carbon property rights holders would be able to apply to become accredited forest entities under the scheme. The White Paper on Climate Change states that some Australian state governments will possibly have to improve their legislation regarding carbon property rights in order to ensure enforceability of scheme obligations towards forest entities. Forest entities would also have to prove in advance that they have the capacity and are willing to meet obligations under the scheme. Additional compliance measures such as restrictions on land use and bank guarantees are in discussion (Department of Climate Change 2008).

Emissions and removals from the forest sector are to be estimated using a prescribed methodology referred to as the National Carbon Accounting System (NCAS) and the National Carbon Accounting Toolbox (NCAT). An initial emissions estimation plan would be set up at the commencement of the scheme. Accordingly, forest entities would be required to report at least once every five years. They would also be required to notify authorities of any major changes to the emissions estimation plan as a result of changes to forest management or natural disturbances. Permits in the forest sector could be issued from scheme commencement once carbon stocks are greater than in 2008. Scheme liabilities are to be enforced for a defined period of time following the issue of the last permit for an individual forest entity. Entities are required to surrender as a maximum as many credits as were issued for their individual forest stand. Credits from reforestation would only be issued to a certain limit, and contain a risk of reversal

buffer, which addresses the issue of non-permanence (Department of Climate Change 2008). The risk of a reversal buffer creates a reserve to help protect forest entities against the exposure posed by emissions from natural events such as fire, insect attack, storm, or severe drought. The buffer would take form of a small deduction each time permits are issued. The amount deducted would be calculated on the basis of risk factors at the specific project-level. The Australian government argues that the voluntary inclusion of reforestation in the cap would not provide perverse incentives to clear native forests in order to subsequently receive permits as such forests are sufficiently protected by national environmental frameworks. Considering that reforestation is likely to take place on marginal and unproductive agricultural lands, land use change into forests is not believed to undermine food security. Due to capacity concerns, natural resource management implications (for water or biodiversity) are not assessed with regard to reforestation activities in the cap-and-trade system.

Deforestation is not included in the cap. The Australian governments decided against the inclusionof deforestation, as domestic deforestation emissions have reduced markedly since 1990, largely due to increased protections against land clearing. Therefore, a cover of deforestation would yield only marginal results in terms of avoided emissions and create large transaction costs. In addition, there is the concern that including deforestation would raise the risk of pre-emptive land clearing. At the international level, however, Australia is one of the main drivers for an inclusion of REDD into a post-2012 agreement and contributes to the development of internationally accepted methodologies for assessing reduced emissions from deforestation and forest degradation in developing countries. In this context, Australia is also active in the International Forest Carbon Initiative (IFCI).

3.4 US Schemes

In the US, a country not party to the Kyoto Protocoll, cap and trade has been discussed at various levels of government. While cap and trade legislation did not progress in the Senate, several ETSs are being implemented or discussed at the regional level.These include the Regional Greenhouse Gas Inititative (RGGI), in the northeastern United States, the Western Climate Inititative (WCI, which includes several Canadian provinces), and the Midwest Greenhouse Gas Reduction Accord (MGGRA).

3.4.1 Regional Greenhouse Gas Initiative (RGGI)

Overview

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort by ten Northeast and Mid-Atlantic States to limit greenhouse gas emissions by a regional cap-and-trade system[6]. RGGI is the first mandatory, market-based CO_2 emissions

[6] Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont are signatory members of the RGGI.

reduction program in the US and started operation in January 2009. The member states of the RGGI commit to stabilizing emissions by 2014, and to cut emissions by 10 percent until 2018[7] from a baseline of 2009 (RGGI 2007). The regulatory framework of the scheme is described by the RGGI model rule, which was published in 2007: sectoral coverage is addressed in that RGGI covers fossil-fuel electricity generators larger than 25 MW. Each participating state will receive an emissions budget and is free to determine how to allocate 75 percent of the corresponding allowances among industries. At least 25 percent of the allocated allowances must be assigned to consumer benefit or strategic energy purposes, such as new technologies (Tuerk et al. 2008). The scheme includes a safety valve for cost limitation linked to the amount of offsets allowed for compliance. In general, the use of offsets is restricted to 3.3 percent of a facility's emissions during an initial control period. However, if the average allowance price exceeds a certain level, entities may use domestic offset credits for compliance. Should the average price exceed US $10, facilities may also use credits from the EU ETS and the flexibility mechanisms under the KP (Tuerk et al. 2008).

Approach to sinks

Under the offset program, five possible project categories are mentioned. The system merely allows for the use of domestic offset mechanisms, however, the use of international offsets is possible in the case of allowance prices exceeding a certain threshold (price trigger event) (RGGI 2008). With regard to carbon sequestration, afforestation is the only eligible project category at the time being. RGGI members are however considering extending the number of project categories (possibly to forest management and conservation). The issuance of RGGI offset credits from afforestation activities is subject to conditions that seek to ensure that offsets are real, additional, verifiable, permanent, and enforceable. Additionality is addressed in that offset credits cannot be awarded to an offset project that is required to any local, state or federal law, regulation, or administrative or judicial order (RGGI 2008). Offset projects that receive funding or other incentives from public funds established under RGGI[8] or projects, which are at the same time awarded offset allowances under other mandatory or voluntary ETSs, are also inelligible. Offset allowances are allocated based on the net increase in carbon stocks relative to a carbon sequestration baseline. The carbon sequestration baseline will be determined as followed: The existing sequestered carbon within the offset project boundary must be calculated prior to commencement of the offset project. The carbon sequestration baseline is then determined based on a sum of measurements, made no more than 1 year prior to offset project commencement, of the carbon content of specified carbon pools (RGGI, 2008). Afforestation projects must occur on land that has been in a non-forested state for at least 10 years preceding the commencement of the offset project. They must be managed in accordance with widely accepted environmentally sustainable forestry

[7] Baseline calculated with respect to average emissions for 2000-2004.

[8] This includes System Benefit Funds, or funds or other incentives provided through the consumer benefit or strategic energy purpose allocation under RGGI

practices and designed to promote the restoration of native forests by using mainly native species and avoiding the introduction of invasive non-native species. If commercial timber harvest activities are to occur at the site, certification must be obtained prior to the harvesting. Such certification can be obtained through the Forest Stewardship Council (FSC), Sustainable Forestry Institute (SFI), American Tree Farm System (ATFS) or other similar organizations approved by RGGI regulatory agencies (RGGI 2008).

The issue of non-permanence of sequestered carbon is addressed through the requirement that land included in the offset project boundary is placed in a legally binding permanent conservation easement. The conservation easement must specify that the land will be preserved in a forested state in perpetuity and that carbon density within the offset project boundary will be maintained at long-term levels at or above that achieved as of the end of the crediting period. The conservation easement also requires the land to be managed in accordance with environmentally sustainable forestry practices. The document must include a written legal opinion, which confirms the enforceability of the permanent conservation easement (RGGI 2008).

Offset certificates for afforestation projects are awarded at the beginning of the relevant allocation period, which lasts for 20 years (and can be renewed thereafter). For monitoring purposes, carbon stocks must be calculated at least every 5 years.

Compared to other credits, offset from afforestation projects are generally discounted by a factor of 0.9 in order to account for risks of non-permanence. Forest owners can avoid this discount by purchasing a long-term insurance that guarantees the replacement of any lost sequestered carbon for which CO2 offset credits were issued (Tuerk et al. 2008).

At present, RGGI members are currently developing MRV provisions for the RGGI offset program. This includes an offset registry, model offset project applications and monitoring and verification materials as well as provisions on independent verifier accreditation and submittal materials. The RGGI CO2 Allowance Tracking System (COATS), the registry and tracking system of the scheme, will be available soon. Furthermore, RGGI will use ISO 14065 by the American National Standards Institute (ANSI) to determine regulatory requirements for accreditation under the offset program (RGGI 2009).

The RGGI model rule does not specifically define criteria to address leakage and social and environmental co-benefits of afforestation projects.

However, the RGGI is one of the few regional ETSs that addresses the topic of biofuels as source or removal of emissions from the atmosphere. In general, emissions from biomass combustion are accounted as carbon neutral in RGGI. However, RGGI recognizes that net emissions benefits of combusting liquid biofuels can vary considerably due to the broad range of production processes and feedstock. The participating states of the RGGI have not yet developed a procedure to address liquid biofuels and are currently doing research on the topic (RGGI 2007).

3.4.2 California

Overview

The California Global Warming Solutions Act of 2006 (AB 32) sets an enforceable target for the state of California to reduce its GHG emissions to 1990 levels by 2020 (Flachsland et al. 2008). This requires cutting emissions by approximately 30 percent from BAU emission levels projected for 2020. The long range goal for 2050 is to cut GHG emissions by 80 percent from 1990. Meeting the goals of AB 32 is tackled by a whole mix of strategies, including a cap-and-trade market mechanism. The scheme will start operation in 2012. It will cover the six GHGs mentioned under the KP and place 85 percent of California's emissions under a declining cap (CARB 2008). Discussions on sectoral coverage of the Californian cap are still running. The responsible 'Market Advisory Committee' recommends the eligibility of CDM for for compliance with the system. Further, it will develop a domestic offset program using the experience of the RGGI scheme (CARB 2007). In addition to domestic efforts, California has taken a leading role in the development of the WCI (see below). The Californian system is intended to link with the programs of other states and provinces participating in this regional ETS. Accordingly, the design of the Californian ETS will also have considerable influence on the development of the WCI-methodologies.

Approach to sinks

The Forest Project Protocol (FPP) of the Climate Action Reserve[9] provides guidance for forests projects, which will be eligible under the offset program of the scheme. An updated version of the protocol was released in April 2009. Eligible forest project types under the protocol include reforestation, improved forest management, and avoided conversion. The FPP includes a specific set of eligibility criteria (CARB 2009):

Additionality is addressed in that only projects that yield GHG reductions above and beyond any BAU carbon stocks can be registered. The protocol applies an additionality test using quantitative baseline estimates for the BAU carbon stocks on lands affected by the project activity. Under the FPP, projects on public and private lands in the US are eligible. Projects outside the US are currently not possible within the FPP framework. Eligible projects must not only achieve climate benefits, but also create positive environmental co-benefits. In this sense, they must demonstrate commitment to environmentally responsible long-term forest management. For instance, if commercial harvesting occurs in the project area, forest entities must seek certification under a nationally-recognized third party forest management certification program. Moreover, the forest projects must promote and maintain a diversity of native species and utilize natural forest management. The FPP does also require reporting on

[9] The Climate Action Reserve is a national offsets program with the aim to ensure integrity, transparency and financial value in the US carbon market. It establishes regulatory-quality standards for the development, quantification and verification of GHG emissions reduction projects in North America. The Reserve

'secondary effects', which are caused by the project outside of its geographic boundaries (leakage).

Hereby addressing non-permanence concerns, the FPP defines a comprehensive MRV regime for offsets from carbon sinks. Eligible projects have to enter into a conservation agreement ('Project Implementation Agreement'), which requires the landowner to comply with the FPP permanency definitions and to rights and remedies in the event of any failure with these provisions. In addition, the FPP defines appropriate buffer pools and insurance contracts for projects enhancing carbon sinks.

In order to ensure 'measurability' of carbon sequestration, the FPP includes provisions on defining the project starting date, forest project geographic boundaries, GHG assessment boundaries, quantifying GHG emission reductions for each project type and other issues. In case of avoided conversion projects, a discount will be applied to account for uncertainty in the likelihood of conversion of the forest area. The discount rate will be based on the percent difference in fair market value between the project area's current land use and the proposed conversion.

3.4.3 Western Climate Initiative (WCI)

Overview

The Western Climate Initiative (WCI) is an initiative of seven US states[10] and four Canadian provinces[11] to design and implement a regional market-based cap-and-trade system[12]. Members of the WCI agreed to reduce their GHG emissions by 15 percent below their 2005 levels by 2020, and to start a first compliance period in January 2012. The WCI ETS will have very comprehensive sectoral scope and includes industrial sources, electricity, residential, commercial and industrial fuel combustion and transportation fuel combustion. For entities in these sectors, WCI defines the threshold of 25'000 metric tons of CO_2e annually for coverage under the cap. Program expansion provisions allow WCI to incorporate additional sectors, GHGs or entities, and facilitate the inclusion of new partner jurisdictions at a later stage. In the event that the WCI issues allowances before a federal program in Canada or the US, it is planned that these allowances will be recognized and valued in the operation of a federal program.

In addition to conventional WCI allowances, certificates from other specified GHG trading systems and offset credits are allowed for compliance for up to 49 percent of the total emission reductions from the initial commitment period (2012-2020). Each of the WCI partner jurisdictions will have the discretion to set a lower percentage limit for the inclusion of these credits. The WCI encourages the development of offset projects located inside WCI jurisdictions in order to capture collateral benefits associated with some offset projects, such as health, social, and environmental benefits (WCI 2008). In

[10] California, New Mexico, Oregon, and Washington are members. Utah and Arizona, while founding partners, have since reduced their participation to that of observers.

[11] British Columbia, Manitoba, Ontario, Quebec

[12] In addition, observer status is currently given to Alaska, Colorado, Idaho, Kansas, Nevada, Wyoming (US), Saskatchewan (CA) and Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora, Tamaulipas (Mexico)

general, offset projects located throughout the US, Canada and Mexico are allowed for compliance, provided that they meet comparably oversight, validation, verification and enforcement as within the WCI jurisdictions. In addition, international credits are allowed from CDM projects (CERs). In order to safeguard against low quality credits, CDM projects will possibly have to comply with particularly defined high standards (WCI, 2008).

Approach to sinks

Eligible project types for offset credits are not yet definitively defined. They will however probably include agriculture (soil sequestration and manure management) and forestry (afforestation/reforestation, forest management, forest preservation/conservation, forest products)[13]. The WCI partners are currently undergoing a review of appropriate protocols for the project types that meet the criteria for inclusion (WCI 2008).

3.4.4 Midwest Greenhouse Gas Reduction Accord (MGGRA)

The Midwest Greenhouse Gas Reduction Accord (MGGRA) is long from being as far developed as RGGI or WCI, but does show initiative on the part of various other states and Canadian provinces that are otherwise not involved in regional initiatives. Founded on 15 November 2007 by Iowa, Illinois, Kansas, Manitoba Michigan, Minnesota, and Wisconsin, MGGRA members agreed to establish regional greenhouse gas reduction targets, including a long term target to reduce emissions by 60-80 percent below 2007 levels. The inititative also plans for a multi-sector cap and trade system to meet the targets. Indiana, Ohio, and South Dakota are observers.

Approach to sinks

The three regional systems RGGI, WCI, and MGGRA met in May 2010 to discuss best practices and areas of cooperation including linking between the systems and offset policy. The white paper underlines that offsets and removals (sinks) “must be real, additional, verifiable, enforceable, and permanent” (MGGRA 2010). While MGGRA rules and guidelines have not yet been finalized and passed into law, the white paper that resulted from the May 2010 meeting mentions sinks, as well as the possibility of credits for afforestation and forestry management projects.

3.4.5 Federal US Scheme

Overview

Over the last couple of years, US legislators have seen several proposals for the introduction of a federal cap-and-trade system: the American Clean Energy and Security Act (Waxman-Markey) as passed by the US House of Representatives on 26

[13] Waste management (landfill gas and wastewater management) is mentioned as a third possible project category. Not being relevant for sequestration, this will not be discussed here.

June 2009, the Clean Energy Jobs and American Power Act (so-called Kerry-Boxer) proposal as passed in the U.S. Senate Committee on Environment and Public Works on 5 November 2009 as well as the American Power Act presented by Senators John Kerry and Joe Liebermann (Kerry-Liebermann Bill) presented on 12 May 2010. The most prominent example was the Lieberman-Warner Climate Security Act, which was introduced to the US senate in 2007. Though so far all bills in the Senate have failed to advance, they did lay down a comprehensive set of provisions drawing the framework of an American ETS.

As written, ACESA was to capture around 85 percent of US GHG emissions and cover electricity generators and large industrial sources (emitting more than 25000 tons CO2 e per year) (Sterk et al. 2009). In addition to conventional allowances issued by the regulating agency, the proposed system allows for several offset mechanisms. Their use is regulated by several specific provisions: the maximum amount of offsets allowed in any year is 2 billion tons, which translates to about 30 percent of the allocation of allowances[14]. The issuance of these offset credits would have to be split evenly between domestic and international offsets. International offsets can only be used in case that the US is party to a bilateral or multinational agreement that includes the developing host country of the offset project (Sterk et al. 2009). Given concerns to ensure additionality of offset projects, ACESA adopts a conversion rate of 0.8 between offsets and allowances; i.e. 4 allowances equal 5 offset credits (US Congress 2009).

It was speculated that had the bill have been approved, the regional and statewide ETS in the US (RGGI, California, MGGRA, WCI) would probably have been closed down by 2012 for the national cap and trade scheme to begin the same year (Lomax 2009).

Approach to sinks

Acknowledged to be a crucial element of climate change mitigation, the Waxman-Markey proposal brings in credits from carbon sinks by several mechanisms: ACESA will establish a domestic offset program, which will almost certainly include sequestration. Permitted project categories were not defined, but the bill included provisions on additionality, baselines, measurement, leakage and uncertainty, and specifically addresses non-permanence of sequestration projects (MRV, legal liabilities, etc.). The bill stated that “if the administrator lists forestry projects types … , the administrator … shall promulgate regulations for the selection and use of tree species in forestry offset projects.” These regulations included the use of native species, enhancement of biological diversity, prohibition of noxious weeds and invasive plants and respect of widely accepted, environmentally sustainable forestry practices (US Congress 2009).

[14] Environmental organizations criticize the significant resort to offsets allowed in the proposed scheme. In their opinion, the US could comply with the targets set by the ETS without cutting total emissions until 2026 (IR and RAN 2009).

CEJAPA´s provisions on offsets and measures to reduce deforestation mainly reflect the rules set by ACESA. Additionally, the bill elaborates on early offset supply rules from international REDD projects but did not hammer out general REDD requirements (US Senate 2009a).

An important feature of the US proposals was the explicit intention to help reduce deforestation in developing countries[15]. Avoiding deforestation was introduced by several mechanisms (Bendana 2009): First, avoided deforestation activities in developing countries are mentioned as a permitted offset project category for facilities covered by the proposed ETS. The conversion rate of 0.8 for offset credits is supposed to sufficiently safeguard against losses in the carbon stock and to account for these credits in a conservative matter. Second, the proposal gives incentives for tropical forest conservation through a fund-based mechanism referred to as 'supplemental pollution reduction program'. For this purpose, additional certificates would be set aside to be used to support reducing deforestation in developing countries. The program would include national and subnational deforestation reduction activities and capacity building for REDD (e.g. for leakage prevention, development of MRV capacities and government structures, enforcement mechanisms). Third, the proceeds of a special auction of additional certificates ('strategic reserve auctions') would be used to purchase international credits issued for reduced deforestation activities.

In the absence of work in the Senate, the Obama administration is moving on various other measures to decrease emissions through the administration. In 2007, the US Supreme Court ruled, in a 5 to 4 vote, that the EPA has not only the power, but also the mandate to regulate greenhouse gasses under the Clean Air Act. The EPA took no action under the Bush administration and mainly waited for Congress to pass legislation under the first period of the Obama administration. After the Senate's failure to pass cap and trade legislation, it is assumed that the EPA will take on a larger role, though this will likey not include cap and trade, or therefore offsets or sink options.

3.5 Canada

A regional ETS in the Canadian province of Alberta has been in force since 2007. Within that scheme, agricultural soil sequestration and afforestation are mentioned as eligible carbon sinks, provided that the projects are Alberta-based, hence, international offset mechanisms are not included (Alberta Government 2008). Additionally, Canada is planning to establish a national intensity-based GHG system for large final emitters scheduled to start off in 2010. In a "Regulatory Framework for Industrial Greenhouse Gas Emissions", the Canadian government excludes credits for forest sink projects within the scope of eligible CDM offsets, with the reasoning that CERs from carbon sinks are temporary and thus, would add complexity to the domestic system without significantly reducing costs for the regulated industries (Canadian Government 2008a). As for domestic offsets within the planned national scheme, projects that store carbon

[15] The inclusion of avoided deforestation has become mainstream in the relevant climate bills since late 2007 (EDF 2008)

in agricultural land, afforestation, reforestation, avoided deforestation and forest management are considered as eligible project types (Canadian Government 2008b). Additionality and Non-Permanence should be addressed in a similar way as in the Alberta system, namely through an assurance factor and several baseline methods (Tuerck et al. 2008). There have been remarks that the prospect of a federal U.S. system might be a risk factor for a national Canadian system since the former may possibly overtake and replace the proposed Canadian scheme (Mondaq 2008).

As previously mentioned, various other Canadian provinces have taken part in initiatives with American States (WCI and MGGRA). It is highly unlikely that Canada will take action on the national level until the United States does so, putting Canadian national action in a holding pattern at least until new elections are called. Canada is currently governed by a conservative minority government elected in October 2008. Though elections must be called every four years, the Governor General can dissolve parliament at any time, which usually occurs after a no confidence vote in parliament, though this is not a precondition. Elections are next expected in 2012.

4 Implications for the discussion of linking arrangements

Two ETSs are linked if one system's allowance can be used, directly or indirectly, by a participant in the other scheme for compliance purposes (Haites 2003). Indirect linking means that the two ETS to be linked agree on the common use of a certificate issued by a third system (i.e. CERs for the EU and NZ ETS). The direct or indirect availability of certificates can be problematic when provisions in one system have a harmful impact on the other system or on GHG abatement as a whole. Accordingly, the definition and recognition of trading units can represent a challenge to linking. A linking issue that arises frequently is the recognition and the handling of sinks in ETSs (Flachsland et al. 2008). Against this backdrop the table below summarizes the key features regarding the handling of sinks of existing and evolving ETSs as discussed in chapter 3.

Key features regarding the handling of sinks in existing and evolving ETSs:

Emissions Trading Scheme	Approach to sinks	Eligible activities	Non-Permanence	Additionality
EU ETS	Exclusion from EU ETS	None at all		
New Zealand	LULUCF CERs/ERUs: Unrestricted import	KP	KP	KP
	Inclusion of forestry (2009) and agriculture (2013) in the cap; NZUs are directly convertible into AAUs - Pre-1990 forests (mandatory inclusion) - Pre-1990 forests (voluntary inclusion)	Mirroring rules under KP	Emissions liability	Not relevant
Australia	RMUs	KP	KP	KP
	Voluntary inclusion of forestry in cap	Reforestation	• Accurate MRV (NCAS/NCAT) • Risk of reversal buffer	Voluntary Cap approach
RGGI	International offsets in case of safety valve	Afforestation	• Conservation easement (in perpetuity)	• Carbon sequestration baseline and run baseline tests (no credit for project receiving funding, not required by law, etc.)

Emissions Trading Scheme	Approach to sinks	Eligible activities	Non-Permanence	Additionality
	trigger event Domestic offset program		• Project sponsor must either discount by 10 percent or retain approved long-term insurance to guarantee replacement of any lost sequestered carbon for which allowances were awarded • If harvesting: Project lodges easement with registered NGO	• If harvesting: Project lodges (with registrered) NGO ensure that project is above BAU
California	Domestic offset program	Reforestation, improved forest management and avoided conversion (Offsets)	• Accurate MRV (FPP) • (Perpetual) conservation easement: • in case of avoided conversion discount rate applied • Risk of reversal buffer	• Additionality test using quantitative baseline estimates for BAU carbon stocks • FPP Standards
WCI	Probably domestic offset program	Not yet defined, probably AR+Conservation	Not yet defined	Not yet defined
MGGRA	Not yet defined	Not yet defined	Not yet defined	Not yet defined
Federal U.S.	REDD offset credits	Avoiding deforestation	• Accurate MRV, legal liabilities • Conversion rate of 0.8 for offsets vs. allowances	Additionality test (not required by law, no subsidies, etc.)
Canada	Domestic offset program: Probably projects that store carbon in agricultural land, afforestation and forest management	Not defined yet	Not defined yet	Not defined yet

Elegible activities related to sinks in existing and evolving ETSs:

Emissions Trading Scheme	Afforestation	Reforestation	Avoided Deforestation	Forest management	Forest conservation
EU ETS	excluded	excluded	excluded	excluded	excluded
New Zealand	activities as under KP, included into cap-&-trade scheme	activities as under KP, included into cap-&-trade scheme	excluded	not mentioned explicitly; included under cap	not mentioned explicitly; included under cap
Australia	included only through RMUs	domestic: included by a voluntary cover under the cap-&-trade scheme, according to KP rules	domestic: excluded	included only through RMUs Note: Australia did not elect FM for compliance with the KP	not mentioned
RGGI	included through offsets, Definition: creating a forest on land that has been non-forested state for at least 10 years	excluded	excluded	possibly included in the future	possibly included in the future
California	excluded	included	included	Included	excluded
WCI	probably included but eligible activities not yet defined	probably included but eligible activities not yet defined	excluded	probably included but eligible activities not yet defined	probably included but eligible activities not yet defined
MGGRA	Not yet defined	Not yet defined	Not yet defined	Not yet defined	Not yet defined
Federal U.S.	eligible activities not yet defined; according to CEJAPA: included as offsets, acreage not forested as of Januar 1, 2009	according to CEJAPA: included as offsets; acreage not forested as of Januar 1, 2009	included as international offsets	included as offsets; according to CEJAPA: improved forest management including accounting for carbon stored in wood products, restoration of forestland, etc.	included as offsets; changes in carbon stocks attributed to land use change and forestry activities, including conservation of grassland and forested land
Canada	included (at domestic level); Definition: creating a forest where none has existed since at least 1990	included; Definition: creating a forest where none has existed since at least 1990	included	included (at domestic level), Definition: managing activity (or changing the level of an existing activity) within a forest area that increases carbon sequestration, reduces emissions, or avoids emissions	excluded

5 Differences in design relevant to linking ETSs

The relevance of "undesired credits" for ETSs may vary from case to case and depends on circumstances such as the integration of the carbon market, the size of the systems to be linked, the framework of standards or the character and scope of carbon pools of the relevant activities.

5.1 Integration of the carbon market

The example of Europe excluding LULUCF credits for compliance in their ETS shows that banning of undesired credits can indeed be very effective. The EU ETS member states – by far the most important carbon market up to date – sent a political signal showing displeasure with the integration of sinks in the UN flexible mechanisms. Thereby choking demand, it seems likely that the exclusion from the European system did not allow the development of a market for credits from sinks. However, when further ETSs become operational and when and if other systems link to each other, unilateral restrictions on project categories will not prevent the import of such credits as certificates indirectly become available in all linked systems (PIK 2008). Therefore, systems with import restrictions on project categories will necessarily have to convince others to consider similar limiting provisions in order to achieve effective banning of a certain project category. Otherwise the rejection will have very limited effects with regard to its intended aim.

5.2 ETS-specific emission profiles and culture

When analyzing different approaches to sinks, it is important to recognize that ETSs are always tailored to a specific national or regional emission profile. In chart below, we can observe different emission profiles of the EU, the US, New Zealand, and Australia. 80 percent of European emissions originate from energy sources. Hence, Europe's objective to become a low carbon economy is only achievable through a broad transformation of the energy sector. The opportunity to use (probably cheap) offsets from LULUCF activities would slow down this important process. Also for future activities beyond 2012, the EU prefers to deal with REDD+ via a fund-based mechanism, which does not interfere with the EU ETS. In addition, opportunities for cost-effective GHG abatement from carbon sinks seem rather few: Current sequestration only amounts to 6,4 percent of Europe's overall emissions (see chart below). In addition, transaction costs of European carbon sink activities are considerd to be high (van Kooten 2007), which we discussed in Chapter 2.

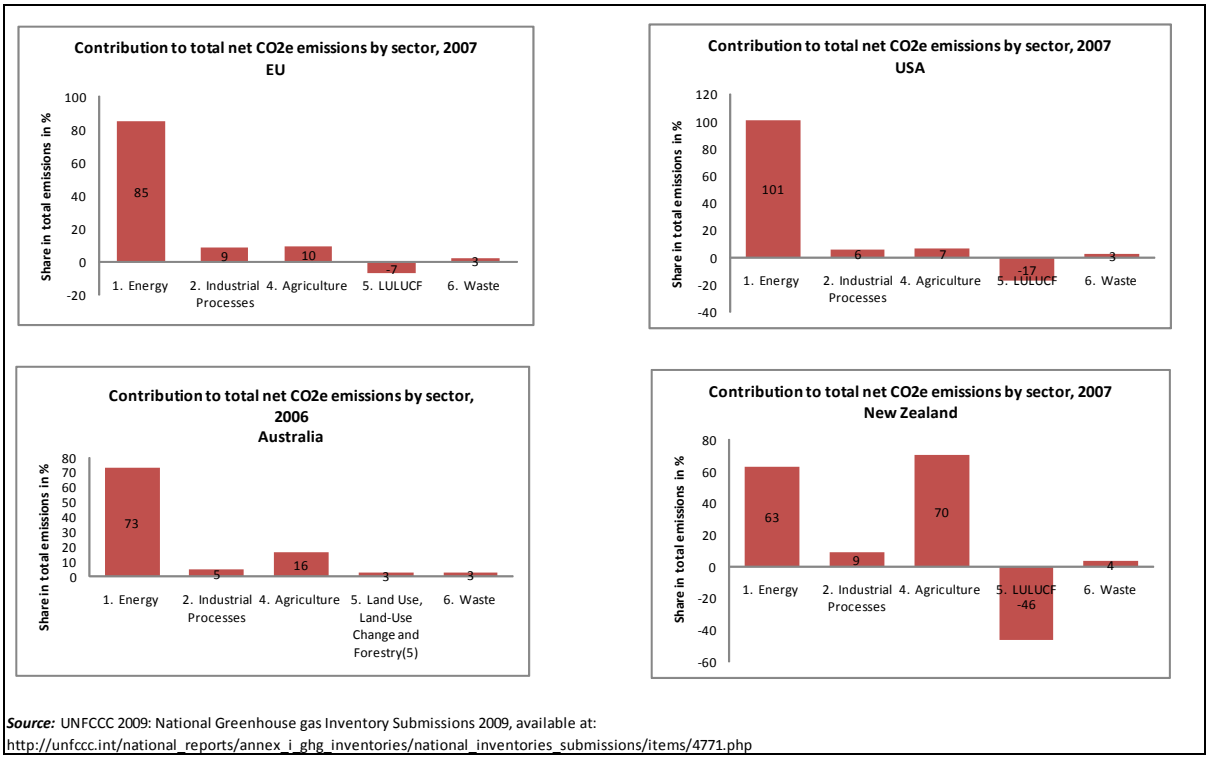
In contrast, countries or regions with a high share of emissions and important sequestration opportunities with regard to sinks tend to include this sector in their market system. Of course, the importance given to sinks does not only reflect the opportunity for cost-effective GHG abatement at home, but also shapes specific culture towards dealing with sinks. The prime example for this phenomenon is New Zealand, where forestry plays such a great role that it became an integral part of the cap-and-trade system. But also in the US, the large offset programs for domestic sink

enhancement in the regional and federal schemes reflect the historically strong emphasis that the country has given to the preservation of national forests (Tvinnereim et al. 2009). If an ETS considers linking to another scheme, it will to some extent have to accept how the other system is dealing with carbon sinks.

5.3 Defining eligible activities

The ETSs analyzed in Chapter 3 not only differ regarding the instruments addressing LULUCF /REDD (inclusion in the cap, offsets, fund-based approach); they also define different activities as eligible categories for these mechanisms and introduce quotas for the use of these project categories. Some ETSs only address afforestation (RGGI) or reforestation (Australia). Other schemes list a whole variety of eligible activities such as ARD, conservation, forest management, and avoided conversion (see e.g. California). In some cases, analysis is difficult as schemes use different terms for similar practices or the same terms with different standards. Differences in eligible activities in regional or national ETSs constitute a potential barrier to linking those schemes. Especially, this

National Emissions Profiles (EU, USA, Australia, New Zealand):



Source: UNFCCC 2009: National Greenhouse gas Inventory Submissions 2009, available at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php

becomes relevant when some schemes allow for activities that are not eligible in the Kyoto Protocol (or its successor after 2012).

Recognition of international offsets (e.g. lCERs and tCERs) come into play in that some schemes set a specific quota for credits related to carbon sequestration, others do not define extensive restrictions on the import of such credits. Schemes such as RGGI increase the quota for international carbon sink credits in the event that allowance prices exceed a certain threshold. Especially the US schemes provide for specific

offset projects, which can take place in their own jurisdiction or some specified neighboring countries (e.g. Mexico and Canada for the WCI).

A category that is often addressed by proposals for future ETSs, is REDD+. Even more than for other activities linked to sinks, a possible inclusion of REDD+ into market systems will depend on the negotiations for a post-2012 agreement and an internationally recognized system for eligibility of such credits. The future of REDD+ is still uncertain. A recent survey by Point Carbon shows that most experts expect REDD+ to produce tradable credits in a separate mechanism, with limitations and restrictions on the use of REDD+ credits by developed countries. Only a few expect a solely fund-based approach with finance coming from outside the market (Tvinnereim et al. 2009). However, one can also question the unbiased view of actors in the carbon market on this issue. Further, international negotiations show that it not always the mass of actors that counts. Rather, the commitment of particular key players and creditors will be necessary to make an important initiative such as REDD+ operational. In any case, the possible development of REDD+ credits at the international level will surely trigger off a discussion regarding an inclusion of REDD+ in national and regional ETSs. It seems too early, however, to analyze this issue in detail. Considering the uncertainties regarding the regime governing REDD+ in post-2012, it will probably be best to exclude it from cap-and-trade design in order not to preclude decisions at the international level.

Almost certainly, market- and fund-based approaches for REDD+ activities will have to be used in complementarity: to ensure economic efficiency and environmental integrity, a market for carbon sink credits requires an appropriate non-market environment (regulatory framework, safeguards for biodiversity, watershed protection, indigenous people's rights, distribution channels, etc.) in the host country. As carbon credits would probably only be issued for doing better than in the reference case, if the payment comes from a fund or a market mechanism needs to be decided. In general, differing eligible activities will pose significant challenges to linking, until a full set of activities is accepted by all schemes (Tuerk et al. 2008). Consequently, explicit or implicit international consent on eligible activities for compliance in ETSs would be the first best solution allowing for fast and unproblematic linking of regional and national schemes.

5.4 Standards for activities related to sinks

ETS legislation generally agrees on the guiding principles ruling carbon sinks; as for emission reductions, carbon sequestration must be measurable and permanent. If sinks are included via offset mechanisms, reductions or sequestration must also be additional (see chapter 2). However, ETS rules significantly differ regarding provisions to ensure these principles; namely provisions on monitoring, reporting, verification, enforcement, additionality screens, baselines, accounting and co-benefits. Diverging provisions can possibly represent a barrier for linking different ETSs as these rules reflect the environmental integrity of a specific offset (Tuerk et al. 2008). Considering that the methodologies ruling carbon sinks (other than CDM) in the specific ETS were developed only recently, it is difficult to compare the relative stringency of these

standards at present. Methodologies would have to run for some time in order to allow for in-depth analysis.

In general, we can observe that all ETSs address the specific concerns related to environmental integrity of activities related to sinks. Of course, ETSs allowing for many project categories related to sinks (e.g. California) define more comprehensive standards than systems only allowing for few and very specific activities (e.g. afforestation in RGGI). Depending on how they address carbon sinks, ETSs can also blank out some of the issues. For instance, the inclusion of forests in the cap makes provisions on additionality and non-permanence obsolete. However, it adds to the urgency to design an accurate set of rules regulating issues such as accounting and enforcement.

National and regional ETSs that allow for carbon sink offset activities (even outside of CDM and JI) all address additionality and non-permanence concerns. Ensuring additionality somehow represents the cornerstone of all offset activities. In this perspective, schemes often set up a comprehensive set of criteria to ensure that the relevant activity is additional to what would have occurred under BAU: This can include provisions specifying that the project must be beyond regulatory requirements (see e.g. RGGI), certification must be obtained from an NGO (see e.g. California) or the project is not allowed to obtain specified subsidies from the government (see e.g. ACESA).

Non-permanence concerns are addressed in that the analyzed ETSs use several mechanisms to ensure that carbon sequestration in projects is permanent or at least less prone to reversibility:

- ETSs can require that projects related to carbon sinks are placed in a legally binding conservation easement (e.g. RGGI and California).
- ETSs can use discount factors for credits coming from carbon sequestration. A discount factor means that an activity yields fewer credit units for a specific emission reduction or carbon sequestration than other activities.
- ETSs can set up a risk of reversal buffer. In such an arrangement, a part of the credits will only be released at the end of the crediting period (in case no loss of sequestered carbon has occurred).
- The regulator can require the project developer (or credit holder) to invest in risk insurance to safeguard against losses in carbon sequestration.
- Credits can be temporary. Accordingly, they expire after a certain period and must be replaced; e.g. this is currently the case for tCERs under the CDM. This design feature particularly brings up the question of compatibility to other systems: When credits have different duration periods, linking possibly becomes even more complex. Swapping of temporary credits against permanent ones could be a solution to this issue. However, safeguarding against non-permanence is likely to remain the principal issue to be solved in the future.

In addition, provisions on enforcement of liabilities in case of non-compliance with scheme obligations also have an impact on permanence. Leakage and environmental

co-benefits issues are only addressed by a few ETSs. The Californian model, for instance, addresses both: Carbon sink offsets must yield environmental co-benefits such as promotion and maintenance of native species. Leakage is addressed by a comprehensive framework and requires forest entities to account for any activity – shifting leakage or increase in GHG emissions caused – by a project outside of its geographic boundaries. For instance, leakage in reforestation projects is assessed by measuring the displacement of commercially viable cropland or sites where grazing has been the historically dominant activity. The procedures measuring leakage in the Californian ETS are similar to the ones used for A/R activities under CDM. As for other ETSs analyzed by this study, it is too early to assess if leakage is addressed in an appropriate manner and yield verifiable results.

Standards are a key element when it comes to linking ETSs, as weaker standards will probably set the overall quality of all linked systems. Accordingly, there is a strong case for harmonization of standards among systems, which will possibly be linked in the future.

5.5 Designing provisions for linking agreements

A unilateral exclusion of undesired project categories by one ETS is difficult, if the scheme is to be linked with other ETS. Regulators should balance the benefits of linking to a specific ETS against the import of undesired credits. The relevance of safeguards against an inflow of undesired certificates depends on ruling standards and the quantity of credits allowed.

5.5.1 Harmonization of standards

The need for harmonization of standards is the most obvious measure against negative effects of undesired credits when linking ETSs. Harmonization is beneficial to both, economic efficiency and environmental effectiveness of ETSs. The economic efficiency of certificates is closely related to standard level setting: the higher the standards, the more expensive the credits. Similar high quality standards for carbon sink credits the various linked ETSs will prevent the system being undermined by scrambling for cheap foreign credits. Some schemes will have to enact more precise regulatory frameworks for their crediting to overcome concerns of environmental effectiveness. Accurate accounting standards, in particular, should be a precondition for the linking of different ETSs. Similar to international accounting standards agreed under KP, “units” of carbon sinks should be traceable and well defined in their geographic boundaries. However, accurate accounting standards will possibly increase the transaction costs for crediting emission removals and reduce the comparative advantage in cost-effectiveness of carbon sink credits over other carbon credits (i.e. in the energy sector).

Stricter schemes, however, may have to make some concessions regarding standards for the benefit of an integrated carbon market through linking. However, these concessions should not compromise the environmental effectiveness of regulations. Rather, stricter schemes such as the EU ETS could possibly accept temporary minimal standards ruling carbon sinks. After the transition period, requirements for carbon sinks could then be successively raised (the “race to the top” effect).

It is important to ensure minimal standards going beyond the issues of additionality and non-permanence. For instance, criteria for Sustainable Forest Management (SFM) by the United Nations Forum on Forests (UNFF) could give guidance for promoting social and environmental co-benefits of carbon sink projects. Also, ETS regulators could learn from efforts made by other schemes, e.g. the handling leakage in the Californian ETS. Harmonization and discussion of minimal standards should occur in formal and informal settings. The formal international level, i.e. the UN, is crucial for the development of national and regional schemes and the linking between them. In the event of an international agreement under UNFCCC, participating jurisdictions will probably use international offset mechanisms for compliance under their ETS. An internationally recognized system for eligible project categories, monitoring and reporting, accounting and enforcement of carbon sink activities in ETSs would be beneficial to all actors involved. Informal discussion forums such as ICAP (International Carbon Action Partnership) help to facilitate learning between schemes. In such an arrangement, regulators can exchange best practices and possibly identify loopholes in their regulations.

5.5.2 Agreement on quantities of credits covering carbon sinks

The overall quantity of credits related to carbon sinks is an important issue for linking. The number of such credits can be, and currently are, limited by the quantity of the eligible activities and/or a specified quota for carbon sink credits. For instance, an ETS seeking to protect its forests therefore includes domestic sustainable forest management in the ETS. However, if the geographic area of that trading scheme only covers a few forests – the low number of possible credits from these activities will not threaten allowance prices or environmental integrity of a more restrictive system to be linked. Accordingly, a restrictive system should be aware when linking to ETSs allowing for a broad spectrum of eligible carbon sink activities and accepting unrestricted import of international credits related to carbon sinks. It could be less problematic to find an agreement with an ETS, allowing for very specific activities or only for projects within national boundaries. Of course, quantities also depend on the overall size of the system to be linked. Even though New Zealand includes forestry in its ETS, linking the NZ and EU ETS is not likely to threaten the functioning and effectiveness of the latter system. In contrast, linking the EU ETS with a federal US scheme is likely to produce severe discussions on project categories that distort the balance of one of the systems. In an international agreement post-2012, a specific quota for credits related to carbon sinks could be set so that countries could offset a certain percentage of their emissions through removal by sinks. This is similar to the current CDM restriction that offsetting through LULUCF credit is limited to 1 percent of a country's AAUs by 1990 (times five, as the second Kyoto Protocol commitment period is five years) (UNFCCC 2002).

5.5.3 Exchange rates and parallel markets for credits from sink projects

If direct agreements on standards and quota are not sufficient to ensure economic and environmental functioning of an ETS when linking to other schemes, one could also think of other solutions:

- Exchange rates between schemes: assess the share of “undesirable” units in the total volume of allowances in the other system and discount traded allowances from that system accordingly (Sterk et al. 2009). This could make sense when the quantity of credits from carbon sink activities in one system is important. For instance, this could be the case when carbon sink activities are included in the cap and constitute a significant share of all certificates (e.g. in New Zealand). However, an adoption of exchange rates seems exaggerated and politically unfeasible if carbon sink credits only represent a fraction of allowable trading units.
- Parallel market: a parallel market for credits from carbon sink offsets could be developed. These credits could either be exchanged with other credits by applying a certain exchange rate (discounting) or not be exchangeable at all. This would prevent the flooding of emission trading markets with credits from the land and forest sector. The parallel market approach is currently discussed in the course of international negotiations for an agreement on REDD.
- Some consider the market to be an appropriate setting for the dealing with carbon sinks. However, they are concerned that the current scientific and political setting is not sufficiently developed to ensure appropriate standards. Accordingly, one could think of an intermediate solution excluding credits related to carbon sinks from cap-and-trade, but purchasing carbon sink credits from the proceeds of ETS allowance auctions. That way, a market for credits related to carbon sink activities could be developed without compromising GHG emission reductions in other sectors and avoiding a barrier for linking to other schemes.

6 Conclusion

The discussion on how to design policy instruments to reduce emissions and enhance removals from land use, land use change, and forestry is likely to be a key feature of a future global climate protection framework and will also influence the design of an emerging global carbon market. By analyzing different ETSs it turns out that very specific provisions are in place to deal with carbon sinks. Different instruments, eligible activities and standards reflect the prevailing emissions profile and cultural preferences of a geographic area. The inclusion of forestry into a cap, for instance, makes provisions on additionality and non-permanence obsolete, but increases the relevance of other issues such as accounting and enforcement. In general, all ETSs address the specific concerns related to environmental integrity of carbon sink related activities. Further research would be needed to analyze the specific differences and quality of standards in the different systems. However, considering the rudimentary state of some of the systems analyzed, it seems too early to come to a conclusion in this regard.

As a result of such differences in dealing with carbon sinks the definition and recognition of trading units represents a challenge to linking different ETSs. In this context, the standards ruling the use of sink credits in the cap-and-trade systems represent one of the most relevant barriers. Considering the impact of these credits on linked systems and on global climate protection as a whole, there is a strong case for the harmonization of instruments, activities, standards, quotas and discount rates of credits related to carbon sinks in ETSs. This harmonization can take various forms and can be promoted through different formal and informal formats. An internationally recognized system for eligible project categories, monitoring and reporting, accounting and enforcement of carbon sink activities in ETSs would be beneficial to all actors involved. Moreover, the harmonization of standards is the most useful approach to provide for economic efficiency and ecological integrity of the emerging global market. However, in the light of very different forest-related interest structure of the respective parties, additional approaches are likely to gain some prominence, namely agreements on quantities of credits related to carbon sinks as part of the markets, the establishment of exchange rates or the even the development of parallel markets.

In the end one single approach to REDD+ will probably not be sufficient; it will rely on a comprehensive framework of market- and fund-based or hybrid mechanisms. In the light of the importance to address the respective sector as one of the main pillars to avoid dangerous climate change the establishment of a market for credits from carbon sinks may also be a matter of more strategic considerations, namely to use such credits as a springboard to set up a strong and ambitious overall global carbon market in the long term. In other words, REDD+ can help to facilitate the communication of climate protection measures not only with respect to valorizing activities in the forest sector but also in other sectors not yet subject to mitigation activities in developing countries.

An agreement at the UN level on international rules governing the use of credits for emission removals is certainly the first-best solution. Such an agreement will guide further discussions in the respective national and regional ETSs. However, the

relevance of carbon sinks for emission trading will not only depend on agreements at the multilateral levels. National and regional ETSs can serve as laboratory for the further development of such a recognized regime for dealing with carbon sinks. Hence, communication and – as far as possible - harmonisation of ongoing activities to include carbon sinks in national and regional ETSs is needed at the earliest possible stage. Early coordination will be crucial for the development of a global carbon market as well as the potential linking of different ETSs.

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