UNEP RISØ CENTRE
ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

Progressing towards post-2012 carbon markets

UNEP

ACP MEAs

Global Green Growth Institute

PERSPECTIVES SERIES 2011

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Contents

SECTION 2. EXISTING INSTRUMENTS

SECTION 3. NEW INSTRUMENTS

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FOREWORD

The transition towards low carbon development and more broad based green growth are vital to addressing some of the most pressing challenges facing the global community, such as global warming and unsustainable use of natural resources. Confronting the end of the first Kyoto Commitment period in 2012 with no agreed outcome for global cooperation on future emission reductions, there is an urgent need to look for new opportunities for public and private cooperation to drive broad-based progress in living standards and keep projected future warming below the politically agreed 2 degrees Celsius.

Responding jointly to these global challenges the United Nations Environmental Program (UNEP) and its UNEP Risø Centre (URC) have in cooperation with the Global Green Growth Institute (GGGI) prepared the Perspectives 2011. The publication focuses on the role of carbon markets in contributing to low carbon development and new mechanisms for green growth, as one core area of action to address the challenges noted above. Under the title of 'Progressing towards post-2012 carbon markets' the publication explores, how carbon markets at national, regional and global levels can be developed and up-scaled to sustain the involvement of the private sector in leveraging finance and innovative solutions to reduce greenhouse gas emissions.

GGGI opened the first regional office in May 2011 at the Technical University of Denmark, where the UNEP Risø Centre is located and this report represents a first collaborative effort.

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EDITORIAL

The absence of agreement on a second commitment period for the Kyoto Protocol or another legally binding agreement is creating uncertainty for investors looking to invest in emissions reduction activities all over the world. This year's *Perspectives* from UNEP and its UNEP Risoe Centre focuses on the mushrooming of initiatives that are filling the global vacuum while waiting for a post-2012 climate agreement. These may provide the building blocks and lead the way for carbon markets in the future. Local and regional initiatives have emerged in countries like India, South Korea, China, Japan, Australia, Brazil and others. Compared to the situation prior to negotiating the Kyoto Protocol, the international community may find that it no longer shapes the global carbon market, but will need to find ways of integrating the market fragments that have already established themselves.

The current situation gives rise to a number of questions. Is a global carbon market possible that incorporates these diverse initiatives? If so, what would it look like? How can carbon markets reach their full potential and contribute to a significant scaling-up of climate finance by 2020? Can bottom-up approaches and voluntary markets help us reduce greenhouse gas emissions sufficiently to keep global warming below 2 degrees Celsius? How will existing mechanisms evolve, and how will new instruments operate: independently, or as part of an integrated global carbon market? Do the new instruments constitute a threat or an opportunity for carbon markets?

Ten articles in *Perspectives 2011* address these questions. *Durando Ndongsok* shares experiences from the CDM in Africa and takes a critical look at the perspectives for CDM and future mechanisms in Africa, despite a preferential status in the EU ETS post-2012. *Christian Egenhofer* contends that the future European carbon market is unlikely to induce noticeable demand while it still remains the backbone of global carbon markets. The carbon credit overhang may seek towards the voluntary markets that are experiencing a new dynamism, as described by *Dinesh Babu*, or it may wait for a scaled-up cost-efficiency mechanism like the sectoral crediting approach, as suggested by *Wolfgang Sterk*. Meanwhile the USA and Canada are lagging behind on carbon trading, as both *Robert Stavins* and *David Sawyer* describe, while at the same time experiencing a significant fragmentation of the emissions-related markets within their borders. *Axel Michaelowa* argues that fragmentation comes at a cost and maintains that a top-down regime remains the preferential outcome of the negotiations. But fragmentation is already becoming a reality in China, a rapidly rising newcomer in the exclusive group of countries that, as described by *Wei Lin, Hongbo Chen and Jia Liang*

is seeking to establish its own national carbon-trading markets. Therefore, as *Kishan Kumarsingh* describes, the role of the UN is fast becoming that of the 'coordinating entity' of a global programme of activities, the diversity of which is threatening the liquidity of the global carbon market unless a regulator assumes the task of ensuring compatibility. Finally, there is still the chance that Durban will provide the breakthrough and deliver a suite of new GHG market instruments, as *Andrei Marcu* suggests, that will ultimately go beyond off-setting and mean the beginning of up-scaled carbon markets, with additional benefits for the atmosphere.

Perspectives 2011 is organized into three interrelated sections covering policy, existing instruments and new instruments. The first section is a collection of articles presenting the range of policy responses from a number of essential players – the EU, China, the USA and Canada, and not least the UN in a potentially coordinating role. The second section discusses perspectives for existing markets and mechanisms, in which the CDM and its recent adjustments and additions may inspire the structuring of future instruments, while the voluntary market, free from top-down regulation, may also explore other less compliance-related corners of emissions-reduction markets and indeed inspire the development of new approaches. Such new approaches are the focus of the third section, in which sectoral crediting and new market mechanisms are the main concepts being promoted in the negotiations.

Paradoxically, while many seem to be on the lookout for something new to follow the Kyoto flexible mechanisms, the CDM is thriving. Never has the number of new projects entering into validation on a monthly count been higher than now, reaching over 200. Of course, part of this is an End of Business syndrome, but a more positive interpretation is that it provides evidence for an investment momentum that is unlikely to come to a halt overnight. Thus, what the current market has done above anything else is to ensure that there is a common understanding of the issue and a global drive to find ways to keep rewarding the pursuit of emission reductions.

Acknowledgements

Perspectives 2011 has been made possible thanks to support from the Global Green Growth Institute (GGGI) (www.gggi.org), which opened an office on the DTU Risø Campus in Denmark in 2011. The *Perspectives* series started in 2007 thanks to the multi-country, multi-year UNEP project on Capacity Development for the Clean Development Mechanism (CD4CDM), funded by the Ministry of Foreign Affairs of the Netherlands. Since 2009, *Perspectives* has been supported by the EU project on capacity development for the CDM in African, Caribbean and Pacific countries (ACPMEA). A wide range of publications have been developed to support the educational and informational objectives of capacity development for the CDM with the aim of strengthening developing countries' participation in the global carbon market. The publications and analyses are freely available at www.cd4cdm.org, www.acp-cd4cdm.org and www.cdmpipeline.org

Finally, we would like to sincerely thank our colleagues in UNEP and the UNEP Risø Centre, particularly Maija Bertule, Jørgen Fenhann, Mauricio Zaballa, Kaveh Zahedi, John Christensen and Mette Annelie Rasmussen, for their support in the editorial process, including administration, outreach and communication.

The UNEP Risø Centre
Energy and Carbon Finance Group

Supporting low-carbon development in developing countries, UNEP and its UNEP Risø Centre (www.uneprisoe.org) have a leading role in analytical development and capacity building for the CDM and NAMAs and are well positioned to support the development and implementation of mitigation actions in developing countries. A core thematic focus is to help developing countries pursue development objectives using carbon finance to promote renewable energy and energy efficiency. The group consists of about fifteen staff coordinated by Miriam Hinostroza: milh@risoe.dtu.dk.

Section 1

Policy

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Perspectives

Fragmentation of international climate policy – doom or boon for carbon markets?

Abstract

After Copenhagen and Cancun, fragmentation of carbon markets is in full swing, with the EU and Japan actively dismantling the role of the CDM as "gold standard" currency of the global carbon market. While some political scientists argue that fragmentation could be advantageous for the climate negotiations, economists see it negatively, as it drives mitigation costs upwards and leads to a hodgepodge of rules with high transaction costs. The voluntary market as a laboratory for fragmentation has shown that high-quality credits are restricted to a tiny share, prices vary by several orders of magnitude and registries as well as verification standards have proliferated. Thus fragmentation should be resisted as far as possible.

The rise and fall of centralized international climate policy

Anthropogenic global climate change is one of the biggest challenges for mankind entering the 21st century due to its particularly "nasty" policy characteristics. Mitigation of greenhouse gases has the character of a global public good whose benefits accrue to everybody while costs have to be borne by the entity financing the mitigation activity. In contrast to other public goods such as public security, benefits from climate change mitigation do not accrue immediately, but only in the future, and the level of benefits is contested. For some actors, e.g. people living in high latitudes where climate change increases agricultural productivity (see Yang et al. 2007), mitigation of climate change might actually not be desirable. Moreover, given the uncertainty surrounding climate change impacts, people might prefer to "wait and see", and eventually call for government help if impacts actually occur.

After two decades of increasing visibility and salience, international climate policy is at a crossroads. Hitherto, climate policy had followed a path of increasing centralization and coordination, climbing up a ladder of increasingly detailed international agreements. Climate negotiators had the general impression to follow in the footsteps of ozone diplomacy, where a generic framework treaty was strengthened over time by specific treaties, ratcheting up emissions commitments as well as resource transfers from industrialized to developing countries to fund emissions mitigation. With the UN Framework Convention of Climate Change agreed in 1992, the Kyoto Protocol negotiated in 1997 and the Bali Plan of Action agreed in 2007 on the principles of a post-2012 climate regime, the Montreal Protocol precedent seemed to be a perfect fit.

Of course, game theorists (Barrett 1998) and political science realists (Victor 2001) had long stated that the free riding induced by the global public good characteristics of climate policy would lead to a failure of a centralized international approach. They had seemed to triumph already in 2001 when US president Bush repudiated the Kyoto Protocol. But then the rest of the world rallied to defend the Kyoto approach, and the Protocol entered into force in 2005. 2007 brought the consecration of climate policy as an issue of highest global importance with the award of the Nobel Peace Prize to the Intergovernmental Panel on Climate Change and Al Gore. Everything seemed on track to culminate in a glorious event that would lead international climate policy in its third decade and set up a really global climate regime – the Copenhagen climate summit of late 2009.

But fate intervened by unravelling the real estate bubble in the US. By mid-2009 policymakers in countries previously proud of their role as climate policy pioneers were struggling to keep their economies afloat. Hopes of the US playing the role of a climate policy frontrunner evaporated after Congress failed to pass a comprehensive emissions trading bill. Those advanced developing countries that had weathered the storm well were not really eager to take up the role of greenhouse gas mitigation pioneers. Instead, they discovered climate policy as a field where they could assert their newly won economic power and defy industrialized countries through a new negotiation group called BASIC.

This explosive cocktail derailed the Copenhagen negotiations, with things made worse by the host country's inept handling of the summit. What was hoped to be the herald of a new era of global cooperation on climate change mitigation dissolved into a glimpse into the abyss of a fragmented climate policy with each country just doing what it felt to be appropriate, without any comparability or transparency of mitigation efforts. While through last minute attempts the abyss was papered over by the "Copenhagen Accord", it became quickly visible that Copenhagen heralded a sea change in climate policy. Ever since then, international climate policy faces the inconvenient truth of fragmentation, even if hidden behind many smokescreens of UNFCCC language and "successes" in negotiations such as Cancun in 2010.

Why fragmentation of climate policy is a bad idea

Biermann et al. (2007, p. 8ff) discuss pros and cons of fragmentation from a political science view. In their view, fragmentation could lead to faster agreements among frontrunners and avoid watering down of commitments. Moreover, it would allow side payments and allow to involve non-state actors as well as solutions tailored to specific circumstances. Competition between different approaches could lead to innovation. Ostrom (2010) argues that bottom-up "polycentric efforts" could lead to a situation that is better than an ineffective centralized regime. However, many

of the arguments do not fully fit to the current regime, as it allows for differentiation of commitments, side payments through climate finance and voluntary non-state action. According to Biermann et al. (2007) the disadvantages of a fragmented approach include less potential for package deals, lack of fairness, incentives to engage in a race to the bottom and lack of transparency.

From an economist's viewpoint, the disadvantages dominate. Due to the characteristics of greenhouse gas mitigation as a global public good, it is economically ideal to agree on emissions targets globally and to harness the cheapest mitigation options through market mechanisms. While simple marginal abatement cost curves as reported by Mc Kinsey need to be treated with caution (see Ekins et al. (2011), and the dynamic effects of mitigation policies need to be considered when comparing measures, experience from the Clean Development Mechanism has shown that it was able to mobilize a significant volume of low-cost reductions, but also higher cost ones (Castro 2011). The effect of fragmentation will be that overall emissions mitigation effort will be lower than required by the 2°C target acknowledged both in the Copenhagen and Cancun agreements (Kartha and Erickson 2011 summarize all relevant studies and conclude that the temperature rise would be in the interval 2.5°C to 5°C) . This is even acknowledged by realists, Carraro and Massetti (2010) propose wryly to use 50 billion $ to buy mitigation in developing countries in order to close the effort gap. They do not realize that under a fragmented approach, there is no incentive for any country to spend huge sums on mitigation abroad.

A comparison of modelling studies show that any fragmentation of mitigation action will unequivocally lead to mitigation cost increases (Hof et al., 2009). This is the case in any configuration of marginal costs. In a fragmented world, carbon prices will differ and even if there is "linking" of different jurisdictions (Flachsland et al. 2009), transaction costs will occur. Further negative effects are carbon leakage, i.e. the increase of emissions outside a group of countries that mitigates emissions due to the reduction of fossil fuel prices caused by the mitigation action (Sinn 2008). Fragmentation of market mechanisms will deter financial institutions which need a minimum turnover and stability to enter a market. In a fragmented market, sellers of credits will be at the mercy of each single, unique buyer for specific types of credit while currently, international competition protects sellers against overly greedy buyers. While some buyers would look for high-quality credits, as done by the EU today, there would probably be a "race to the bottom" in order to minimize costs of complying with the pledge.

Fragmentation of mitigation action will unequivocally lead to mitigation cost increases.

How does a fragmented climate policy world look like?

The key characteristics of the centralized world of the Kyoto Protocol regime and their counterparts under a fragmented regime are shown in Box 1.

Often, a fragmented system is seen as equal to a "pledge and review" system, which was first proposed by Japan in the early 1990s and has resurfaced from time to time. However, the review element still needs to be based on some common ground, which would lack in a fully fragmented system.

A full fragmentation would mean that all countries define their climate policy unilaterally. While even in the bleakest scenario, the UNFCCC would persist, it would uniquely provide rules for reporting of national greenhouse gas inventories. So some degree

of ex post evaluation of actual climate policy successes would be possible, at least for the Annex I countries. However, for developing countries, this evaluation would become difficult as the frequency of reports is not specified in the UNFCCC.

The actual post-2012 future may settle on a "middle ground" between a centralized and a fully fragmented system (Prag et al. 2011, p. 8). While it retains some features of centralization that are commonly seen as useful – Prag et al. (2011) would include common accounting rules, tracking of international transactions and common principles for new market mechanisms - other elements are fragmented. This would entail the risk that in a fragmented system one mitigation activity could be counted in several systems. A reduction might be acknowledged as an offset and at the same time credited towards a national pledge. This would become particularly relevant if some mechanisms credit policies whereas in the same jurisdiction project-based mechanisms continue to exist. It is clear that transaction costs of checking for double counting might be substantial.

Even with the UNFCCC negotiations formally still aiming at a relatively centralized system, de facto fragmentation is in full swing. The EU, which has hitherto formed the backbone of the global carbon market with its domestic emission trading scheme (EU ETS) accepting credits from the project-based Kyoto Mechanisms without serious constraints, is no longer willing to play this role. Already in the legislation agreed in 2009, the import limits for Kyoto credits have been reduced massively for the third EU ETS phase 2013-2020. Moreover, in the absence of an international agreement, Certified Emission Reductions (CERs) from Clean Development Mechanism (CDM) projects can only be imported if they come from projects located in Least Developed Countries or from projects that have already been registered before 2013. The latest restriction, announced in November 2010, was the prohibition of CER imports from CDM projects reducing the industrial gases HFC-23, and N_2O from production of adipic acid, which will enter into force in April 2013. CERs from such projects currently make up the lion's share of all CDM credits. The EU has made it very clear that it sees the Kyoto Mechanisms as

Box 1: *Key differences between a centralized and a fragmented climate policy regime*

Centralized world	**Fragmented world**
- legally binding commitments (absolute)	- unilateral pledges (absolute or intensity-based, partially qualitative)
- common emissions units (same global warming potentials)	- unilaterally defined emissions units (different global warming potentials)
- common inventory guidelines (based on IPCC Good Practice)	- unilateral inventory guidelines (national approach)
- a UNFCCC-administered registry linking national registries	- national registries
- centrally defined market mechanisms	- bilateral mechanisms
- central regulatory oversight	- unilateral rules
- transparency	- opaqueness

a bargaining tool in the climate negotiations. It has been actively pushing for sectoral mechanisms to replace the CDM. Moreover, the EU's import regulations for the EU ETS allow multi-country agreements negotiated as per the EU's interests.

The US, which did not ratify the Kyoto Protocol and thus have been the vanguard of fragmentation proactively undermined the idea of a global carbon market. While the bills that failed to pass Congress in 2009 embraced the principle of international offsets, it remained always clear that these offsets would have to obey domestically defined regulations. This was due to a deep mistrust of the CDM (see e.g. US Government Accountability Office 2008) fostered by an awkward coalition of supporters of environmental integrity and opponents of any monetary transfers abroad generated by climate policy. Offset mechanisms are also seen as a way to subsidize competitors of US industry in advanced developing countries; thus avoided deforestation initiatives were preferred compared to industrial projects.

Even within the US, fragmentation is rampant, with two regional emission trading schemes (the Regional Greenhouse Gas Initiative, RGGI, in the Northeast and the Western Climate Initiative essentially triggered by the Californian emissions trading proposal under the bill "AB 32"). Each of these schemes has different rules for project-based offsets. California has set an offset limit of 8%; offsets may only come from projects in the US, Canada and Mexico under rules approved by the Air Resources Board. So far, only a limited number of project types has been accepted. Moreover, sectoral credits might be allowed.

In 2010, Japan introduced the idea of a bilateral mechanism and quickly embarked in filling it with life. A budget of 77.5 million $ was allocated to promote the concept in 2010 and 2011. Both the Ministry of Economy, Trade and Industry and the Ministry of Environment are lavishly funding feasibility studies for pilot projects, of which 59 have been started to date. Most of the studies are done in South East Asia and relate to technologies either not eligible under the CDM (e.g. a nuclear power plant in Vietnam) or suffering from additionality problems. Japanese industry strongly supports the bilateral approach as it was put off by the high regulatory intensity of the CDM process and now hopes for easily accessible export subsidies for Japanese technologies. Access to feasibility study subsidies is limited to Japanese firms. Agreements with several governments to award and recognize bilateral credits are under negotiation. The credits are to be counted towards the Japanese Copenhagen pledge. To date, no baseline, monitoring and verification methodologies have been published. The pilot projects shall however assess such methodologies.

Even with the UNFCCC negotiations formally still aiming at a relatively centralized system, de facto fragmentation is in full swing.

The current status of fragmentation of carbon markets for the time after 2012 is shown in Figure 1 below, showing the wide range of emissions trading systems and project-based offset mechanisms.

Below, I discuss which parameters of project-based mechanisms and emissions trading systems can be influenced by fragmentation.

Differentiation of project-based mechanisms

The different parameters of project-based market mechanisms that can be influenced by fragmentation are as follows:

a) Baseline and additionality determination
b) Project types and sector coverage

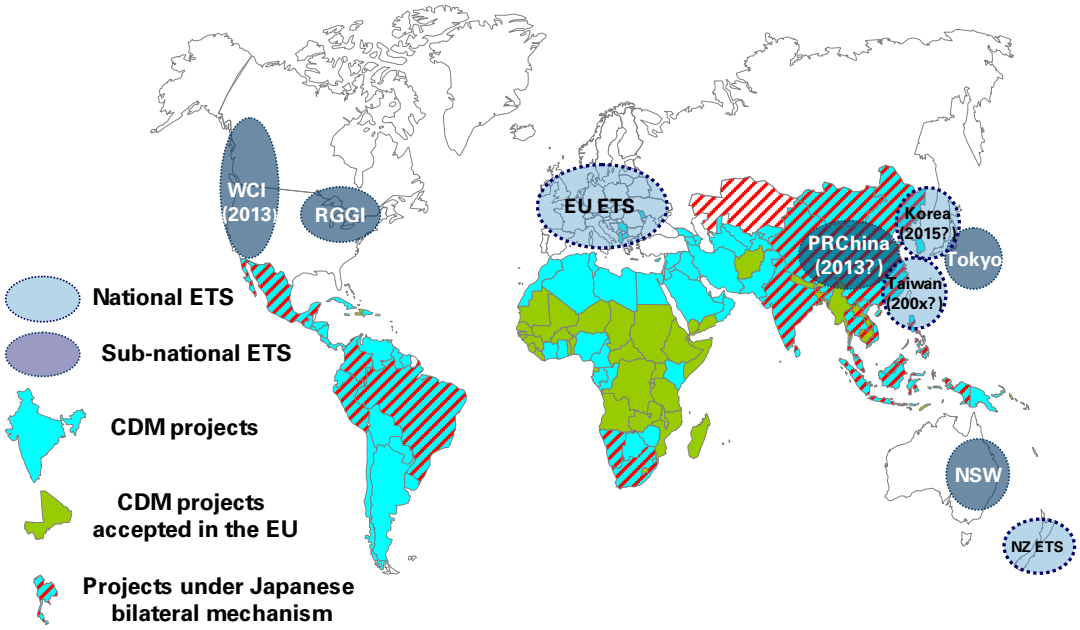


Figure 1: Ongoing carbon market fragmentation – current status for post-2012

c) Duration of crediting period
d) Validation process, monitoring, reporting and verification
e) Sustainability criteria

Positions of different countries and regional groups influencing their acceptance of offset credits in a fragmented world will be discussed below.

Baseline and additionality

Both baseline and additionality determination of mitigation projects are crucial elements of any offset mechanism and thus have been severely contested between business and environmental lobby groups. Normally, rules to set baselines are not identical with additionality determination rules but for many project types they are based on similar principles. The definition of the baseline is usually done by applying methodologies which have been accepted by the regulatory authorities.

Additionality is seen as important by key players in international negotiations. For example the EU has consistently emphasized strict additionality determination based on investment tests or tough technology benchmarks. Due to the strong domestic opposition against offset mechanisms mentioned above the US is arguing on the one hand for a robust additionality test to avoid the impression that US money flows abroad for the purchase of hot air. On the other hand US industry has always been interested in simple access to cheap credits and thus is not really interested in a limitation due to a strict additionality rule. In developing countries, views diverge. On the one hand Least Developed Countries and the AOSIS group which do not have a large potential of non-additional emission reductions due to the absence of industry are in favour of strong additionality to achieve real mitigation of greenhouse gases. On the other hand heavily industrialized CDM players like China and India see additionality as an obstacle to maximize emission credit generation and exports and thus support a lenient interpretation of additionality.

Regarding baseline determination similar challenges appear. A stringent baseline enhances envi-

ronmental integrity by leading to higher emission reductions while lowering the profitability of projects and increasing the costs of the investor country to reach its pledges. Thus the investor country might try to keep the baseline as loose and flexible as possible in a fragmented world.

Countries interested in environmental integrity will ask for accurate and complete datasets for baseline determination, while host countries and less quality-oriented buyers will go for simple default parameters. The pressure to reduce costs of baseline setting will be high; eventually the supporters of environmental integrity might settle for highly conservative default factors.

Project type and sector coverage

Investor countries will define eligible technologies in such a way that interests of its industries are satisfied. Thus technologies that are applied by competitors located in developing countries will not be eligible (see the US position discussed above), whereas technology exports not leading to direct competition will be favoured (see the Japanese approach to the bilateral mechanism).

Duration of crediting periods

In terms of environmental integrity, overall global emission reductions and project profitability, the characteristics of the crediting period within an offset system are a decisive factor as they directly affect the number of credits which can be generated under the scheme. The start of the crediting period can be determined in very different ways. While the CDM is very conservative inasmuch the registration date determines the start date, other mechanisms may apply the starting date of the project or the date of third party validation, both of which would lead to an earlier inflow of credits.

The duration of the crediting period has major impacts on the overall delivery volume of offsets. The CDM allows a maximum of 21 years for credit generation, split up in three periods of 7 years, whereas forestry projects can receive credits for 60 years. If one imagines that the whole lifetime of large power generation units like nuclear power plants or ultra-super critical coal power plants would be eligible for crediting, the overall amount of offsets would be increased tremendously compared to the CDM. Longer crediting periods also increase the unwillingness to change policy regime characteristics and thus tend to "fossilize" policies. The Japanese bilateral mechanism, which has not defined any crediting period, might be the first step into this direction.

Rules for updates and renewals of crediting periods can have important repercussions on credit volumes. Stringent approaches require recalculation of the baseline and re-validation of additionality whereas lenient ones would just require continued existence of the project.

The pressure to reduce costs of baseline setting will be high; eventually the supporters of environmental integrity might settle for highly conservative default factors.

While the EU has shown a tendency to prevent renewal of crediting periods of project types that generate exceedingly high profits such as HFC-23, internationally lenient approaches to crediting period duration and renewal have not really spread to date.

Validation process, monitoring, reporting and verification

A validation process requires an independent auditor. A project could be admitted to a market mechanism by simple production of a validation report of a certification company accredited under domestic law. The CDM goes beyond that inasmuch regulators scrutinize validation reports and frequently ask for revisions. Moreover, regulators accredit vali-

dators on the basis of a careful process of checking organizational competence. Significant cost savings could be achieved by doing away with validation and just rubber-stamping project documentation.

Furthermore it has to be defined whether it is compulsory to publish project documentation ex ante. The CDM even requires to collect the opinion of the potentially affected local population, e.g. by conducting a stakeholder meeting. Publication of documents and stakeholder consultation is costly, but usually seen as critical for credibility of projects. The same applies to monitoring, reporting and verification. Reporting frequencies, contents of monitoring reports, verification requirements and responsibilities need to be clarified. Should the verification body be independent or is verification done by the mechanism administrator?

In a fragmented climate policy world, the incentive to set legally binding targets will be lower than in the Kyoto world.

International acceptance of a "light" approach is not guaranteed, but experience is mixed. Some parties do not require independent validation for domestic offset systems (e.g. Canada). Advanced developing countries have been extremely reluctant to allow independent verification. On the other hand transparency of reporting monitoring results is generally supported, especially by the US.

Sustainability criteria

In the CDM the host country's DNA has the exclusive right to define a set of sustainability criteria that projects have to fulfil. In case of a negative outcome of the sustainability assessment projects can be rejected. This possibility reflects states' sovereignty, but is applied rarely. Under fragmented markets, both countries involved in a transaction would have first to see a need for assessing sustainability benefits and then agree who defines and evaluates the criteria. Either it will be the responsibility of the host country as in the current CDM, or the investor claims that right for itself. A third approach would be the joint definition of criteria and a joint evaluation body.

Differentiation of emissions trading systems

For emissions trading systems, the key parameters are

a) Characteristics of targets
b) Coverage
c) Allocation processes
d) Openness

Characteristics of targets

Under the Kyoto Protocol, targets are legally binding and thus generate demand for trading units. Targets can be set on different jurisdictional levels and "cascade" downwards from the international to the national and subnational level – the Kyoto target triggered the introduction of the EU ETS. In a fragmented climate policy world, the incentive to set legally binding targets will be lower than in the Kyoto world. Types of targets would also be differentiated. The currently prevalent absolute targets would most likely be substituted by much less "biting" intensity targets, especially in advanced developing countries.

Coverage

The degree of coverage is akin to project type eligibility for project-based mechanisms. An upstream system where allowances are surrendered by fossil fuel producers and importers can cover the entire economy. In a downstream system, coverage is usually limited to large sources in order to keep transaction cost at a manageable level. In a fragmented world, the latter system is more likely as it allows to exempt critical sectors. For example, in Australia and New Zealand key sectors prevented coverage

in proposed emission trading systems arguing that their competitors were not covered by any climate policy instrument. Likewise, industries in the EU were able to prevent a replacement of free allocation by auctioning in the phase 2013-2020 by arguing that a critical loss of competitiveness would ensue. Fragmentation will also lead to attempts to reduce transaction costs of the systems.

Allocation processes

Allocation can range from pure grandfathering to full auctioning of allowances. Fragmentation will make a grandfathering approach attractive as auctioning is seen to provide a competitive disadvantage. The EU implementation of the rules to prevent competitive distortions would certainly have led to less exemptions if Copenhagen had brought a centralized regime for post-2012.

Openness

In a centralized climate policy world, openness is favourable as it allows access to UNFCCC regulated credits and thus cost reduction with only a limited reduction in credibility. The fragmented world will reward exclusive relations between symbiotic partners and discount openness. Openness reduces the degree of control over prices and quantities. Price caps and floors are a huge obstacle to openness as they might lead to "contamination" of other trading schemes in case the caps are reached.

The voluntary carbon market – laboratory of fragmentation

We already have a fragmented world in an important segment of the carbon markets – the voluntary market. In the decade of its existence, several key lessons have been learned. None of these is particularly encouraging.

Lack of transparency

The voluntary market is highly non-transparent. Only specialists have a good overview of the details of rule differences. While some institutions provide an evaluation of the market segments (the best is the annual report on the state of voluntary markets, for the most recent edition see Peters-Stanley et al. 2011), there is no institution providing real-time information. This is a massive contrast to the mandatory market systems where high liquidity and standardized contracts lead to real-time publication of prices free of charge.

Wild swings in demand

Right from its inception, the voluntary market has been a buyer's market. Turnover of the voluntary market is dependent on the whims of the demand side and credit suppliers have to discover "what turns the markets on or off" (Peters-Stanley et al. 2011, p. iii). Whole market segments are turned off if the political appetite for greenhouse gas reductions slackens as seen in the US in 2009-10. This shows that a large share of the demand for voluntary credits was actually due to the hope to acquire an offset that could eventually be used for compliance purposes at rock-bottom prices. Many players in the voluntary markets have also tried to market those segments that were ineligible in the compliance market, such as forest protection. Generally, marketing plays a much larger role than in the compliance market, leading to waste of resources and a tendency to focus on simple messages. Despite a decade of efforts, overall, annual turnover of the entire voluntary market has remained below ¾ billion $, i.e. less than 1% of the compliance markets. Even if one only counts primary transactions of offsets from the Kyoto Mechanisms, the voluntary market never reached more than a quarter of the volume of the compliance market.

Proliferation of institutions with similar tasks

Registry and verification systems compete with each other, increasing transaction costs. 15 registries are competing, most of which are located in the US. Divergence of standards is likely as

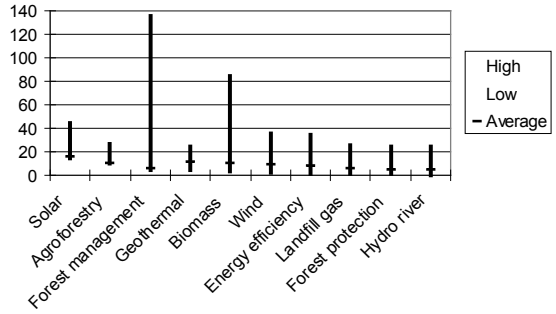
standard providers try to find stable niches. For example, the Gold Standard with a highly elaborate stakeholder consultation procedure caters for the buyers who value development benefits highly, whereas the Verified Carbon Standard (VCS) caters for those who want to get a "no-frills" credit. Peters-Stanley et al. (2011, p. vi) list 21 verification standards, twelve of which have a market share of 1% or less. Some offset providers combine several standards, particularly in the forestry sector.

As the voluntary market shows, there might be a small share of very high quality mechanisms, whereas bulk transactions would be done in a "no frills" way.

Wide divergence of credit prices reduces efficiency

Prices per emissions credit have a range of several orders of magnitude depending on the appeal of the credit. The difference is large both between project types as well as between different projects of the same type. This clearly does not lead to an efficient mitigation outcome, as should be achieved by a market mechanism. With the exception of forest protection, there is an inverse relationship between the typical size of a project and its chance to achieve a high price.

Figure 2: Price lottery on the voluntary market ($)



Data source: Peters-Stanley et al. (2011: 20).

Doubtful environmental integrity

Environmental integrity of voluntary offsets is very variable. While there is a distinct "high end" of the market catered for by the Gold Standard, many voluntary projects have a distinctively lax approach to additionality. Unsurprisingly, frequently projects rejected under the CDM are accessing the voluntary market.

Possible futures of market mechanisms in a fragmented climate policy world

An apt analogy of the current situation in global climate policy is the eve of the great depression in the 1930s. Then, the gold standard currency system was still working, albeit with challenges created by protectionist tendencies of countries in the post-war period. Nobody did envisage how the currency world would look like just five years later – impoverished and fragmented, with countries indulging in "beggar my neighbour " policies. If we do not engage in a last minute attempt to save a global climate policy approach, we will similarly look back in a nostalgic fashion to the "good old days" of an integrated carbon market with a single currency, the CER.

Fragmented carbon market mechanisms will lead to a coexistence of project-based mechanisms, sectoral crediting and crediting of policies. Within the universe of project-based mechanisms, there will be different eligible project types, different baseline methodologies, different monitoring procedures and different degrees of verification, all leading to different degrees of environmental integrity. We will se a patchwork of partially overlapping approaches. Buyers will try to minimize costs of credits whose environmental integrity is sufficiently high to dispel doubts in the general population, as well as in the eyes of the international community whereas sellers will want to maximize revenues. Given that the demand will be rather weak, a buyer's market can be expected.

One key criterion that is consistent among buyers and sellers is low transaction cost. The availability of cheap credits from hitherto ineligible project types is also supported by both sellers and buyers, unless the environmental integrity of those credits is perceived to be low. Furthermore, both sellers and buyers are interested in diffusion of advanced technology, unless transfer of this technology leads to an increase of competitive pressure on industries from the investor country. As the voluntary market shows, there might be a small share of very high quality mechanisms, whereas bulk transactions would be done in a "no frills" way.

Of course, fragmentation of carbon markets will generate some winners – politicians unwilling to underwrite expenses for serious national mitigation strategies, industry lobbyists, sovereignty enthusiasts, contract lawyers, highly specialized consultants like my firm Perspectives, speculators and arbitrageurs. The great loser will be the global climate.

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Perspectives on the EU carbon market

Abstract

The EU emissions trading system (ETS) strictly speaking is a regional carbon market. Nevertheless, it has developed into the backbone of the global carbon market, generating demand for international carbon credits. The recession in the EU with a resulting reduction of demand for carbon credits has brought home the tension that the EU faces between domestic objectives such as 'ensuring' an adequate EU price signal to drive the decarbonisation of the economy and its 'responsibility' for the global carbon market by maintaining or increasing the trade of carbon credits. With the EU currently not being able politically agree on a tighter ETS cap to increase scarcity, for some time the EU ETS will not be able to generate significant demand for carbon credits. In the meantime, the EU is currently discussing reform of existing and design of new flexible mechanisms to be ready for the moment that EU or international demand for credits picks up.

Introduction

The EU emissions trading system (ETS) is arguably the most important part of the global carbon market. By covering currently some 2 billion of GHG emissions in the EU and so-called countries of the European Economic Area[1], comprising of Norway, Iceland and Liechtenstein, the EU ETS by most estimates makes up some 80% of the global carbon market. Strictly speaking a regional carbon market, its size however means that prices for EU allowances (EUAs) under the ETS are price setters for the global carbon market. With demand from those countries that have ratified the Kyoto Protocol fast decreasing, the EU ETS will become – at least temporarily – even a more important component of the global carbon market.

This is why the ETS, despite being a regional market, remains the backbone of the global carbon market. While it is the prerogative of the EU to restrict or allow certain credits from the Kyoto Protocol mechanisms, decisions have implications

1 Countries of the European Economic Area (EEA) are closely associated to the EU's internal market and as a result take over most of the EU's economic regulation

beyond the EU, because in the absence of other comparably sized carbon markets, there are little alternative outlets for credits. Restrictions typically trigger market participants' harsh criticism of the EU's lack of responsibility for the carbon market, which arguable is the EU's domestic and global flagship policy.

Seen from within the EU's political economy, the EU's carbon market is first of all meant to serve EU interests, i.e. to "promote greenhouse gas (GHG) reductions in a cost-effective and economically efficient manner"[2], and if one wants to believe policy makers, to drive EU decarbonisation. Only secondary are EU concerns of developing a global carbon market, once forcefully advocated, now somewhat more tempered after the US has *de facto* abandoned attempts to develop a US carbon market.

It becomes increasingly clear that the EU ETS alone cannot generate the demand for the big volumes of credits that are or at least that could be generated globally. The EU ETS therefore faces the tension between pursuing domestic policy objectives such as cost-effectiveness, decarbonisation of its economy, investment and after all ensuring competitiveness of its industries and developing the global carbon market. This tension will continue to define the perspectives of the EU ETS as a regional carbon market in the absence of even the promise of an integrated global market. EU experiences in this respect will not remain unique but become generally applicable to other regional emissions trading systems as they appear.

From the very beginning the EU ETS has been designed as a domestic, i.e. EU 'policy and measure' in Kyoto Protocol speak, somewhat 'protected' from carbon markets emanating from the Kyoto Protocol such as CDM and JI or International Emission Trading. The principal reason has been concerns over compliance under the Kyoto Protocol and the Marrakech Accords although scepticism over the possibility for a global effort may also have played a role. For an efficient trading system to work, there has to be guarantee that a 'tonne is a tonne' and that compliance is ensured with a possibility of recourse to a court in case of litigation. This, so the rightful reason of the EU can only be guaranteed within a national or regional jurisdiction and not within a more loosely UN framework. With this in mind, the following article will highlight perspectives of the EU carbon market.

Past EU ETS experiences

The EU ETS had a bumpy start, especially in its first (pilot) phase (2005-07) as well as the on-going phase 2 (2008-12), suffering from a number of 'teething problems' and design flaws, extensively covered by the literature – see also below. Most have been addressed by now notably by a review, adopted in 2009, coming into force, however only in the beginning of 2013.

Initial problems were partly the result of the rapid speed with which the ETS was adopted, motivated by the EU's desire to show a strong determination to tackle climate change.[3] This should, however, not hide the fact that the ETS suffered from some serious design flaws (e.g. Egenhofer 2007; Swedish Energy Agency 2007), which were largely the result of two political choices: a high level of decentralisation and free allocation based on grandfathering, i.e. historical emissions. Initial allocation of allowances by member states on the basis of National Allocation Plans led to a 'race to the bottom', i.e. member states were under pressure by industries not to hand out fewer allowances than their EU competitors received (e.g. Kettner et al. 2007, Ellerman et al 2007). This led to over-allocation, and

2 See Art. 1 of the EU Emissions Trading System Directive (European Union 2003)

3 For a full overview of this period, see Delbeke 2006 and Skjærseth and Wettestad 2008.

ultimately to a price collapse. During the period when the EU allowance price was high, free allocation also generated 'windfall profits', mainly but not only in the power sector (e.g. Keats and Neuhoff 2005). Some of these issues were addressed in phase 2 (2008-12) as a result of member state cooperation and the European Commission being able to reduce member states' allocation proposals (e.g. Ellerman et al 2010). Still, throughout both phases, by and large, the ETS has managed to deliver a carbon price. One result has been that carbon price has now officially entered board room discussions (Ellerman and Joskow 2008).

In the absence of a global agreement, leading to 'uneven' carbon constraints, concerns over competitiveness and carbon leakage have been high on the agenda. The essential answer by the ETS was free allocation. Free allocation constitutes a compensation or a subsidy, potentially creating an incentive to continue producing in Europe. At the same time, historical grandfathering in the first two phases has led to significant windfall profits.

The *ex-post* analyses on economic rents and windfall profits are relatively clear, while also more or less consistent with *ex-ante* studies that assessed the potential windfall profits for the ETS sectors at the time. Ellermann et al (2010), the most authoritative *ex-post* study conducted so far, conclude that in total the rents were substantial, even at a relatively modest carbon price of €12, and amount to more than €19 billion in windfall profits, plus more than €10 billion of 'informational'[4] rents, although with the caveat of surrounding uncertainties in the calculations. Other *ex-post* studies (e.g. Delarue et al 2010) and own calculations (Egenhofer et al 2011) do not significantly disagree with this finding[5]. During phase 1, all technologies and all participants included in the ETS – power and industry alike – benefited from ETS-related rents. Those rents for the power sector that accrued as a result of free allocation will disappear with the auctioning in the ETS phase 3 (see below for details). This is not the case, however, for those rents in the power sector of low carbon power-generation technologies, such as hydro or nuclear, which will enjoy additional revenues as a result of higher power prices due to the ETS but do not face additional costs. The benchmark-based allocation – in place as of 2013 – will reduce potential rents, sometimes significantly. Still, different studies come to diverse conclusions (e.g. De Bruyn et al 2010, CE Delft 2010). This is partly so because windfall profits depend on the ability to pass through product price increases due to the ETS allowance price, an issue that remains controversial.

It becomes increasingly clear that the EU ETS alone cannot generate the demand for the big volumes of credits that are or at least that could be generated globally.

Overhaul in two steps

Experiences from phase 1 and 2 have greatly helped the European Commission to propose and adopt radical changes to the EU ETS, which were not even thinkable before its initial adoption in 2003[6]. The principal element of the new ETS is a single EU-wide cap which will decrease annually in a linear way by 1.74% starting in 2013. This linear reduction continues beyond 2020 as there is no sunset clause.

4 'Informational' rents describe the fact that during the first period of general over-allocation, which should have produced a zero price, the EU allowance price remained at around €12. Companies that have received allowances for free – both industry and the power sector – could make large trading profits by selling their allowances. This appears to be a one-off rent.

5 For a detailed overview, see Egenhofer et al 2011: 8-14

6 See e.g. Ellerman et al 2010, Skjærseth and Wettestad 2010 and Egenhofer et al 2011 for a full overview.

The revised ETS Directive also foresees EU-wide harmonised allocation rules. Starting from 2013, power companies will have to buy all their emissions allowances at an auction with some temporary exceptions for 'coal-based' poorer member states. For the industrial sectors under the ETS, the EU agreed that the auctioning rate will be set at 20% in 2013, increasing to 70% in 2020, with a view to reaching 100% in 2027. The remaining free allowances will be distributed on the basis of EU-wide harmonised benchmarks, set on the basis of the average performance of the 10% most GHG-efficient installations. Industries exposed to significant non-EU competition and thereby potentially subject to carbon leakage, however, will receive 100% of allowances free of charge up to 2020, based on Community-wide product benchmarks set on the basis of the average performance of the 10% most GHG-efficient installations.

Other changes include a partial redistribution of auction rights between member states, restrictions of the total volume of CDM/JI credits, the use of 300 million EU allowances to finance the demonstration of carbon capture and storage (CCS) and innovative renewable technologies and a general – non-legally binding – commitment from EU member states to spend at least half of the revenues from auctioning to tackle climate change both in the EU and in developing countries, including for measures to avoid deforestation and increase afforestation and reforestation in developing countries.

- Furthermore, 12% of the overall auctioning rights will be re-distributed to member states with a lower GDP per capita (10%) and those that have undertaken early action (2%).
- The system will be extended to aviation, the chemicals and aluminium sectors and to other GHGs, e.g. nitrous oxide from fertilisers and perfluorocarbons from aluminium.
- Member states can financially compensate electro-intensive industries for higher power prices. The European Commission is drawing up EU guidelines as to this end.

As already in the previous periods, access to project credits under the Kyoto Protocol from outside the EU will be limited. The revised ETS will restrict access to no more than 50% of the reductions required in the EU ETS to ensure that emissions reductions will happen in the EU. Left-over CDM/JI credits from 2008-12 can be used until 2020. Exact figures are subject to discussion.

Possible further changes

Changes for phase 3 are not the end point of ETS reform.

First, several implementation provisions, e.g. on allocation or monitoring and reporting of emissions, have not been finally adopted or implemented. New gases and sectors will require amendment of the Monitoring and Reporting Guidelines (MRGs). Similarly, the auctioning regulation is still pending implementation.

Second, the ETS Directive has also developed a framework for possible changes without amending the Directive. This includes for example the possibility for member states to opt-in new gases and activities under certain conditions, a clause that has already been applied in the past. A second possibility constitutes a kind of domestic offset schemes, the so-called Community-level projects under article 24a, where member states can issue credits for reductions projects outside ETS coverage. Another clause (Art. 27) allows for the exclusion of small installations from the ETS. Finally, the ETS features an enabling clause for linking the ETS with other regional, national or sub-nation emissions trading programmes through mutual recognition of allowances (Art. 25). Another – poten-

tially contentious – issue will be the compensation of electro-intensive industries by member states. Although the European Commission is drawing up guidelines, there is a risk of a new round of distortions to competition between member states.

Third, the revised ETS Directive explicitly foresees the possibility for a revision in the case of an international climate change agreement. Depending on the nature of the agreement, this could mean the lowering of the cap, for example if the EU decided to move to a unilateral EU reduction commitment of 30%. This move would trigger a whole number of implementation rules including notably an increase of the linear annual reduction factor of currently 1.74%[7] allocation rules, the role of flexible mechanisms, the inclusion of forestry credits and land use changes.

In 2011, the European Commission has formally adopted a ban on the use of HFC-23 and N_2O industrial gases credits in the EU Emissions Trading System, coming into effect in May 2013. According to Commission analysis, CDM credits have encouraged more production of HCFC-22 to access credits for HFC-23 abatement, while for N_2O, the high rents have shifted production from the EU to developing countries, leading to carbon leakage, due to the high rents from CDM. The European Commission has also declared that no future restrictions are currently considered.

Carbon prices remain low: what now?

At the time of the hard won compromise of the ETS review for post-2012, there was a general conviction that the new ETS will be 'future-proof', i.e. being able to cope with the lack of a global climate change agreement, address competitiveness, yet able to drive de-carbonisation of the EU economy. The 2008/9 economic crisis however has destroyed that confidence by a seemingly permanent dramatic lowering of EUA prices due to rapid and dramatic decline in economic output. Ever since EUA prices have been lingering around €10-15 per tonne of CO_2 and few expect EUA prices to climb much higher than €20 at best throughout the period of up to 2020 (Egenhofer 2010), largely because of the possibility to bank unused allowances between the second and third phase.

Access to project credits under the Kyoto Protocol from outside the EU will be limited.

Alarmed by this, the European Commission has launched the idea of a set-aside, whereby a certain number of EUAs would be taken out of the market either temporarily or permanently. Some also argue that the European Commission has been identifying other ways to support EUA prices, for example by delaying or restricting EUA supply such as delay of the initial auctioning of EUAs and restrictions on the use of CDM credits stemming from industrial gases. However this remains subject to debate. Member states are equally concerned with low EUA prices and have also started to design policies such as for example the UK carbon price support mechanisms, in essence a price floor by a carbon tax for the UK only. The efficiency measures under a newly proposed directive on energy efficiency that foresees efficiency standards also for the ETS sector could lead to a further drop of EUA prices because some, cover areas that are already 'regulated' under the EU ETS. The market in the meantime seems to have drawn its own conclusions. EUA prices had further fallen to around €12 per tonne of CO_2 with a tendency to decrease further for the time being.

7 Simple calculations reveal that in order to almost entirely decarbonise the power sector by 2050 – a precondition to meet the officially agreed 80%-95% reductions of GHg emissions by 2050, the ETS linear annual reduction factor would need be in the order of 2.5% rather than the current 1.74%.

As a result, the list of those voices to call for some sort of market oversight and price stabilisation mechanisms has increased. Many agree that both price stability and a strong carbon price signal are beneficial if not essential. More controversial is the question on the nature of such a mechanism, its organisation and after all, how *ad hoc* or permanent this should be. The following ideas have been raised (e.g. Egenhofer et al 2011):

- *Price floors & ceilings:* Among the most prominent proposals have been various ideas for price floors and ceilings including the announcement of a minimum price for future auctioning for example in 2030.

- *Back to a carbon tax:* Others have suggested to adjust ETS prices upwards from time to time to ensure a steadily increasing carbon constraint, essentially transforming the ETS into a hybrid tax-ETS system.

- *Technology accelerators*: This new mechanism would support early investors in top performing low-carbon technologies by rewarding them with additional free allowances.

- *Complementary member states measures:* Member states are free to adopt additional measures also for the ETS sector, for example to address market failure or provide technology push for certain technologies.

- *Ex-post adjustment*: some have argued that ex-post adjustment are a suitable tool to deal with carbon price fluctuations stemming from rapid and frequent changes in economic activity.

- The most far-reaching idea is the establishment of an independent *European Carbon Bank* to increase long-term predictability and notably ensure a carbon price signal that drives low-carbon investment. This would include a mechanism to cope with EUA demand fluctuations by adjusting the supply.

Although not doing away with the need for a price stabilisation mechanism, the obvious answer would be *upping the unilateral EU target to -30%*. The current ETS Directive foresees the possibility to increase the EU's unilateral 20% reduction target. Politically, the likelihood for this to happen in the short term, i.e. within the next 2 years or so is very slim. While it still might happen beyond that period, it would also mean an opening and re-negotiation of the current Directive, which many EU governments might wish to avoid.

Difficult discussions on off-sets from the outset

From the outset, the EU ETS has experienced a difficult relationship with CDM and JI credits. While there are many issues around CDM/JI, the most important within the EU has been how the trade-off between 'cost-effectiveness' and 'incentives for EU/EEA industry' to reduce emissions, thereby avoiding EU/EEA lock-in in high-carbon growth patterns. Thus, from the beginning of the EU ETS, policy makers, industry and NGOs have debated hotly how much of the abatement should be done domestically – i.e. is there a need for quantitative restrictions? – and on project type and quality – i.e. is there a need for qualitative restrictions? At the same time, the EU and EEA tied themselves to the UN-based crediting mechanisms, not only to show support for the UN system but also to work towards one integrated system of offset mechanisms. However, the perceived 'failure' to act on 'controversial' emissions on the part of the UN eventually has started to undermine the credibility of offsetting mechanisms and therefore the ETS. This is why qualitative restrictions, on for example industrial gases projects, have been adopted.

The supply/demand interface

Linking JI and CDM to the EU ETS has been meant to increase cost–effectiveness, an objective of the ETS.[8] Given current and expected future EUA prices, this concern is only of limited importance for the time being, however. But clearly perceived advantages of the JI, CDM or other mechanisms that they give investors an incentive to engage in carbon reduction projects and promotes technology transfer and investments will unlikely be able to tip the balance for unlocking new supply options in the near future.

For the global carbon market, the EU message is clear: the last thing that the EU and the ETS requires at this stage is additional supply. Already now, prices are 'too' low and the EU is struggling to find a suitable solution to raise them. And even if a move to a unilateral target of -30% by 2020 compared to 1990 were to be made within a realistic timeframe, changes would come into force by 2014 at best, a bare six years before the target date.

As a result, EU demand for credits remains limited. For the period up to 2012 buyers will be able to meet their demand easily through carbon credits generated under existing flexible mechanisms under the Kyoto Protocol. The EU for both the ETS and non-ETS sectors is expected to require somewhat more than 300 $MtCO_2e$ through 2012 (Linacre et al. 2011, table 12). For the period until 2020[9] estimates range between 1.750 to 2.100 $MtCO_2e$ for the EU's unilateral 20% reduction target and between 2.550 and 3.800 for a possible 30% reduction target. In the "Roadmap 2050", the European Commission (2011) estimates that a 25% reduction by 2020 can be achieved by full and effective implementation of the Energy Efficiency Plans and the legally-binding renewables targets while only a 30% reduction target would generate additional demand for post-2012 credits or offsets from non-Annex 1 countries.[10]

The European Commission has launched the idea of a set-aside, whereby a certain number of EUAs would be taken out of the market either temporarily or permanently.

However, this is not to say that the EU has no interest in new carbon mechanisms. The EU alongside other Parties within the UN has an interest in progress towards improving existing or creating new mechanisms. Only for the time being, the interest is mainly in the structure of the mechanisms and less so in volumes of credit.

This seemingly paradox situation can be explained in the EU's strive to arrive at a single legal framework for developed and developing countries alike as successor to the Kyoto Protocol. As such a single framework is likely to take time, there is value in designing the necessary elements of the architecture including mechanisms. Thus, the period before a global deal on mitigation targets and measures can be reached – if ever – should be used to get the rules and mechanisms in place to reach the globally agreed targets.

What future mechanisms?

Therefore, following the Cancún Agreements, Parties to the UNFCCC including the EU currently elaborate new market-based mechanism options, highlighting their views over their potential roles in a comprehensive international agreement, the

8 Recital 19 sees the mechanisms as "important to achieve the goals of both reducing global greenhouse gas emissions and increasing the cost-effective functioning of the … scheme" (European Union 2009).

9 Based on Point Carbon 2011 and Linacre et al 2011.

10 Note that all indicators point out that the EU is likely to meet its 2020 renewables targets while underachieving on energy efficiency. New legislation has been proposed to address energy efficiency.

institutional set-up, and their relations to the existing mechanisms. Within the EU, overall objective continues to be that new or revised flexible mechanisms continue to aim at advancing climate objectives, i.e. achieving real global emissions reductions and possibly other specific objectives such as sustainable development, technology transfer and financing. A number of options are discussed.[11]

Clean Development Mechanism

Programmes of Activities (PoAs) are a programmatic version of the CDM, registering a set of activities of the same type under a single umbrella. Sectoral benchmarking in the CDM credits emissions reductions below the baseline based on a pre-determined benchmark for a sector or a subsector. Expansion of the scope to sectoral and programmatic activities could help to strengthen the CDM and address more mitigation opportunities. On the other hand, an increase in the number of CDM projects will require improvements in efficiency of administration and an increase in the transparency of governance.

For the global carbon market, the EU message is clear: the last thing that the EU and the ETS requires at this stage is additional supply.

Joint Implementation

JI has faced administrative and organisational shortcoming pertaining to the Joint Implementation Supervisory Committee (JISC) as well as more technical issues such as baseline setting and methodology choices. Existing problems with double-counting have become controversial (see Sandbag 2010).

Sectoral Crediting Mechanism

For the EU, most potential to reach EU/EEA objectives is related to sectoral crediting. A sectoral crediting mechanism (SCM) credits emissions reductions from a covered sector against a threshold possibly below the business as usual (BAU) scenario. The main difference from the CDM is to expand the coverage moving beyond offsetting. A SCM could enhance the environmental integrity of the system. An SCM based on no-lose targets means that the host country will be rewarded for its over-performance in the sector above the threshold but will not be penalised for its underperformance, hence 'no-lose'. There are a variety of design options. The baseline can be negotiated as part of an international agreement between parties or domestically set on the basis of a sectoral benchmark. The baseline could be expressed in absolute emission levels, the carbon intensity or technology penetration rates. A technical merit of sectoral crediting is to circumvent the additionality test on a project basis.

By introducing a carbon price signal, an SCM is considered to be a stepping stone in an evolution path of a market mechanism from the CDM or JI via Programme of Activities (PoAs) to a *sectoral trading* scheme, then to a cap-and-trade scheme.

Sectoral trading

Sectoral trading is a cap-and-trade scheme (or alternatively, a baseline and credit programme) applied to a whole sector or a sub-sector within a country (e.g. Fujiwara 2009:44). Such a move can be done by gradually tightening the negotiated baselines and converting them into absolute caps. Sectoral trading aims at addressing countries that are not yet ready to take on binding economy-wide targets but are prepared to accept them in key

11 For more details see Fujiwara 2009, Egenhofer et al 2011 and Fujiwara forthcoming.

sectors, such as power and industry. Emissions allowances would be allocated to the host country's government, reflecting binding sectoral targets. Governments would be responsible for reducing emissions in particular sectors to a pre-determined level, based on national rules such as on allocation or on compliance. Theoretically, sectoral trading if based on absolute caps would be simpler with lower transaction costs that sectoral crediting. Some countries, such as China for example might prefer this model over sectoral crediting or a scaled up CDM. As sectoral trading is generally seen as stepping stone to a cap-and-trade system as the ETS, one should expect some sort of 'preferential' treatment of credits emanating before it. This would be possible for example by a bi-lateral agreement between the EU and China, something that has been rumoured for some time.

REDD plus market

There is a consensus of the importance of providing a value to environmental services such as the ones of avoided deforestation. The importance of avoided deforestation has been discussed in detail during the review of the ETS and recognised in Article 10 (3).[12] From an EU perspective, sovereign participation of EU member states in international REDD plus market generally appears preferable to linking to the ETS and international carbon markets irrespective of whether a CDM style (international issuance of credits) or JI style (national issuance of credits) is chosen. Full linking to international carbon markets would first require more clarity of the design of REDD plus markets, notably addressing questions of permanence, MRV and more generally, compliance as well a solution to the tricky question on how to absorb the expected volumes of credits (e.g. O'Sullivan et al 2010).

To date, the link to the EU ETS is the auctioning of EUAs, which will supply EU governments with the necessary funds for sovereign participation. However, current and expected EUA price levels are insufficient with EU finance commitments (e.g. Egenhofer 2010: 169).

NAMA crediting

Crediting of Nationally Appropriate Mitigation Actions (NAMAs), which is being discussed within the UN negotiations has attracted less attention within the EU. Besides the familiar point of lack of demand within the EU, NAMA crediting is seen as even more complex than for sectoral crediting, the EU's preferred mechanism. Unless there is a significant breakthrough on NAMA crediting in the UN negotiation, EU interest will most likely remain limited. This does however not rule out EU and member states support for NAMAs through sovereign climate finance.

Conclusions

The EU is promoting the creation of a global carbon market, which is seen as the most efficient and effective tool to reach domestic and global climate change objectives. To this end, it has established its domestic carbon market, the EU Emissions Trading System. Consistent with the Kyoto Protocol and the objective of a coherent, if not single legal framework under the UN, the Kyoto Protocol's flexible mechanisms, CDM and JI credits have become fungible – in principle yet conditionally - with EU allowances that are issued under the EU ETS. While being a sign of support for the UN system, this has made the EU ETS – at least as regards CDM and JI – dependent on UN rules, thereby 'importing' actual or perceived shortcomings, notably as to transaction costs, the integrity of the CDM, excessive rents and the value of pure

12 Article 10 (3) c stipulates that at least 50 % of the revenues generated from the auctioning of allowances should be used for climate-related activities enumerated in a list including "measures to avoid deforestation and increase afforestation and reforestation in developing countries that have ratified the international agreement on climate change" (European Union 2009).

off-setting. Indeed, the practice of off-setting developed countries emissions against developing countries' reductions – even if assumed that they are real – will not be consistent for much longer with the objective of halving global GHG emissions by 2050.

As a result, the EU is exploring new mechanisms that address the identified shortcomings. While the CDM is considered to continue to be useful for least developed countries with limited institutional capacity, sectoral crediting or sectoral trading is promoted as more suitable instrument for emerging economies, partly but not only because of their potential for deeper reductions and broader sector coverage. To date, discussions on these mechanisms continue in international negotiations and bilaterally without much tangible progress.

The major challenge for the EU ETS however is the low allowance price which currently standing at around €10 per tonne of CO_2 and with little prospects that it will recover any time soon, unless policy intervenes. Absence of intervention – highly uncertain at this moment – demand for credits will remain very weak. A possible recession in the EU, which many expect is possible if not likely, could drive down the price even further. From a global carbon market perspective, the good news is that

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further EU restrictions on supply, i.e. credits would not be a solution and hence are unlikely, unless for integrity reasons. The bad news however is that there is no immediate prospect for much stronger demand in the ETS. Such demand can only be re-established by economic growth or far-reaching changes in the way the ETS works. Either way, both would take their time.

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China Carbon Market

Abstract

This article provides an overview and analysis of the situation in China regarding the emerging carbon market. The policies and targets introduced by the central government and the actions and pilot activities undertaken at the provincial and industrial levels will be illustrated to demonstrate the formation and development of the Chinese carbon regime and show how a market approach will be applied in this process.

Policy-makers in China have given clear signals that the establishment of a trading scheme for carbon credits will be realized and regulations on the carbon market issued in the near future. The Twelfth Five-Year Plan on National Economic and Social Development states clearly that 'China will set up a sound system for the measurement, reporting and verification of greenhouse gas emissions, and gradually establish a trading market for carbon credits.'(NDRC 2011)

Apart from the policies being developed by the central government, a series of initiatives promoting the low-carbon economy have been undertaken by regional (provincial) and industrial entities as

well. For instance, a domestic Voluntary Emission Reduction Mechanism is being established to regulate and promote the transaction of voluntary emission reductions; low-carbon pilot locations in five provinces and eight cities have been selected as a way of exploring and accumulating experience in addressing the nation's carbon issues; the China Green Carbon Foundation has been set up, dedicated to combating climate change by increasing carbon sink projects in China; carbon-neutral activities have been conducted by some Chinese companies; and several climate exchanges have been established, those in Beijing, Tianjin and Shanghai being the most active.

Policy Prospect of Carbon Market and Trading in China

Mandatory requirements and administrative approaches have been used excessively in China to tackle the issue of climate change. However, the limitations of these methods have emerged gradually. During the period of the Eleventh Five-Year Plan (2005-2010), China has used climate change mitigation as an important opportunity to promote the transformation of economic development patterns and economic structures. Meanwhile, energy conservation and emissions reductions and the development of a green and low-carbon sector have also been recognized as the internal requirement for the country's sustainable development. Remarkable results were obtained through a series of policies and actions. For instance, energy consumption per unit of GDP decreased by 19.1 percent during the period, with 630 million tons of standard coal being saved and carbon dioxide emissions being reduced by 1.5 billion tons. Nevertheless, these achievements were dependent on mandatory requirements and administrative approaches such as the elimination of outmoded forms of production, the compulsory shut-down of inefficient power plants, steel factories and cement plants, and provision of significant financial subsidies. Yet these mandatory requirements and administrative approaches have caused high economic and social costs, and sustainability was gradually exposed as a problem. For example, in 2010, in pursuit of achieving the energy-saving goal of the Eleventh Five-Year Plan, some local governments imposed power cuts for consumption that seriously impacted on the production of enterprises and people's day to day activities, and was widely criticized. Hence, the central government started considering how to use market mechanisms to promote energy conservation and tackle climate change.

The Chinese Government formally included the issue of carbon trading in its most important official documents. In November, 2009, the central government explicitly announced targets to deal with climate change by 2020, namely that carbon dioxide emissions per unit of GDP should be reduced by 40-45 percent compared to the level in 2005, and the share of non-fossil fuels in primary energy consumption should reach 15 percent. In March 2011, the '12th Five-Year (2011 to 2015) Plan on National Economic and Social Development' was approved by the National People's Congress of China. A series of intermediate binding goals were also put forward, such as (by 2015, compared with the level in 2010): energy consumption per unit of GDP to be reduced by 16 percent; carbon dioxide emissions per unit of GDP to be reduced by 17 percent; the share of non-fossil fuels in primary energy consumption to reach 11.4 percent; and binding targets to be set for forest carbon sink. To meet the targets mentioned above, the plan also announced that a sound system for the measurement, reporting and verification of greenhouse gas emissions will be set up, and a trading market for carbon credits will be established step by step. This is the first time that the central government has formally made the plan to set up a domestic carbon trading

market in China, indicating that this concept has entered the stage of governmental working procedures. As a result, the National Development and Reform Commission, along with other ministries and committees, have started designing the carbon trading scheme and other related fundamental work.

The construction of a domestic carbon market in China will be a stepwise process. From the official speeches and documents released so far, the establishment of a domestic carbon market will be progressively promoted, changing from voluntary to compulsory, and from regional pilots to an unified national carbon market.

The first task is to standardize and promote the construction of a voluntary trading market. The National Development and Reform Commission has devoted itself to the formulation of '*Administrative Measures on Greenhouse Gas Emission Reductions Voluntary Trading Activities (Interim)*' (hereafter referred to as the Administrative Measures), which have been completed and are currently in the stage of consultation and approval. The Administrative Measures aim to standardize the market for voluntary greenhouse gas emission reductions trading, create an open, fair and transparent market, and encourage enterprises to take part in activities mitigating climate change. Through application of the Administrative Measures, the central government intends to set up the basic registration system for a voluntary market, define trading products and sites and to clarify how to apply the new methodologies and accreditation procedures for validation and verification entities (the DOEs), so that the whole process of the validation of emission reductions, registration and issuance, etc. can be realized under the supervision of the government. Meanwhile, another intention of the government in setting up the voluntary market is that the compulsory market can learn from the lessons drawn from the operation of the voluntary market, and experiences regarding government supervision will also be accumulated.

The second task is to facilitate the construction of regional pilot projects on carbon policies. In 2010, five provinces, namely Guangdong, Hubei, Liaoning, Shaanxi and Yunnan, as well as eight cities, namely Tianjin, Chongqing, Hangzhou, Xiamen, Shenzhen, Guiyang, Nanchang and Baoding, have been selected as the first group of regions for low-carbon policy pilots. The National Development and Reform Commission required the pilot regions to study and formulate relevant low-carbon development plans, actively explore a low-carbon development pattern with distinctive local characteristics, set up and implement the target of reducing greenhouse gas emissions, transform and upgrade traditional industries through the application of low-carbon technologies, construct low-carbon buildings, promote low-carbon forms of transport, strengthen the statistical work of greenhouse gas emissions, and actively advocate low-carbon and green lifestyle and consumption behaviour. Carbon trading was also added to the tasks this year, thus encouraging and supporting the pilot regions to launch regional pilot cap-and-trade initiatives. In recent months, the National Development and Reform Commission has held a number of workshops on setting up carbon trading markets in pilot regions to deploy and promote the regional carbon trading pilot establishment. The purpose of these activities is to generate experience in establishing a nationwide

China has used climate change mitigation as an important opportunity to promote the transformation of economic development patterns and economic structures.

unified carbon market. In addition, these pilots may provide a platform for exploring how to develop a diversified financial mechanism that can actively lead to foreign investment into China's low-carbon research and industrial development. Consequently, China's carbon market will be established step by step.

There are still some restrictions and deficiencies connected with the process of establishing a carbon market in China, such as a lack of infrastructural facilities for carbon market operation. To address these problems, the National Development and Reform Commission and concerned departments are committed to studying, compiling and developing policies to establish and improve infrastructural facilities for a national carbon market, including climate change legislation and setting up a system for the measurement, reporting and verification of carbon emissions. The pace at which these elements will be completed is uncertain. Some government officials have stated that China is expected to implement its regional carbon trading pilots by 2013 and to go nationwide in 2015. But other officials reported that there is no clear timetable for the establishment of a national carbon market. Regardless of rumours, it seems certain that significant progress will be achieved in setting up a carbon market in China during the period of the Twelfth Five-Year Plan.

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China is now at a crucial point in building a prosperous society, and at an important stage of industrialization and urbanization. It has difficult tasks to perform to develop the economy and improve people's living standards, and it faces more severe climate change challenges than developed countries do. Therefore, China is likely to continue to stick to the principle of sustainable development, adopting more powerful policies and measures to strengthen her ability to deal with climate change in an all-round way.

Specific Actions on the Regional and Industrial Levels

Global climate change has become one of the biggest threats to humanity, and concerns are growing globally. On 12 December 2009, at COP15, the Copenhagen Accords fell far short of the declared purpose of confirming the timetable for international negotiations and defining the emission reduction responsibilities of relevant parties. Also, the Cancun Conference held in 2010 has not accomplished the task of negotiations set in the 'Bali Road Map', which means that negotiations for the Durban Conference will be arduous, and it is as yet unclear whether the negotiations for a second Commitment Period for the Kyoto Protocol can be achieved. Nevertheless, the low-carbon economic system supported by low-carbon industry, low-carbon technology and low-carbon finance will not be hampered. On the contrary, this indicates that international cooperation on climate change has a long way to go and that countries all over the world must urgently speed up the construction of low-carbon economies.

China's government attaches great importance to climate change, having adopted a series of policies and measures and actively implemented climate change programs to reduce greenhouse gas emissions and strengthen its capacity to address climate change. Meanwhile, regional governments and industries have undertaken a series of actions representing bottom-up initiatives to combat climate change.

The establishment of China's voluntary emission reductions mechanism

As a responsible developing country with a large population, China has been fully aware of the importance and urgency of addressing climate change, following the requirements of China's guiding theory of development, namely a Scientific Outlook on Development,[1] taking into consideration both economic development and ecological construction, and bearing in mind both domestic and international issues, as well as both present and future generations, China has kept to the principle of *common but differentiate responsibility* in its pursuit of low-carbon development.

As already mentioned, China is working to build a voluntary emission reductions system of its own. China's first domestic voluntary carbon standard, the Panda Standard, was launched at COP 15 in December 2009. The China Beijing Environment Exchange (CBEEX) and BlueNext jointly developed this standard, which is designed to provide transparency and credibility in the nascent Chinese carbon market and to fulfil the Chinese government's poverty alleviation objective by encouraging investments in China's rural economy. The Panda Standard will support the commitment of the Chinese government to reduce the level of greenhouse gas emissions in its economy, help develop national capacity in domestic voluntary carbon trading, and promote Agriculture, Forestry and Other Land Use (AFOLU) greenhouse gas offset projects with significant poverty alleviation benefits. This standard is intended to establish a match with China's national conditions and to be compatible with international rules of voluntary emissions reduction in terms of certification and registration standards.

Apart from the establishment of the voluntary carbon standard, China's voluntary emissions reduction market is being rapidly constructed with the development of a voluntary carbon trading platform led by the China Beijing Environmental Exchange, the Shanghai Environment and Energy Exchange and the Tianjin Climate Exchange established in 2008. For instance, CBEEX has launched the first China Low Carbon Index.[2] The Tianjin Climate Exchange has completed China's first voluntary emission reductions-based carbon neutral transaction (see below). The Shanghai Environment and Energy Exchange set up a carbon offset platform in 2010 to support the green World Expo and has helped transact over 70 projects involving carbon emissions reduction technologies and the Clean Development Mechanism (CDM). The internet-based trading platform for carbon credit offsets was founded by Shanghai Environment and Energy Exchange on 27 April 2010. The volume in the first month reached 526 transactions. The platform has established technical systems, including remote transaction, immediate quotation, online delivery and a database of all related Environmental Protection Standards,[3] as well as a registration and accounting system. Along with further improvements to the trading system and mechanism, the platform will be equipped with the same carbon trading technical capacity as those from international institutions like EU-ETS (i.e. reflecting the relationship between supply and demand, and providing the reference for investment). Apart from these three well-established trading platforms, founding environmental and climate exchanges has proved very popular in China since 2009. Exchanges have also been established in Wuhan, Hangzhou, Kunming, Dalian,

1 The Scientific Outlook on Development was put forward at the Third Plenary Session of the 16th Communist Party of China National Congress in 2003, which is necessary in order to achieve the objective of building a prosperous society in an all round way.

2 The China Low Carbon Index reflects the development of China's low carbon industry and degree of securitization, which is the first RMB-denominated low carbon index. The index covers nine energy technologies: solar, wind, nuclear, hydro, clean coal, smart grid, battery, energy efficiency, water and refuse treatment.

3 http://www.cneeex.com/datacenter/huanjingbaohu.html (in Chinese).

Anhui Province, Guizhou Province, Hebei Province and Shanxi Province, etc. in succession.

The growing number of exchanges is being established in the wake of the Chinese government having drawn up rules to implement a domestic carbon-trading market and in expectation of a series of practical policies, laws, regulations and systems that will promote technological innovation and a sustainable economy in China, combined with high efficiency and low emissions. The Chinese government will definitely play a leading role in this, though the exchanges ensure that companies and the public will also make contributions. Consequently, the '*Administrative Measures on Greenhouse Gas Emission Reductions Voluntary Trading Activities (Interim)*' will be issued this year. The Administrative Measures will regulate the trading regime by first of all instituting accreditation for emission reduction verification and formulating a unified verification standard. In addition, it will help identify and guide market demand, as well as enhance the capability and knowledge of Chinese companies in the carbon-trading field.

Apart from the establishment of the voluntary carbon standard, China's voluntary emissions reduction market is being rapidly constructed with the development of a voluntary carbon trading platform.

Low-carbon pilot locations in China

On 8 July 2010, the National Development and Reform Commission (NDRC) of China issued a *Notice on Initiating Low-carbon Pilot Projects in Provinces and Cities*. It states that five provinces as well as eight cities have been selected as the first group of regions for low-carbon policy pilots.

Each region is required to draft its own plan to reduce carbon emissions and develop a green economy for the nation's 12th Five Year Plan. The plans should put forward a target and list the main tasks and concrete measures for controlling local greenhouse gas emissions. The city's or province's carbon emission intensity must be reduced and low-carbon development options explored.

The central authority also requires that corresponding policies supporting low-carbon development should be made. A target and task management system to control greenhouse gas emissions should be employed based on the setting up of a greenhouse gas emissions data, statistics and management system. This should accelerate the establishment of an industry system characterized by low-carbon emissions, while simultaneously the low-carbon and green lifestyle and consumption should be advocated actively.

In accordance with the state's policy, the pilot work in Guangdong Province has developed rapidly. This province is at the forefront of opening up and reform in China and possesses the location advantages in facilitating cooperation with Hong Kong (HK) and constructing the SZ (Shen Zhen City)-HK conurbation, as well as establishing an Asian carbon credits exchange. To provide a good external environment, in the process of constructing a carbon credits trading system, the local government of Guangdong Province provided a 'green' trading channel for the pilot project, widened the channels for international communication and exchange, and widely disseminated information, awareness raising and public involvement.

Xiamen City, which was also listed as one of the pilot cities for low-carbon policy development, will initiate a pilot program on low-carbon city development and a project on carbon emissions trading. Xiamen has introduced two measures to cut building energy consumption. The first method is to ensure the energy efficiency of the buildings by upgrading the standards on design and raw material usage for new

buildings, as well as strengthening new buildings reviews and approval procedures. The second method is to take a market-oriented approach to gradually completing the energy-conservation renovations of existing buildings. Till now, Xiamen has collected energy consumption statistics from 264 large public and governmental office buildings and has released energy-conservation renovation plans for the first group of 67 high-energy consumption public and governmental office buildings.

In 2011, the Urban Environment Institution of the Chinese Academy of Sciences, in cooperation with the National Development and Reform Commission, is creating a low-carbon city assessment indicator system with more than a hundred indicators. The program is expected to be finished at the end of the year. If the research findings of the assessment indicators submitted by each institution are accredited by the National Development and Reform Commission, the assessment indicators of low-carbon cities may be changed from voluntary into authorized ones, which will then eventually be introduced and applied to the whole country.

China has been demonstrating its credentials as an active and responsible country in dealing with climate change issues. The pilot projects are the central government's response to the international community and its pressure on China's huge and increasing carbon emissions, which shows the government's commitment to developing a low-carbon and green economy. The pilot work conducted in low-carbon provinces and cities will be helpful to inspire initiatives from all stakeholders and accumulate experience in guiding different areas and different industries, which is the basis for policy-making in respect of the nationwide carbon trading mechanism and is an important breakthrough in controlling of greenhouse gas emissions. In reducing carbon emissions, the pilot regions, voluntary carbon standards and assessment system are essential lessons to be drawn by China, as well as other developing countries, in drawing up national rules and regulations.

China Green Carbon Foundation

In an effort to mitigate greenhouse gas emissions while encouraging the development of carbon credit trading and bio-fuel technology, on 30 July 2010 the State Forestry Administration officially launched the China Green Carbon Foundation, the first nation-wide publicly funded foundation dedicated to combating climate change by increasing carbon sink in China. The mission of the China Green Carbon Foundation is to promote activities combating climate change in fields including afforestation, forest management, decreasing deforestation and other activities associated with increasing carbon sink and reducing emissions. Its aim is to spread relevant knowledge so as to strengthen public capacity in combating climate change and to support and perfect the Forest Effect Compensation Mechanism of China.[4] A brand new operational model was used in which enterprises or individuals donated to the China Green Carbon Foundation for the activities of afforestation, forest management, etc., and the CO_2 absorbed by trees from the forest funded by these enterprises will be credited to their own accounts and published on the internet. Farmers can obtain more job opportunities, and their income will be increased and living standards improved through participation in afforestation activities and forest management, reflecting the principle that 'industry supports agriculture, and the city supports rural areas'.

Since its establishment, the China Green Carbon Foundation has collected an endowment of RMB

4 The examination of a Forest Effect Compensation Mechanism of China started at the beginning of 1980s. This mechanism was established to compensate for ecological damage, provide ecological protection, solve the problems of eco-conservation in the fields of key national eco-protection zones, river basins and development of mineral resources, and improve eco-environmental protection in China.

9.68 million and established five specialized funds in Beijing, Shanxi Province, Zhejiang Province, Daxing region and Weizhou county respectively. It has created afforestation pilots in nine provinces or cities through partnerships with forestry administrations, and the afforested area has reached eight thousand hectares. Meanwhile, the first group of fifteen bases of individual donors for afforestation have been established in Yan'an City, Shanxi Province, Jinggangshan City, Jiangxi Province, Duolun County, Inner Mongolia Autonomous Region, Tengchong County, Yunnan Province, etc., thus creating the conditions for public participation in carbon offsetting.

The construction of a low-carbon industry and system can provide a transaction platform for carbon trading, as well as a basis for policy-making and the establishment of rules.

The foundation has built a quadruple beneficial platform between the enterprises and the public for 'storing carbon credits, practising social responsibility by enterprises, raising farmers' incomes and improving the ecological environment' (China Green Carbon Foundation, 2010) by the way of a forest carbon sink. The China Green Carbon Foundation guarantees that every ton of carbon in the carbon sink account will correspond to a forest plot, which will not only absorb the carbon but also provide employment opportunities and increase incomes for farmers working in afforestation and forest management. The amount of carbon sink is to be made open and transparent by means of online publication. The activities of increasing carbon sinks can create positive social benefits, and it is straightforward and easy so that everyone can participate.

Carbon neutral actions

On 17 November 2009, as China's first carbon-neutral action, Shanghai Pacific Millennium Packaging & Paper Industries Co. conducted China's first voluntary emission reduction-based carbon neutral transaction at the Tianjin Climate Exchange, offsetting 6,266 tons of carbon emissions from 1 January 2008 to 30 June 2009. All the packaging businesses under Pacific Millennium Holdings Corporation (the parent company of Shanghai Pacific Millennium) will gradually introduce carbon management and carbon neutral measures.

In January 2010, the China Carbon Neutral Alliance was officially launched by CBEEX in Beijing. In accordance with the aims of Green Earth, Sustainable and Harmonious Development through Carbon Neutral, the Alliance aims to provide all-round carbon-neutral services for enterprises, institutions and organizations, and to take the lead in carrying out corporate social responsibility activities and supporting the national strategy on sustainable development.

Also launched by CBEEX in association with a large number of professional institutions, the Chinese Enterprises Voluntary Emission Reductions Billboard was issued on 6 June 2011, with 41 institutions in total. The institutions include Chinese and foreign listing enterprises such as Baidu, Air China, China Everbright Bank, China Merchant Bank and SocGen. These entities purchased voluntary emission reductions to offset greenhouse gas emissions generated during their operations or activities, with a reduction of 210,000 tons of greenhouse gas emissions in total.

Among the listed enterprises, China Everbright Bank has made good efforts in environmental

improvement and corporate social responsibility through various channels in recent years. In 2010, the company purchased voluntary emission reductions to offset the CO_2 emissions generated in 2009 from the operations of its headquarters and 33 branches. Hence, China Everbright Bank is China's first carbon-neutral bank. The Bank also actively promoted carbon finance business by means of a green credit mechanism, the promotion of modular financing and the creation of carbon financing products. The Zero-Carbon credit card is one of the financial products launched by China Everbright Bank in cooperation with the Beijing Environment Exchange. This card has six functions, including a recyclable chip, carbon trace calculator, scheduled carbon purchases, and environmentally-friendly billing to support the Chinese government's emission reduction initiative. By June 2011, China Everbright Bank had issued 100,000 Zero-Carbon credit cards.

Besides China Everbright Bank, Air China came up with the first green flight in China, SocGen issued the first low-carbon credit card — the China Low-Carbon credit card. Similarly, Baidu became the first internet company to try and offset carbon emissions by purchasing carbon credits. China Vanke Co Ltd, a leading real-estate developer, has bought emission reduction quotas on the Shanghai Environment and Energy Exchange in order to make its pavilion at the Shanghai Expo carbon-neutral.

At the present stage, Chinese companies have established preliminary carbon neutral services, including carbon footprint counting and verification, as well as carbon assets management and consulting. China encourages large emitters, such as the power and petrochemical industries, to adopt low-carbon technologies and implement carbon-neutral strategies.

China has attached great importance to the construction of low-carbon industries and systems at a national strategic level and has taken many measures and actions ultimately to construct a domestic carbon trading market. The construction of a low-carbon industry and system can provide a transaction platform for carbon trading, as well as a basis for policy-making and the establishment of rules. Solving environment-related problems by using the market mechanism will help create an open and fair environment for all players, thus reducing social costs and attracting more businesses. Meanwhile, the development of China's domestic carbon market will be an effective way to strengthen the capability and knowledge of Chinese companies in the carbon-trading field. It will help reduce transaction costs for both buyers and sellers and inject improved liquidity into the global carbon market. The efforts that China is making at present in the field of low-carbon development can provide practical experience for policy-making in respect of the nationwide carbon market and is a critical step in the development of the future carbon trading mechanism.

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The National Context of U.S. State Policies for a Global Commons Problem

Abstract

Why should anyone be interested in the national context of a state policy? In the case of California's Global Warming Solutions Act (AB 32), the answer flows directly from the very nature of the problem – global climate change, the ultimate global commons problem. Greenhouse gases (GHGs) uniformly mix in the atmosphere. Therefore, any jurisdiction taking action – whether a nation, a state, or a city – will incur the costs of its actions, but the benefits of its actions (reduced risk of climate-change damages) will be distributed globally. Hence, for virtually any jurisdiction, the benefits it reaps from its climate-policy actions will be less than the cost it incurs. This is despite the fact that the global benefits of action may well be greater – possibly much greater – than global costs.

This presents a classic free-rider problem, in which it is in the interest of each jurisdiction to wait for others to take action and benefit from their actions (that is, free-ride). This is the fundamental reason why the highest levels of effective government should be involved, that is, sovereign states (nations). And this is why international, if not global, cooperation is essential.

Despite this fundamental reality, there can still be a valuable role for subnational climate policies. Indeed, my purpose in this essay is to explore the potential for such state and regional policies – both in the presence of federal climate policy and in the absence of such policy. I begin by describing the national climate policy context and then turn to subnational policies, such as California's AB 32 and the Regional Greenhouse Gas Initiative (RGGI) in the Northeast. My focus is on how these subnational policies will interact with a federal climate policy. It turns out that some of the interactions will be problematic, others will be benign, and still others could be positive. I also examine the role that could be played by subnational policies in the absence of a meaningful federal policy, with the conclusion that – like it or not – we may find that Sacramento, California comes to take the place of Washington as the center of national climate policy.

The (Long-Term) National Context: Carbon Pricing

Virtually all economists and most other policy analysts favor a national carbon-pricing policy (whether carbon tax or cap-and-trade) as the core of any meaningful climate-policy action in the United States. Why is this approach so overwhelmingly favored by the analytical community?

First, no other feasible approach can provide truly meaningful emissions reductions (such as an 80 percent cut in national CO_2 emissions by mid-century). Second, it is the least costly approach in the short term, because abatement costs are exceptionally heterogeneous across sources. Only carbon pricing provides strong incentives that push all sources to control at the same marginal abatement cost, thereby achieving a given aggregate target at the lowest possible cost. Third, it is the least costly approach in the long term, because it provides incentives for carbon-friendly technological change, which brings down costs over time. Fourth, although carbon pricing is not sufficient on its own (because of other market failures that reduce the impact of price signals – more about this below), it is a necessary component of a sensible climate policy, because of factors one through three, above.

But carbon pricing is a hot-button political issue. This is primarily because it makes the costs of the policy transparent, unlike conventional policy instruments, such as performance and technology standards, which tend to hide costs. Carbon pricing is easily associated with the dreaded T-word. Indeed, in Washington, cap-and-trade has been successfully demonized as "cap-and-tax." As a result, the political reality now appears to be that a national, economy-wide carbon-pricing policy is unlikely to be enacted before 2013. Does this mean that there will be no federal climate policy in the meantime? No, not at all.

The (Short-Term) National Context: Federal Regulations on the Way or Already in Place

Regulations of various kinds may soon be forthcoming – and in some cases, will definitely be forthcoming – as a result of the U.S. Supreme Court decision in Massachusetts v. EPA (April 2007) and the Obama Administration's subsequent endangerment finding (December 2009) that emissions of carbon dioxide and other greenhouse gases endanger public health and welfare. This triggered mobile source standards in mid-2010, the promulgation of which identified carbon dioxide as a pollutant under the Clean Air Act, thereby initiating a process of using the Clean Air Act for stationary sources as well.

Initial stationary-source standards took effect on January 2, 2011. The EPA plans to issue additional new source performance standards and possibly other stationary-source regulations later in 2011 and in 2012.

The merits that were originally suggested of such regulatory action are that it would be effective in some sectors and that the threat of such regulation will spur Congress to take action with a more sensible approach – namely, an economy-wide cap-and-trade system. However, regulatory action on carbon dioxide under the Clean Air Act will accomplish relatively little and do so at relatively high cost, compared with carbon pricing. Also, Congress has now rejected cap-and-trade and will not reconsider it in the near future. It is reasonable to ask, though, whether regulatory action was ever a credible threat; the implementation of inflexible, high-cost regulatory approaches may lend ammunition to the staunchest opponents of any climate policy.

Air pollution policies for non-greenhouse gas pollutants, the emissions of some of which are highly

correlated with CO_2 emissions, may also play an important role. Most importantly, without any new legislation, a set of rules now making their way through the regulatory process – affecting ambient ozone, SO_2 /NO_2, particulates, ash, hazardous air pollutants (mercury), and effluent water – could significantly reduce the portion of electricity generated by coal-fired power plants.

Finally, there is the possibility of new energy policies (not targeted exclusively at climate change) having significant impacts on CO_2 emissions. The possible components of such an approach that would be relevant in the context of climate change include: a national renewable electricity standard; federal financing for clean energy projects; energy efficiency measures (building, appliance, and industrial efficiency standards; home retrofit subsidies; smart grid standards, subsidies, and dynamic pricing policies); and a new federal electricity-transmission siting authority.

Even without action by the Congress or by the Administration, legal action on climate policy is likely to take place within the judicial realm. Public nuisance litigation will no doubt continue, with a diverse set of lawsuits being filed across the country in pursuit of injunctive relief and/or damages. Due to recent court decisions, the pace, the promise, and the problems of this approach remain uncertain.

Beyond the well-defined area of public nuisance litigation, other interventions which are intended to block permits for new fossil energy investments, including both power plants and transmission lines, will continue. Some of these interventions will be of the conventional NIMBY character, but others will no doubt be more strategic.

But with political stalemate in Washington on carbon pricing or national climate policy, attention is inevitably turning to regional, state, and even local policies intended to address climate change.

Subnational Climate Policies

The Regional Greenhouse Gas Initiative (RGGI) in the Northeast (Figure 1) has created a cap-and-trade system among electricity generators. More striking, California's Global Warming Solutions Act (Assembly Bill 32, or AB 32) will likely lead to the creation of a very ambitious set of climate initiatives, including a statewide cap-and-trade system. The California system is likely to be linked with systems in other states and Canadian provinces under the Western Climate Initiative (Figure 2) (see later on linking). Currently, more than half of the 50 states are contemplating, developing, or implementing climate policies.

Virtually all economists and most other policy analysts favor a national carbon-pricing policy (whether carbon tax or cap-and-trade) as the core of any meaningful climate-policy action in the United States.

In the presence of a federal policy, will such state efforts achieve their objectives? Will the efforts be cost-effective? The answer is that the interactions of state policies with federal policy can be problematic, benign, or positive, depending upon their relative scope and stringency, and depending upon the specific policy instruments used (for elaboration see Goulder and Stavins, 2010).

Problematic Interactions

Let's start with the case of a federal policy which limits emission quantities (as with cap-and-trade) or uses nationwide averaging of performance (as with some proposals for a national renewable portfolio standard). In this case, emission reduc-

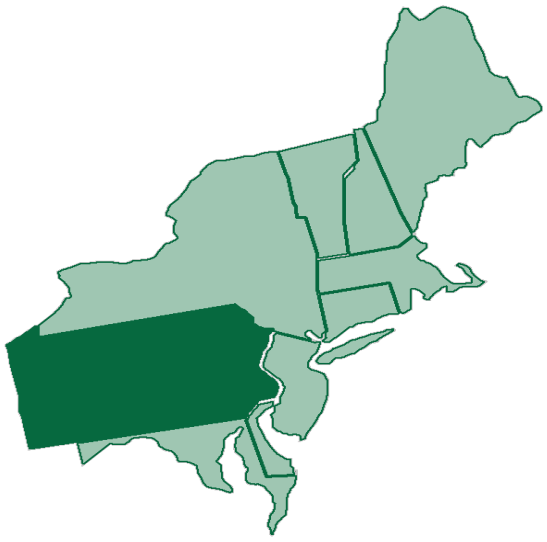

Figure 1. ***Map of the Regional Greenhouse Gas Initiative (RGGI)***

RGGI is the first mandatory U.S. cap-and-trade program for carbon dioxide. It was established in December 2005 by the governors of seven Northeastern and Mid-Atlantic states; three additional states joined in 2007, and Pennsylvania remains an observer.

Source: The Pew Center on Global Climate Change 2011

tions accomplished by a "green state" with a more stringent policy than the federal policy – for example, AB 32 combined with Waxman-Markey/H.R. 2454 – will reduce pressure on other states, thereby freeing, indeed encouraging (through lower allowance prices) emission increases in the other states. The result would be 100 percent leakage, no gain in environmental protection from the green state's added activity, and a national loss of cost-effectiveness.

Potential examples of this – depending upon the details of the regulations – include: first, AB 32 cap-and-trade combined with some U.S. Clean Air Act performance standards (neither H.R. 2454 nor anything like it are any longer on the table); second, state limits on GHGs/mile combined with federal Corporate Average Fuel Economy (CAFE) standards; and third, state renewable fuels standards (RFS) combined with a federal renewable fuels standard or state renewable portfolio standards (RPS) combined with a federal RPS. A partial solution would be for these federal programs to allow states to opt out of the federal policy if they had an equally or more stringent state policy. Such a partial solution would not, however, be cost-effective.

Benign Interactions

One example of benign interactions of state and federal climate policy is the case of the RGGI in the Northeast. In this case, the state policies are less stringent than an assumed federal policy (such as H.R. 2454). The result is that the state policies become nonbinding and hence largely irrelevant.

A second example – that warms the hearts of economists, but appears to be politically irrelevant for the time being – is the case of a federal policy that sets price, not quantity, i.e., a carbon tax or a binding safety valve or a price collar in a cap-and-trade system. In this case, more stringent actions in green states do not lead to offsetting emissions in other states induced by a changing carbon price. It should be noted, however, that there will be different marginal abatement costs across states, and so aggregate reductions would not be achieved cost-effectively.

Positive Interactions

Three scenarios suggest the possibility of positive interactions of state and federal climate policies. First, states can – in principle – address market failures not addressed by a federal carbon-pricing policy (should there ever be one). A prime exam-

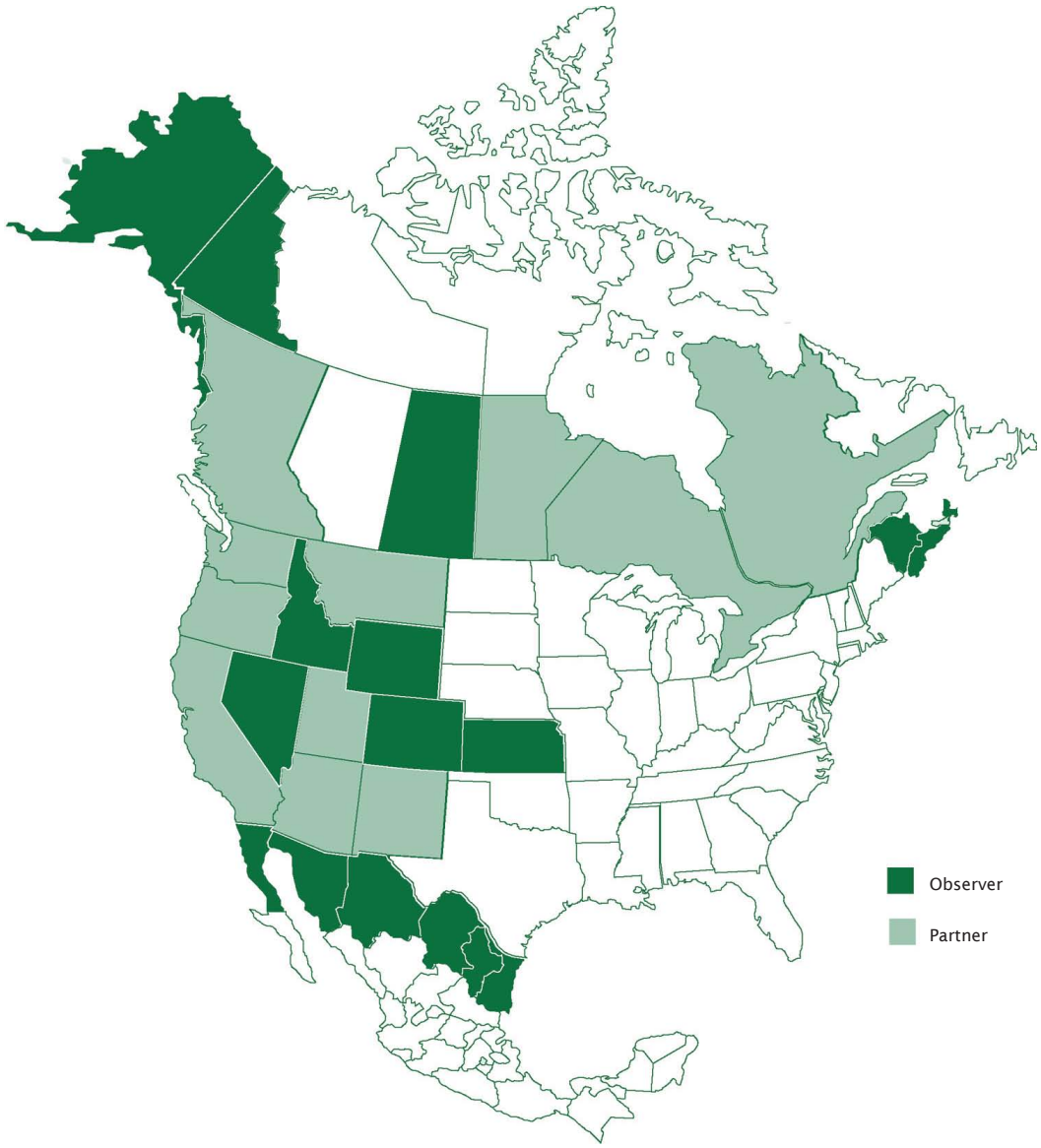

Figure 2. ***Map of Western Climate Initiative***

The WCI is a collaboration of independent jurisdictions who work together to iden¬tify, evaluate, and implement policies to tackle climate change at a regional level. Other U.S. states, Canadian provinces, Mexican states, and tribes are encouraged to participate in the WCI as either partners or observers.

Source: Western Climate Initiative 2011

ple is the principal agent problem of insufficient energy-efficiency investments in renter-occupied properties, even in the face of high energy prices. This is a problem that is best addressed at the state or even local level, such as through building codes and zoning.

Second, state and regional authorities frequently argue that states can serve as valuable "laboratories" for policy design and thereby provide useful information for the development of federal policy. However, it is reasonable to ask whether state authorities will allow their "laboratory" to be closed after the experiment has been completed, the information delivered, and a federal policy put in place. Pronouncements from some state leaders should cause concern in this regard.

Third, states can create pressure for more stringent federal policies. A timely example is provided by California's Pavley I motor vehicle fuel-efficiency standards and the subsequent change in federal CAFE requirements. There is historical validation of this effect, with California repeatedly having increased the stringency of its local air pollution standards, followed by parallel federal action under the Clean Air Act. This linkage is desirable if the previous federal policy is insufficiently stringent, but whether that is the case is an empirical question.

The interactions of state policies with federal policy can be problematic, benign, or positive, depending upon their relative scope and stringency, and depending upon the specific policy instruments used.

Thus, in the presence of federal climate policy, interactions with subnational policies can be problematic, benign, or positive, depending upon the relative scope and stringency of the subnational and national policies, as well as the particular policy instruments employed at both levels. (For a more rigorous derivation of the findings above, see Goulder and Stavins, 2010).

International perspectives – The Linking of Trading Systems

At the international level, tradable permit systems are emerging as a preferred instrument for reducing greenhouse gas (GHG) emissions. Two of the most significant institutions for reducing GHG emissions implemented to date – the European Union Emission Trading Scheme (EU ETS) and the Clean Development Mechanism (CDM) – are tradable permit systems. Australia, Canada, Japan, and New Zealand, , among other countries, are considering or have put in place tradable permit systems for reducing GHG emissions. As these systems grow in prominence and number, attention has increasingly focused on whether and how to link them.

Linking occurs when a tradable permit system's regulatory authority allows regulated entities to use emission allowances or emission reduction credits from another system in order to meet compliance obligations. Linking thereby allows these entities to take advantage of the cost savings from international trade in allowances or credits.

As mentioned the Regional Greenhouse Gas Initiative provides for several types of one-way links. Covered sources may use emission reduction credits from qualified domestic offset projects, subject to quantitative limits that depend on the prevailing RGGI allowance price. When the RGGI allowance price exceeds a specific threshold, which increases over time, sources have the additional option to use CERs and allowances from other countries' cap-and-trade systems, such as the EU ETS, in meeting their compliance obligations.

Linking tradable permit systems leads to diverse effects that need to be considered in assessing both the merits of particular linkages, be it among state-based systems or internationally, and the merits of linkage as a major design element of a post2012 international policy architecture.

The degree of control that a (State) government can retain over its system depends in part on whether linkage is oneway or twoway. For example, twoway linkages can increase *or* decrease domestic allowance prices. Twoway linkages lead to complete propagation of cost-containment measures across the linked systems. In contrast, oneway linkages can only decrease the price of allowances in the system that establishes the link. Oneway linkages therefore will only lead to propagation of cost-containment measures in one direction – from the system with which a link is established to the system that establishes the link.

The effects of a linkage also depend on whether it connects two cap-and-trade systems or a cap-and-trade system and an emission-reduction-credit system. For example, linkage that involves an emission-reduction-credit system raises the issue of additionality. On the other hand, in a link between two cap-and-trade systems, the increase in allowance prices in one may have more far-reaching economic consequences – such as increasing domestic energy prices – than would the increase in credit prices resulting from a link between a cap-and-trade system and a credit system. In a credit system, entities are not required to meet any emissions targets and thus can only benefit from the opportunity to sell credits for higher prices.

Linkage as a Bottom-Up International Policy Architecture

Bilateral linkages are likely to continue to evolve among national and regional capandtrade systems and the CDM (or its successor). Could such a set of linkages, established without central coordination, function as an effective, standalone, bottomup international policy architecture? – And if so would this in effect entail a significant de facto U.S. participation?

Although such an architecture would need to include other design elements, including emission reduction commitments and participation incentives, its distinguishing feature would be that it would grow organically from direct and indirect linkages. The degree to which a system of bottomup linkages could achieve meaningful environmental performance depends on whether participants set sufficient environmental targets, a sufficient number of key countries participate, and participants comply.

States can – in principle – address market failures not addressed by a federal carbon-pricing policy (should there ever be one).

With regard to whether participants will set meaningful environmental targets, commitments to reduce emissions in an architecture of bottom-up linkages would result from unilateral decisions by individual nations, or from negotiations among small groups of nations. In developed countries, internal political support would probably be the driving force behind adoption of more stringent emission caps, whereas adoption of emissions caps by developing nations may depend upon incentives provided by committed developed countries. To address the possibility that linking may create incentives for some countries to adopt less stringent future caps, countries could negotiate cap trajectories as a condition for linking. On the other hand, a system of linkages may actually allow some countries to adopt more aggressive targets than they otherwise would.

Links among cap-and-trade systems create gains from trade for the participating countries. Therefore, such an architecture has the potential to be costeffective if the bottom-up system includes a sufficient set of direct twoway links, or if the sys-

tem relies primarily on indirect links through a common credit system (a sort of clearing house) that has an adequate supply of low-cost credits to bring about allowance price convergence.

A bottom-up system of linkage is already evolving for example in the U.S., and could function well in the nearterm in the absence of a top-down post-2012 international policy architecture. However, for a bottomup system to achieve meaningful long-term environmental performance and a high degree of participation, it would require the major

In the absence of meaningful federal action, subnational climate policies could well become the core of national action with potential links also to the international level.

emitters – the United States, the European Union, Russia, Japan, China, India, and other key countries – to reach an implicit agreement regarding emissions targets and incentives for participation. Whether this would be possible without centralized negotiations is an open question.

Subnational Climate Policies in the Absence of Federal Action

Cap-and-trade systems are emerging as a preferred domestic instrument for reducing GHG emissions in many parts of the world, the CDM having developed a substantial constituency despite some concerns about its performance. Because of the considerable political and economic pressure to link these systems, linkage may be expected to play a de facto, if not de jure, role in any future international climate policy architecture.

In the U.S., comprehensive federal carbon-pricing policy appears to be delayed until 2013, at the earliest. And it is possible that pending federal regulatory action under the Clean Air Act will be curtailed or significantly delayed either by the new Congress or by litigation. Therefore, it is important to consider the role of state and regional climate policies in the absence of federal action. State policies and the linking of state policies is an obvious first step in the absence of any federal policy.

In brief, in the absence of meaningful federal action, subnational climate policies could well become the core of national action with potential links also to the international level. Problems will no doubt arise, including legal obstacles such as possible federal preemption or litigation associated with the so-called "Dormant" Commerce Clause.

Also, even a large portfolio of state and regional policies will not be comprehensive of the entire nation, that is, not truly national in scope (for a quick approximation of likely coverage, check out a recent map of blue states and red states).

And even if the state and regional policies were nationally comprehensive, there would likely be different policies of different stringency in different parts of the country. As a result, carbon shadow–prices would not be equivalent, and overall policy objectives would be achieved at excessive social cost.

Is there a solution (if only a partial one)? Yes. If the primary policy instrument employed in the state and regional policies is cap-and-trade, then the respective carbon markets can be linked. Such linkage occurs through bilateral recognition of allowances, which results in reduced costs, reduced price volatility, reduced leakage, and reduced market power. Good news all around.

Such bottom-up linkage of state and regional cap-and-trade systems could be an important part, or

perhaps even the core, of future of U.S. climate policy, at least until there is meaningful action at the federal level. In the meantime, it is at least conceivable – and perhaps likely – that linkage of state-level cap-and-trade systems will become the (interim) de facto national climate policy architecture.

In this way, Sacramento would take the place of Washington as the center of national climate policy deliberations and action. No doubt, this possibility will please some and frighten others.

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Mind the Gap: The State-of-Play of Canadian Greenhouse Gas Mitigation

Abstract

At the United Nations Framework Convention on Climate Change (UNFCCC) talks in Bonn in June 2011,1 Canada released its climate change mitigation plan. Canada will harmonize mitigation with the U.S. "where appropriate" and develop performance-based standards for large industrial emitters, transportation and buildings (Government of Canada 2011a). However, a focus on recent federal approaches ignores long-standing efforts by provinces to mitigate greenhouse gases (GHGs). Original modelling completed for this paper indicates current and planned provincial and federal mitigation could reduce 103 million tonnes (Mt) of GHGs in 2020, or about 46 percent of Canada's targets of -17 percent below 2005. More importantly, Canada is not seized with mitigation inaction; many emitters face carbon costs consistent with emitters in the European Union. Still, more needs to be done but now, at least, Canada is moving in the right direction.

Federal Carbon Policy Developments and Carbon Reductions

Canada's announcement in the UNFCCC intercessional climate meetings in Bonn confirmed what the federal government had been signalling for some time: the Government of Canada will regulate greenhouse gas emissions (GHGs) using emission standards that specify industry performance and will not implement carbon pricing. Carbon pricing is most certainly dead for now due to the politicization of instrument choice, where the choice of carbon taxes, cap and trade or performance based regulations formed competing political platforms in the 2008 and 2011 national elections. In the political arena the ruling political party rejected the carbon pricing platforms of the other parties. The result of this politicization of instrument choice, at least at the federal level, is a preference by the Government of Canada for narrowly targeted sector-based performance standards.

Two Government of Canada regulatory initiatives provide a blueprint of the type of performance-based regulations that will come: new light duty vehicles sold after 2012 need to achieve an emission standard based on grams of carbon dioxide (CO_2) per kilometer travelled (Government of Canada

1 The 34th sessions of the Subsidiary Body for Implementation (SBI) and the Subsidiary Body for Scientific and Technological Advice (SBSTA)

2010); and thermal electricity generating units at age 45 years must attain a natural gas performance standard of 375 tonnes of GHG per gigawatt hour of electricity produced (Government of Canada 2011b). Yet is this preference for performance regulations necessarily bad for carbon pricing?

To achieve the aspiration targets adopted by the federal government,[2] carbon pricing held the only cost-effective path forward. Regulations were too hard to design given information asymmetries between the regulator and industry, too inflexible to enable cost-effective decision making by firms and households and simply too costly relative to more efficient carbon pricing. Yet the focus on the depth of the quantity GHG targets was the problem and not necessarily which management instrument could deliver the reductions. The sticker shock of compliance for the deep targets was so great that Canada became locked into inaction, even under efficient carbon pricing proposals. Since the late 1990s, when the federal government initiated the National Climate Change Process, successive studies modelled Canada-alone carbon pricing scenarios with aversion to international flexibility (i.e. Russian hot air) and deep targets (-6% below 1990).[3] These scenarios produce big compliance costs, in the order of CAD$200 per tonne reduced, while wreaking havoc on indicators of competitiveness due to the Canada mitigates "alone" focus (NRTEE 2007). Add to this a "petro-state" view that GHG mitigation would slow regional economic development from oil and gas in Alberta, but also British Columbia, Saskatchewan, Newfoundland and Nova Scotia. In this light, it is not surprising that successive governments, taking signals from the public where climate change has not catalyzed as an issue, have been slow to reduce GHG emissions given competiveness concerns. Mitigation actions aligned with deep GHG reduction targets were not on the table regardless of whether the instrument was efficient carbon pricing or less efficient regulations.

Nonetheless, Canada's GHG reduction targets remain, and the ability of performance regulations to deliver cost-effective reductions consistent with the targets is questionable. Canada has harmonized its reduction targets with the U.S. at minus 17 per cent below 2005 levels in 2020, which for Canada represents 607 Mt. With the economy growing at about 1.25 times current levels to 2020, including a rapidly expanding oil and gas sector, Canada's GHG emissions could grow to 830 Mt in 2020, leaving a gap of 223 Mt to the 607 Mt target.[4]

Uniquely, Canada is a federation where provinces and the federal government have strong jurisdiction over energy and emissions decision making. All provinces, for example, have set aspirational carbon reductions targets of varying stringency and have implemented some form of GHG mitigation policy. As such, a forward-looking climate policy for Canada necessarily includes a mix of provincial and federal mitigation actions. But the risk of continued fragmentation has much to do with the rejection of carbon pricing by ruling federal government due to its politicization in the last two federal elections, concern over Canada-US competiveness and slowing growth in the oil and gas sector.

But a forward-looking policy also needs to unify the emerging patchwork of federal and provincial actions if cost-effective mitigation is to be

2 -17 per cent below 2005 levels in 2020 (Government of Canada 2011c)

3 "Canada-alone" usually did not include action by the United States, Canada's major trading partner. This then exacerbated competitiveness impacts given the importance of Canada-US trade. About 80 per cent of Canada's exports are to the United States, with daily cross-border flows well over CAD$2 billion.

4 To estimate the baseline and the emissions reductions below, we use the CIMS energy and emission model. CIMS is calibrated to historic Canadian energy demand and technology deployment and uses a forecast of future economic demand and energy prices for emission forecasting and policy scenario outcomes. It is maintained by researchers at Simon Fraser University.

achieved. Due to the significant differences in jurisdictional mitigation costs between sectors and regions, policy fragmentation with no sector or regional flexibility to smooth compliance costs will necessarily be inefficient. For example, analysis by Canada's National Roundtable on the Environment and Economy estimated that fragmented jurisdictional GHG policy could lead to compliance costs that were 25 per cent higher for a given mitigation target relative to a unified carbon pricing policy (NRTEE 2009).

Understanding where Canada needs to go with respect to developing cost-effective mitigation policy first requires understanding the current patchwork of federal and provincial mitigation policies. Below we present the current state of play with respect to provincial and federal mitigation actions and then discuss additional mitigation opportunities.

Provincial GHG Mitigation Action

Provincial and territorial governments in Canada hold many levers for action on climate change. They have established their own climate change emissions reductions targets and are implementing GHG reduction strategies that reflect their individual circumstances. The main actions are primarily carbon pricing, with a mix of regulatory actions such as a phase-out of coal thermal power in Ontario. Below we present new modelling completed for this paper to estimate current emissions reductions from existing provincial actions.

The modelling uses CIMS, an integrated set of economic and energy modules for Canada designed to provide information on the likely response of firms and households to policies and changes in prices that influence their technology acquisition and use decisions.[5] The CIMS model is based on current and forecast energy flows through Canada's economic system and tracks the flow of energy, beginning with production processes through to eventual end-use by individual technologies. In the model, historical emissions, energy and economic baselines are coupled with economic, demographic and energy price forecasts to determine both a reference case and a change case with new mitigation policies. The model has been used extensively by the federal and provincial governments of Canada to forecast GHG emissions and energy supply and demand.

The risk of continued fragmentation has much to do with the rejection of carbon pricing by ruling federal government due to its politicization in the last two federal elections, concern over Canada-US competiveness and slowing growth in the oil and gas sector.

With a forecast of emissions to 2020 that reflects baseline increases in energy efficiency and fuel choices given forecasts of energy prices, we then add in each provincial policy incrementally. This serves to both highlight the emissions impact of each policy and avoid double counting the mitigation impact of each policy. In effect, each policy reduces the stock of mitigation potential remaining as policies influence technology deployment and behavioral choices, making these unavailable to subsequent policies.

Based on our assessment of the incremental impact of current provincial mitigation policies, about 31 Mt of reductions are likely to be achieved annually by 2020, representing attainment of about 14 per cent of Canada's 2020 mitigation target:

- *British Columbia's carbon tax* was initiated in 2008 at a rate of CAD$10[6] per tonne and will

5 See NRTEE 2009 for an overview of CIMS.

6 In September 2011, the Canadian and American dollars were about at parity.

climb to CAD$30 per tonne by 2012, or just over 7.25 cents per litre of gasoline. The tax covers liquid fuels and large industrial emitters, or about 75 per cent of the GHG inventory. Covered are both liquid fuels and solid fuels used in industry transportation and buildings, while process, fugitive, agriculture (soils and livestock) and waste emissions are omitted. Assuming the scheduled CAD$30 price in 2012 remains unchanged to 2020, the policy could deliver about 3 Mt in 2020. In all likelihood this underestimates reductions as the carbon tax rate will inevitably climb.

Without action in the United States and carbon costs on U.S. industry, Canadian governments will continue to be hesitant to risk the flow of cross-border trade.

- *Alberta's Specified Gas Emitter Regulations (2007)* (Government of Alberta 2003) is a baseline and credit hybrid of cap-and-trade and carbon tax with a binding intensity standard of 12 per cent improvement per year on large industrial emitters including oil and gas facilities.[7] Coverage includes 100 facilities that represent 50 per cent of Alberta's overall emissions or 70 per cent of industrial emissions. The carbon price for a facility only binds on the compliance obligation (intensity improvement) and not all emissions, thereby reducing the marginal incentive to reduce emissions. Compliance can be attained through buying or selling emission performance credits (EPCs), compliance payments capped at CAD$15 to a technology investment fund, or with domestic offsets. In 2010, about CAD$70 million was contributed to the technology fund, 3.7 Mt in offsets and another 1.9 Mt in EPCs generated by facilities that exceeded their compliance target (Government of Alberta 2010). Our modelling suggests this policy will likely deliver reductions of about 9 Mt in 2020.

- *Quebec's Carbon Levy,* implemented in 2007, is a charge on liquid fuels applied at the refinery gate on gasoline and diesel fuel. The rate is 0.8 cents for each litre of gasoline distributed in Quebec and 0.938 cents for each litre of diesel fuel, which is equal to a carbon tax of CAD$32.50 per tonne. While the charge was designed primarily as a revenue raising tool for financing mitigation, the effect is nevertheless to reduce gasoline consumption and hence emissions. Revenues from the tax are on the order of CAD$200 million annually with modelling suggesting this policy could deliver 1 Mt in 2020.

- *Ontario is phasing out coal for thermal electricity by 2015.* Ontario currently has 6,315 Mw of coal-fired capacity provided by 15 units that operate at four plants across Ontario (Government of Ontario 2009). Phasing this coal out and replacing it with a mix of non-emitting fossil electricity and lower emitting natural gas will likely result in a net reduction of about 8 Mt in 2020.

- *A series of energy efficiency and renewable electricity incentives* across Canada, such as the federal government's ecoEnergy initiatives, Ontario's Feed-in Tariff and Nova Scotia's renewable portfolio standard could deliver another 10 Mt reduction.

Federal Government GHG Mitigation Action

The Canadian federal government has been spending billions on climate change programs for a number of decades. Unfortunately, these expenditures have been used not so much for emissions reductions but rather for government programs that have had limited success in reducing emissions (NRTEE 2011). The primary programs, now de-

7 Any facility in the province that emits more than 100,000 metric tons of CO2e of GHGs per year. (Government of Alberta 2007).

funct, included subsidies to wind power (primarily) and for building retrofits. Other investments include carbon capture and storage demonstration projects.

That said, a number of federal regulations will deliver emissions reductions in the short-term and increase in time to reduce emissions on the order of 39 Mt by 2020. These regulations include:

- *Federal Passenger Automobile Regulations and Ethanol Contents Standards.* Newly promulgated vehicle regulations require all new vehicles purchased after 2011 to achieve an emission standard of 348 grams of carbon dioxide equivalent ($C0_2e$) per mile travelled by 2016 (Government of Canada 2010). In combination with this is a federal renewable fuel standard requiring 5 per cent ethanol in gasoline, our estimates are that these two regulations could deliver 34 Mt of reductions in 2020.

- *Federal performance regulations on new or modified coal fired thermal power plants.* Early indications are that the Government of Canada's greenhouse gas regulatory process will not seek to align stringency with the 2020 targets. The proposed coal-fired regulations will only bind when new or modified capital stock is deployed while existing stock is left unaffected (Government of Canada 2011). This means the majority of the emissions from existing stock will remain unaffected by policy. The proposed coal-fired regulations, for example, will likely deliver about 5 Mt of reductions in 2020 on the sector's forecast emissions of 91 Mt. The average cost of these emissions reductions is in the order of CAD$25 per tonne, or about CAD$260 million annually.

Figure 1 provides an overview of these current actions.

Provincial and Federal Mitigation Actions Likely to be Implemented

The State of California and the governments of British Columbia, Ontario, Manitoba and Quebec, representing about 50 per cent of Canada's 2020 emissions, are currently developing the policy to implement a regional cap and trade system. Coverage of the system starts initially with industrial emitters in 2013 and could then include liquid fuels in transport and buildings sometime thereafter. It is not clear how the overall cap will be allocated between participating jurisdictions and emitters, or to what extent flexibility mechanisms such as offsets will be permitted. Western Climate Initiative (WCI) modelling suggests an allowance price of CAD$30 per tonne in 2020 as a good benchmark for estimating stringency. Applying this allowance price across liquid fuels and large emitters in Ontario and Quebec (we assume the B.C. carbon tax now covering industrials instead becomes covered under cap-and-trade) suggests emissions reductions of about 18 Mt in 2020 from Quebec and Ontario.

Also under development are a series of federal performance regulations aimed at new or modified energy users and producers in the industrial sector. Notably, the federal government has signalled it will regulate emitters in the oil and gas, chemicals, smelting, cement, iron and steel and mining sectors. While the proposed regulations are not available to assess at this time, applying a performance standard similar to the coal regulations (above) to new and modified industrial sources likely to be deployed before 2020 indicates emissions reductions of about another 15 Mt in 2020. Again, we use an integrated modelling framework, so the impact of this action is lower, given reductions already occurring under other programs such as British Columbia's carbon tax.

Putting the provincial and federal policies together indicates that Canada has in place or is ready-

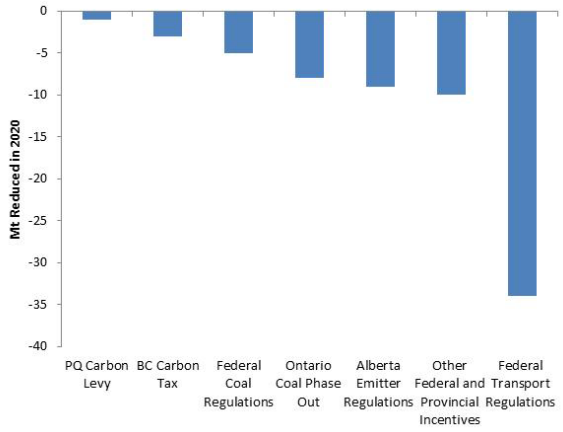

Figure 1: ***Reductions from Existing Federal and Provincial Policies in 2020***
30% Attainment of 2020 Target

ing policies to reduce emissions by about 103 Mt in 2020, leaving a gap of 120 Mt (or 54 per cent) of the 2005 target. Figure 2 provides an overview of the existing measures, those planned and likely to be implemented and the remaining gap to 2020.

While actions aligned to achieve 46 per cent of the 2020 target seems like a large "quantity" gap, from a "price" perspective many Canadian emitters are facing costs aligned with or significantly above international competitors. Notably, the carbon costs facing large portions of Canada's industrial emitters are in line with allowance prices under the European Union Emission Trading System (EU ETS) currently at about CAD$17 per tonne.[8] Seventy percent of emissions in British Columbia currently face carbon prices of CAD$25 per tonne which will certainty increase by 2020, while industrial energy users and producers in Alberta face a price of CAD$15 per tonne. Currently federal coal fired power regulations will impose a carbon cost on emitters closer to CAD$25[9] per tonne between now and 2020. Of course, some initiatives, such as the ethanol in gasoline content requirement, vehicle efficiency standards and renewable energy incentives are imposing very high costs on some emitters. By comparison, the EU ETS has, according to the European Commission, lowered emissions by 8% below 2005 levels by 2010, which is equivalent to 47% of Canada's target (-8% below 2005 relative to a 2005 target of -17%) (European Union 2011). As mentioned above, Canada is on track to lower emissions by 30% by below 2005 levels in 2015. While internationally Canada is seen by some as a GHG mitigation laggard due to a history of federal inaction, there is in fact more mitigation that is aligned with European carbon costs than Canada's reputation would imply. On quantities reduced, Canada is lagging the EU, but still reductions are underway.

Opportunities to Complement Current Mitigation Actions

Canada's willingness to close "the mitigation gap" to Canada's announced 2020 target has much to do with competitiveness. Without action in the United States and carbon costs on U.S. industry, Canadian governments will continue to be hesitant to risk the flow of cross-border trade. But still the gap is there, and Canada has made international commitments to reduce emissions. The question then arises how to design policy to close Canada's mitigation gap in a cost-effective manner while minimizing impacts on Canadian competitiveness. Indeed, without a cost-effective path forward, further action by federal and provincial governments will likely be slow to materialize. But even with efficient mitigation policy, unless the United States move to reduce GHGs, Canada will continue to lag. In short, there is a much greater political con-

8 EU ETS allowance price as of July 21st was €12.77, which is equivalent to CAD$17.33.

9 While the average cost is CAD$25 per tonne, an equivalent marginal cost, assuming a linear abatement cost curve, would be closer to CAD$50 per tonne removed.

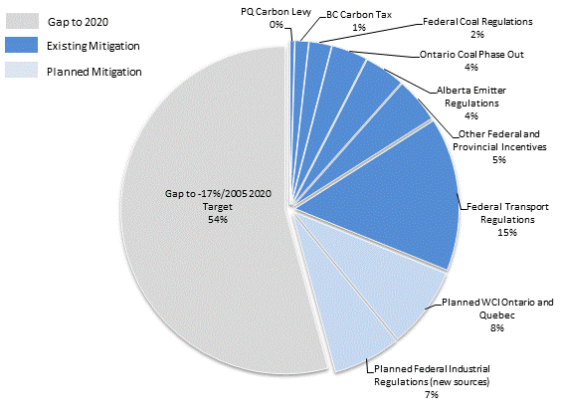

Figure 2: ***Current and Planned Actions to Reduce GHG Emissions in Canada***

Composition of Canada's Target of -17% below 2005 in 2020

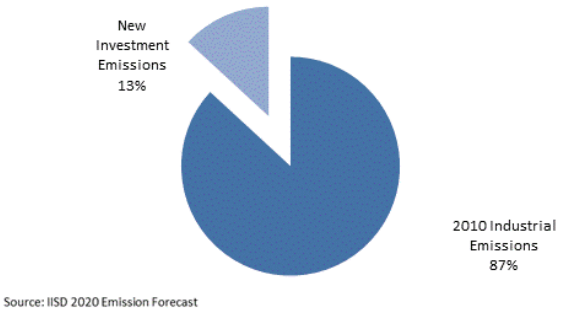

Figure 3: ***Total Emissions in 2020 from Industrial Emitters***

Existing Sources in 2010 and New Additions by 2020

cern over the Canada-US competiveness impacts of "Canada alone" GHG mitigation than the risks posed by a changing climate.

Looking forward, there are at least three options to cost-effectively close the gap. First, the federal government can move to regulate existing sources and not just new and modified; second, develop a domestic offset system to deliver real emissions reductions would contain costs; and third, look internationally for offset opportunities:

- *Move to regulate existing industrial sources.* The focus on new and modified emitters means that the majority of industrial emissions (87 per cent) are omitted from coverage by regulations that target new and modified sources only (Figure 3). Moving to apply the performance standards more broadly is a next logical move. But the regulatory process for new and modified facilities will take some time, and could take upwards of five years to unfold, and therefore significant additional reductions are likely not possible from existing industrial sources much in advance of 2020. That is, the government is focused on new and modified sources first, preferring to not burden existing sources given concerns over competitiveness. Still significant opportunities exist, even with provincial policies covering many large emitters. If regulations for existing sources can be promulgated prior to 2020, existing large industrial energy and producers could deliver in the order of 15 Mt of GHG reductions at an average carbon cost of CAD$25 per tonne.

While a regulatory approach works for now, a forward-looking climate policy is needed to design regulations that can ultimately be transformed to increase compliance flexibility and allow emitters to equalize abatement costs.

- *Establish a domestic offsets system.* With the current federal regulatory approach and provincial actions delivering at best half of the aspirational targets of the federal government, offsets will

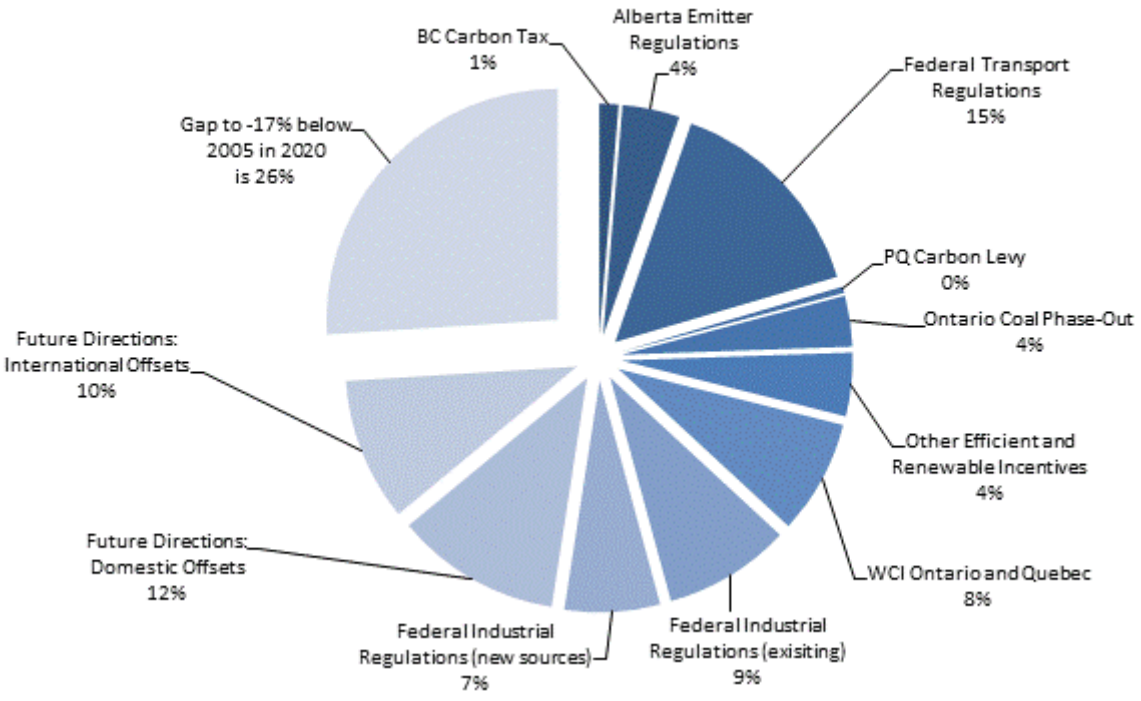

Figure 3: ***Current, Planned and Possible Actions to Reduce GHG Emissions in Canada***
Composition of Canada's Target of -17% below 2005 in 2020

likely form an important compliance option. This is especially the case if the United States is slow to implement carbon policy seeking broad emission coverage. Developing offset rules and offset projects takes time, and therefore the federal government will need to signal early that offsets have a role in future compliance. This will set the necessary expectations for offsets project to be developed. This offset system could take the form of a flexibility mechanism for emitters to reduce compliance costs, or a standalone government fund that purchases reductions for retirement towards Canada's GHG targets. With offsets coverage in the agriculture, waste, buildings and transport sectors, our assessment indicates about 26 Mt of reductions could be delivered annually in 2020 at a price of CAD$25 per tonne.

- *Look to International Offsets.* While it is not clear what the post-2012 Kyoto world will look like, early indications are that project-based Clean Development Mechanism (CDM) could be complemented by reductions from Reducing Emissions from Deforestation and Forest Degradation (REDD+) and from Nationally Appropriate Mitigation Actions (NAMAs) in the developing world. While it is not clear where in the post-2012 architecture NAMAs and REDD+ will fit, or CDM for that matter, the current momentum

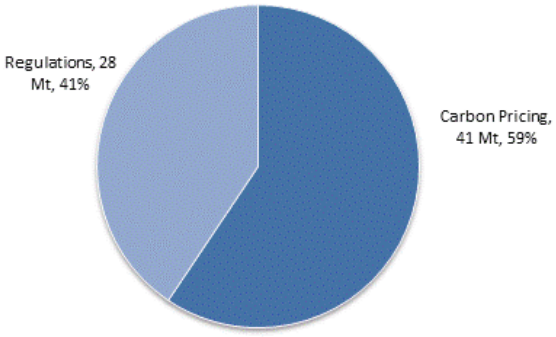

Figure 4: ***Industrial Emission Reductions in 2020 by Management Instrument***
Regulations, Carbon Pricing and Incentives

points to their use in future developing world compliance. Moving forward to support both REDD+ and NAMAs would prepare Canada to access low cost reductions internationally in the years to come. The current federal government has in the past indicated a tolerance for international offsets, but certainly not in an unlimited way. Assuming a 10 per cent international offsets limit at an offset price of price of CAD15$ per tonne would imply reductions of about 22.5 Mt at a cost of CAD$340 million in 2020. To put this into context, Canada's current Fast Start financing totals just over CAD$400 million annually.[10]

Adding these potential opportunities, totalling about 63 Mt of reductions in 2020, would reduce the gap to Canada's 2020 target to 26 per cent. Figure 3 below shows the breakdown of current and planned actions as well as future direction that are possible at carbon costs in the order of CAD$25 per tonne.

10 This financing reflects Canada's commitment under COP 15 in Copenhagen. See WRI 2011.

Future Policy Directions

The question for Canada is how to continue to reduce emissions that move towards Canada's longer-term GHG reduction aspirations. For now, it is not politically feasible to implement national carbon pricing. But with precedents at the provincial level for carbon pricing, Canada's movement to carbon pricing may be inevitable. Indeed, a look at current and planned climate policies targeted at industrial emitters shows that carbon pricing is dominant over regulations, with current and planned initiatives contributing about 59 per cent to 2020 reductions (Figure 4). These overlapping of federal and provincial carbon policy on the same emitter group will need to be sorted out, especially given the different instrument choices that the federal and provincial governments have taken.

The policy-relevant question now that Canada has a jumble of federal regulations and provincial carbon pricing is how to unify these to deliver cost-effective reductions aligned with deeper aspirational targets in the longer-term. While the federal government has shown a preference for regulations, in the longer-term this approach can't deliver cost-effective reductions at a level aligned to deeper GHG targets. Our modelling suggests that the thermal power coal regulations mentioned above deliver 5 Mt of reductions at a price of CAD$25 per tonne but could be delivered with economy-wide carbon pricing of CAD$5 per tonne. This ratio would likely be exacerbated with increased stringency given that most marginal abatement cost are exponential, meaning compliance costs rise rapidly with deeper reductions sought.

There is also the question of how well performance regulations can be designed for heterogeneous sectors such as those in the oil and gas sector and petroleum refining. Information asymmetry for

the regulator is likely a real problem when designing performance standards for emitters with very different operations.

While a regulatory approach works for now, a forward-looking climate policy is needed to design regulations that can ultimately be transformed to increase compliance flexibility and allow emitters to equalize abatement costs. To design this forward-looking policy that builds on the current federal preference for performance based standards, five guiding principles are worthy of consideration:

1. *Establish certainty through a published regulatory schedule that makes expected effort clear.* Significant uncertainty has emerged in the regulated community and with provinces about both the schedule and stringency of federal regulations. Two sources of uncertainty are significant for industry. First, there is confusion over who will be regulated and in what order, and whether new and/or existing facilities are targeted. Second, the level of effort expected is unknown, with industry trying to equate the announced targets with early indications of how regulations will unfold. For provinces, the uncertainty is impacting policy development, with uncertainty about how equivalence in stringency between provincial and federal policies will be treated by the federal government. To address this uncertainty, and enable forward-looking planning, there is a need to publish a regulatory schedule outlining how regulations will unfold, who will be targeted and when, and to what level of stringency.

2. *Regulations need to enable flexibility while achieving emissions reductions.* Compliance flexibility can be achieved with performance regulations through aligning the regulatory requirement with capital stock turn over. By not asking existing capital to be retired or retrofitted prior to end of life, costs are minimized. The trade-off for keeping costs low is obviously a reduced impact on emissions, given the stock turn over in any year is a fraction of the total emissions. But in time as the regulations bind and more reductions are sought, additional flexibility mechanisms such as domestic and international offsets will need to be added to the policy mix.

3. *The regulations should not impose disproportionate costs.* Getting out of step on compliance costs between sectors or trading partners in Canada will drive adverse competiveness impacts. As such, forward-looking regulations need to be designed to keep compliance costs roughly equal across emitters. This will require a price target to be set by the federal government that can be used to guide regulatory development.

4. *Regulations should seek reductions throughout the entire emission inventory.* A narrow focus will lead to high cost reduction missing some low cost opportunities. While a focus on the large emitters is a good start, there are a whole range of cost-effective options in waste, agriculture and buildings. To the extent these are omitted from a offsets system, then targeted regulations and inclusion in carbon pricing will be required.

5. *Regulations should be designed to transition to carbon pricing.* Ultimately with deeper emissions reductions constraints, more flexibility will need to be added. This means that regulations should be designed with a longer term view to transition to carbon pricing as regulatory costs climb. As such, performance standards should be designed to ultimately make then tradable, as cap and trade regime that allocates allowances on an industry emission intensity benchmark, or to allow them to be used to apply a carbon tax.

As the limitation of national performance regulations are likely to be revealed in time, in terms of both low reduction potential and high costs, additional flexibility mechanisms will be needed. Most likely the future will require a movement to carbon pricing, with additional compliance flexibility such as access to domestic and international offsets.

Conclusion

Canada's move to regulate carbon under proposed federal regulations for new and modified coal fired power facilities will deliver greenhouse gas emissions reductions at a reasonable cost. While the emerging package of regulations won't achieve the deep targets the government has aspired to, it does signal that Canada's federal government is finally establishing the policy architecture to reduce greenhouse gas emissions.

Since the federal government initiated the National Climate Change Process in the late 1990s, successive governments have modelled Canada-alone carbon pricing scenarios with limited compliance flexibility and deep GHG reduction targets. These scenarios, which assume the United States does not act in parallel and view all international offsets with skepticism (i.e. "Russian hot air"), produce big compliance costs to the order of CAD$200 per tonne, while wreaking havoc on indicators of competitiveness. Any mitigation actions aligned with deep GHG reduction targets were off the table regardless of the instrument proposed— whether carbon taxes and cap and trade or regulations. As the debate on carbon pricing became deeply politicized in the last two federal elections, momentum to reduce carbon emissions stalled further despite the focus on a cost-effective instrument to deliver reductions. It is no wonder that the federal government has been locked in inaction for so long.

Now the introduction of performance-based regulations gives the federal government room to move.

Newly released draft regulations for coal fired electricity plants will deliver about 5 Mt of GHG reductions in 2020, climbing higher thereafter. Costs to emitters are likely manageable at about CAD$25 per tonne, which is in line with the current carbon costs under the European Union GHG trading program and with the coal electricity regulations under development in the United States. Canada's proposed electricity sector regulations complement light duty vehicle fuel efficiency regulations enacted in late 2011 and existing ethanol content standards in gasoline, which together deliver another 34 Mt of GHG reductions by 2020. The government has also signalled its intent to regulate other large emitters, such as oil and gas producers and petroleum refining, buildings and commercial vehicles.

The challenge of a forward-looking climate policy is to anticipate how the current patchwork of climate policies can be transitioned to deliver cost-effective reductions, while keeping compliance costs aligned with major trading partners.

The federal government is not acting alone in Canada. The emerging federal carbon policy builds on what is already happening at a provincial level.

The federal regulations, coupled with provincial actions, put Canada on track to deliver about 70 Mt of emissions reductions in 2020; about 30 per cent of Canada's reduction target. All of the provinces have policies for GHG reductions, including

British Columbia's carbon tax, Alberta's specified gas emitter regulations, Quebec's carbon levy, and Ontario's phase-out of coal for thermal electricity. There are other policy mechanisms in the works that will further cut emissions, including the Western Climate Initiative's cap-and-trade program likely to be implemented by Manitoba, Ontario, Quebec, B.C and California. Taken together, Canada currently has implemented or has plans to reduce emissions equivalent to about 46 per cent of its 2020 target of -17 per cent below 2005 levels.

The longer-term objective of Canadian climate policy is to unify the very different federal and provincial actions to deliver cost-effective reductions across Canada's entire emission inventory. This becomes more important as policies start to bind and compliance costs rise as more GHG reductions are sought. The challenge of a forward-looking climate policy is to anticipate how the current patchwork of climate policies can be transitioned to deliver cost-effective reductions, while keeping compliance costs aligned with major trading partners. Recognizing equivalency across provincial and federal policies is a start, as is designing the new federal regulations to accommodate carbon pricing in the longer term. While there is still much work to do, Canada is moving in the right direction on GHG policy.

David Sawyer

As director, David Sawyer leads the work of IISD's Climate Change and Energy program to advance the development of low carbon development strategies internationally, while continuing international efforts to enhance the capacity of all countries to address climate and energy issues through adaptation, risk reduction and resilience to change.

Sawyer is an environmental economist with 20 years of national and international experience. He has built a solid reputation as a leader in the economics of climate policy and energy futures.

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Role of the UN and Multilateral Politics in Integrating an Increasingly Fragmented Global Carbon Market

Abstract

This paper attempts to examine the role of the UN and multilateral politics in integrating an increasingly fragmented global carbon market in the face of the outcomes and implications of the Cancun Agreements on mitigation, mitigation ambition and carbon financing. It also examines the context of the on-going negotiations, emerging uncertainty and the role of the carbon market in contributing to the achievement of a 2 degree or lower temperature increase above pre-industrial levels. Specifically, it examines how a pledge-and-review system and a Nationally Appropriate Mitigation Actions (NAMA) regime can operate in a future global carbon market under various scenarios related to the ongoing international climate negotiations.

Introduction

The emergence of carbon as a virtual commodity on the international market has proved to be a potent mechanism for both regulating emissions-based growth and as a source for financing clean, low-carbon growth. This has largely resulted from the legally binding emission reduction commitments of developed countries who are Parties to the Kyoto Protocol and the concomitant adoption of the flexible mechanisms to assist in meeting these commitments. However, with the expiration of the Kyoto Protocol's first commitment period at the end of 2012 and the growing uncertainty over whether the Parties to the Protocol will agree to a second commitment period, including the quantum of renewed emission reduction commit-

1 The views expressed in this paper are the author's alone, based on his background knowledge of the Convention process and negotiations and the COP decisions, and therefore do not represent those of his employers, his country, any country or groups of countries under the UNFCCC.

ments, significant uncertainty has arisen on the fate of the global carbon market in both the short to medium and long terms. Notwithstanding this political uncertainty at the international level, the players in the carbon market continue to show confidence in the future of the market through the establishment of trading schemes at the national level and multilateral and bilateral levels. This is invariably leading to an increasingly fragmented global market without overarching regulatory guidance at the multilateral political level. This emerging scenario raises several issues and questions, for example:

The players in the carbon market continue to show confidence in the future of the market through the establishment of trading schemes at the national level and multilateral and bilateral levels.

- Does the carbon market require a global regulatory framework for it to be viable?
- What would be the efficacy of a fragmented global carbon market, bearing in mind the genesis of the market and the purpose it was envisioned to fulfil?
- What could be the implications of the on-going negotiations on the market?
- What is the role of UN and multilateral politics in the future of the market in view of the increasing fragmentation?

While this paper attempts to address the issues surrounding these questions, it does not attempt to provide the answers. Rather, it seeks to examine the realities of the on-going international negotiations and the signals and implications of these negotiations, including under various outcome scenarios, as well as provide some suggestions as to what might constitute a UN and multilateral political approach to dealing with the market.

The Cancun Agreements

At the Cancun Climate Change Conference held in December 2010, countries agreed to limit the global average temperature increase to 2 degrees Celsius above pre-industrial levels, with an opportunity to review this commitment with the possibility of moving to 1.5 degrees Celsius on the basis of scientific evidence on impacts (UNFCCC 2011). This political outcome signalled a renewed commitment to address climate change following the disappointing climax of the Copenhagen conference one year earlier.

The Cancun Agreements related to mitigation provide for:

1. *Economy-wide emission-reduction targets by industrialised countries.* Under this aspect, industrialized countries agreed to develop low-carbon development strategies or plans and expected to report on progress in emissions reductions every two years. On this basis, countries pledged emissions reductions.

2. *Nationally Appropriate Mitigation Actions (NAMAs) by developing countries.* Following the Copenhagen Accord, many developing countries submitted plans to limit the growth of their emissions. Such plans, known as NAMAs, are to be supported by technology, finance and assistance in capacity-building from industrialised countries. Cancun provided for the formal recognition and recording of these NAMAs in the form of a registry, and developing countries are also expected to report on progress made on achieving their mitigation objectives. Some developing countries, including the major emerging economies, provided voluntary targets for emissions reductions.

Developed country pledges – bottom-up	Australia	Canada	EU	US
Scheme	Carbon-pricing with transition to emissions trading by 2015	Federal level: performance standards Provincial level: carbon tax (British Columbia), cap-and-trade (WCI), hybrid of carbon tax and cap-and-trade (Alberta)	Cap-and-trade EU-ETS phase III	Primarily cap-and-trade schemes through various state and regional initiatives (e.g. WCI, RGGI)
Targets	5% from 2000 levels by 2020	17% by 2025 from 2005 on an economy-wide basis	21% in 2020 relative to 2005	1990 levels by 2020 (California); 15% below 2005 by 2020 (WCI); 10% in power sector by 2018 (RGGI)
Measures	Legislation; mandatory emissions cuts for major polluters	Sector by sector regulatory approach	Policy Directives	Proposed legislation

Table 1: ***Summary of scheme, targets and measures by some developed countries.***

3. *Decisions related to the Kyoto Protocol.* Although further emission-reduction targets under a second commitment period for the Parties to the Kyoto Protocol are still under negotiation, the Cancun decisions related to the Kyoto Protocol provide that the emissions trading and project-based mechanisms under the Protocol are to be available to industrialised countries in a second commitment period. Additionally, Cancun provides for increased access to under-represented regions under the Clean Development Mechanism (CDM), as well as for standardised baselines and monitoring methodologies, and referenced levels for forest management.

Significantly, in addition to the above, governments agreed on the 'consideration of the establishment of one or more market based mechanisms to enhance the cost-effectiveness of, and to promote, mitigation actions.' This perhaps sends the clearest signal of an intention to develop and use the carbon market in addressing mitigation.

Importantly and critically, the sources of funding have not been identified or at least are not yet clear.

An analysis of the mitigation pledges made so far by some observers (UNEP 2010; IEA 2010) indicates that they fall short of what is required. For example, the United Nations environment Programme (UNEP) Emissions Gap Report estimates that pledges from both developed and developing countries are 60 percent of what will be needed by

Developing country	Brazil	China	India
Scheme	Emissions reduction market	Carbon trading	Market-based mechanisms
Voluntary targets	36.1 -36.9 of projected emissions by 2020	Energy intensity reduction by 16% by 2015	Carbon intensity reduction of 20% to 25% between 2020 and 2030
Measures	Legislation	Voluntary carbon market	Sectoral goals identified as 'missions'

Table 2: ***Summary of scheme, voluntary targets and measures of Brazil, China and India.***

2020 to place the world on a trajectory that will keep global temperature rises to less than 2 °C in comparison to preindustrial levels.

Developed-country Pledges

The Cancun decision on actions by industrialised countries, in the face of the impending conclusion of the first commitment period of the Kyoto Protocol, with no clear indication of whether a second commitment period may be agreed, essentially provides for a bottom-up approach to limiting greenhouse gas emissions based on national circumstances with a view to reviewing these pledges in the future. It would therefore form the basis of domestic climate change policy which may manifest itself as country-driven, bilateral, regional or multilateral, as we have already begun to witness.[1] The following, though not exhaustive, briefly describes the respective initiatives without going into detail in order to give a sense of the general approach. These approaches are summarised in Table 1.

Australia

The Australian government has proposed a carbon-pricing package (Hepburn and Jotzo 2011) | which promises to be a cost-effective way for Australia to meet its national target for reducing greenhouse gas emissions by 2020 (five per cent lower than in 1990, once emissions from land-use change are taken into account). The scheme is scheduled to be introduced in mid-2012 as a fixed-price permit scheme, and expected to make the transition to an emissions trading scheme in mid-2015. Additionally, other initiatives include the development of a domestic offsets scheme the Carbon Farming Initiative (CFI) (Garnaut 2011), which aims to provide new economic opportunities to farmers, forest growers and landholders and to help the environment by reducing carbon pollution.

Canada

Canada plans to reduce total greenhouse gas emissions by 17 percent from 2005 levels by 2020, which is in alignment with the pledge made by the United States. Canada also has initiatives at the provincial level that involves cap-and-trade schemes (e.g. Greenhouse Gas Reduction (Cap and Trade) Act 2008 in British Columbia (Legislative Assembly of British Colombia 2008) and Ontario (Ontario Regulation 452/09 n.d.); Act to amend the Environment Quality Act and other legislative provisions in relation to climate change in Quebec (National Assembly of Quebec 2009), which all al-

1 For example, the European Union Emissions Trading Scheme (EU ETS), the Australian carbon price mechanism, and initiatives in Canada, Japan, New Zealand, the Russian Federation and the United States.

low linking to other emissions trading schemes in other jurisdictions.

European Union

The European Union Emissions Trading Scheme (EU ETS) is the world's most important market mechanism for reducing GHG emissions. The EU ETS operates in 30 countries (the 27 EU Member States plus Iceland, Liechtenstein and Norway) and is expected to reduce total emissions by 21 percent in 2020 compared to 2005 levels (Carbon Finance at the World Bank 2011). The revised EU ETS Directive (DECC 2011) provides for, inter alia, a centralized EU-wide cap on emissions allowances from 2013; it also provides that access to project offsets under the Kyoto Protocol from outside the EU will be limited to no more than 50 percent of the reductions required in the EU ETS. In general this is to increase efforts within the EU through essentially market initiatives.

United States

Emissions reductions efforts in the United States primarily rely on cap-and-trade schemes through various state and regional initiatives (e.g. the Global Warming Solutions Act of 2006 Assembly Bill 32 (AB 32) in California which requires California to cut greenhouse gas emissions to 1990 levels by 2020; the Western Climate Initiative (WCI), which aims to reduce regional GHG emissions to 15 percent below 2005 levels by 2020 (WCI 2011); the Regional Greenhouse Gas Initiative (RGGI), which is a mandatory cap-and-trade CO_2-only-reduction program covering ten northeastern and mid-Atlantic states which aims to reduce CO_2 emissions from the power sector by 10 percent by 2018 (RGGI 2011).

Developing-country actions and NAMAs

The now accepted view that developing countries need to play a part in global mitigation efforts, particularly the emerging economies, has resulted in the Cancun decision on NAMAs, which provide for a recording of these actions in a registry that will match support of finance and technology for those countries that request support. A separate part of the registry will record those NAMAs that do not request support. It is therefore clear that the extent to which NAMAs would be successful, regardless of the quantum pledged, whether expressed as energy intensity, absolute amounts or programmes of activities, would be dependent on the support that they receive consistent with the provisions of the United Nations Framework Convention on Climate Change (UNFCCC).[2] This implies that significant sources of finance would need to be identified to fund mitigation activities in developing countries. Cancun also recognised this and formalized the commitment made by developed countries in Copenhagen to mobilize $100 billion a year by 2020 to address the mitigation and adaptation needs of developing countries, and decided to establish a 'Green Climate Fund.' Importantly and critically, the sources of funding have not been identified or at least are not yet clear. The Final Report of the UN High-Level Advisory Group on Climate Change Financing (UN 2010) assumes that contributions to the pledged $100 billion a year are expected to be made by the private sector, and may be mobilised through the carbon market.

The following, though not exhaustive, briefly describes the respective initiatives and approaches of some developing country Parties without going into detail in order to provide a sense of the general approach. These approaches are summarised in Table 2.

Brazil

Brazil's National Climate Change Policy (NCCP) has been made law and establishes a voluntary na-

2 Article 4, UNFCCC.

tional greenhouse gas reduction target of between 36.1 and 38.9 percent of projected emissions by 2020. In its NCCP law, Brazil proposes the creation of a Brazilian Emission Reductions Market (BERM) in order to achieve the voluntary emission-reduction target.

China

China's 12th Five-Year Plan of National Economic and Social Development sets a carbon-intensity reduction target (CO_2 emissions per unit GDP) of 17 percent and aims to cut energy intensity by 16 percent by 2015. China has announced a 40 to 45 percent reduction in carbon intensity from 2005 (The Climate Group 2011), levels that were first indicated at the Copenhagen Conference and reaffirmed at Cancun. In its 12th Five-Year Plan, China also proposes an increase in forest cover of 12.5 million hectares by 2015, improved GHG emissions and energy monitoring systems, promotion of energy efficiency in industrial plants and buildings, support for the expansion of public rail transport infrastructure, and the continued development of non-fossil fuel energy sources (Seligsohn 2011). China recently transacted its first voluntary carbon credits under its domestic Panda standard (Peters-Stanley 2011; The Panda Standard 2010), a quality standard for Chinese voluntary emission-reduction projects within agriculture and forestry, and developed by the China Beijing Environmental Exchange (CBEEX).

Global efforts to reduce emissions are clearly following a trend of domestic-led policies, with the emergence of a fragmented carbon market.

India

In 2008, India launched the National Action Plan on Climate Change (Govt. of India 2008), which involves the establishment of eight missions or programs on solar technology, energy efficiency, sustainable habitat, water, the Himalayan ecosystem, green India, agriculture and strategic knowledge. The mission on energy efficiency includes a market-based mechanism as a cost-effective way of meeting targets.

From the foregoing, it is evident that market mechanisms do and will form an integral part of domestic mitigation efforts, whether by developed or developing countries. Notwithstanding commitments by developed country parties to the Kyoto Protocol and the uncertainty surrounding the continuation of a legally binding framework for emissions reductions, global efforts to reduce emissions are clearly following a trend of domestic-led policies, with the emergence of a fragmented carbon market. Domestic mitigation efforts must be seen in the context of what they are intended to address, namely global climate change. In the scenario of ongoing uncertainty in defining a global regulatory framework, the efficacy and efficiency of a fragmented market will come into focus.

Market signals from the negotiations

Decision 1/CP.16 (UNFCCC 2011a) (UNFCCC 2011) has given a clear indication of the political intentions of world governments in utilising the carbon markets to this end. Paragraph 80 is particularly instructive in this respect, since it:

> Decides to consider the establishment, at the seventeenth session of the Conference of the Parties, of one or more market-based mechanisms to enhance the cost-effectiveness of, and to promote, mitigation actions, taking into account … ensuring voluntary participation of Parties, supported by the promotion of fair and equitable access for all Parties; … complementing other means of support for nationally appropriate mitigation actions by

> developing country Parties; … assisting developed country Parties to meet part of their mitigation targets, while ensuring that the use of such a mechanism or mechanisms is supplemental to domestic mitigation efforts; …

What has also been made clear in this decision is that the carbon market is only intended to assist countries in meeting their pledges and NAMAs, and that domestic policy and action lie at the core of meaningful emissions reductions. Most if not all of the intentions to use the carbon market involve emissions trading (cap-and-trade) and provisions for these domestic schemes to be linked with other jurisdictions (e.g. U.S., Canada, as stated above). According to an analysis conducted by the World Bank (Carbon Finance at the World Bank 2011), different forms of linking are available, including direct linking and indirect linking. Direct linking involves the mutual recognition of each emissions trading scheme and their allowances, and the linking of these allowances through trading allowances between the schemes (import and export). Indirect linking involves linking through a mutually recognized standard unit. Most trading schemes indirectly link though Certified Emissions Reduction Units (CERs). With the monitoring, reporting, and verification (MRV) requirement of NAMAs, this means that in light of the spirit of Decision 1/CP.16, any possible linkages between emissions trading between developed and developing countries need to take into account issues such as compatibility in the level of effort or ambition; use of offsets; MRV standards; and price caps. It would therefore be necessary for agreed MRV standards to be adopted in order that effective linking between schemes can be meaningful. Such compatibility criteria have been defined in some proposed domestic policies and legislation, for example, the proposed U.S. Waxman-Markey Bill (Library of Congress 2011) (H.R. 2454: Sec 728).

The provisions that developing country NAMAs are to be supported by finance, technology and capacity-building by developed countries also factors in another dimension to the issues under consideration. Developed countries would need to raise the necessary finance to support such developing country actions, part of which is expected to be supplied by the private sector and the carbon market. If one considers that the pledged $100 billion per year until 2020 to assist in mitigation and adaptation actions in developing countries is to be partially capitalised by the carbon market, then consideration would have to be given to some of the implications as a result. Given that 2020 is only eight years away, any contribution by the carbon market would mean that the market would have to be scaled up significantly, not only for raising the finance, but also for facilitating significant emissions reductions, particularly in developing countries.

The only way in which the market can be scaled up, regardless of whether any new mechanism relates to crediting or trading, is by creating increased demand – and to do this, the level of mitigation ambition has to be raised.

Outcome Scenarios of the current UNFCCC Negotiations

Recent analysis (Climate Action Tracker 2011) indicates that, in order to keep on track to limiting the global temperature increase to at least 2 degrees Celsius above pre-industrial levels, global emissions need to be capped at 40-44 billion tonnes CO_2 equivalent (CO_2-e) per year by 2020, and to decline steeply afterwards. The analysis also revealed that, when the individual pledges and targets of all countries were added up, global emissions in 2020 would be 54 billion tonnes

CO_2-e/year in 2020, leaving a gap of 10-14 billion tonnes to reach the reduction level required. What this means is that, if the emerging trend of a fragmented market structure were to be factored in as a mechanism for achieving individual pledges and targets, then more stringent action at the domestic level would be required to achieve the desired temperature stabilisation, as the market alone cannot achieve this. Even when one analyses the state of the voluntary markets in 2010 (Peters-Stanley, et al. 2011), the total volume traded amounts to 131.2 $MtCO_2$-e. It can be reasoned that stronger policy at the domestic level may incentivise and catalyse the voluntary carbon market and so provide the framework for this aspect of the carbon market to contribute to mitigation efforts.

The major challenge for the potential role that the market can play will be posed by the structure (or lack of structure) of a global regulatory regime to incentivise the market. It can be argued that the market needs to be scaled up in order to meet mitigation expectations, at least in this context. However, much will depend on how the international negotiations evolve in both the short and long terms. It would therefore be instructive to examine the possible scenarios that can emerge from the international negotiations, at least in the short term, which would send a signal to the market. These can perhaps be categorised as follows:

1. Agreement at the international level and continuation of the existing multilateral framework with the legally binding emissions reductions, with the quantum being that required for stabilising temperature increase to 2 degrees Celsius or below.
Achieving this scenario would require tremendous political will. Given political realities in those countries that need to play critical roles in such a scenario (e.g. US, Japan, Australia etc.), such a conclusion appears to be remote in the short term. Most countries are continuing to grapple with the economic fallout of the global economic crisis, while countries such as the United States (cap-and-trade legislation), Australia (Carbon Pollution Reduction Scheme) and Japan (Basic Action Global Warming) are faced with internal political challenges in their efforts to address climate change at the domestic policy level. The United States has made is categorically clear that it will not sign on to the Kyoto Protocol, and Japan, along with Canada and Russia, have indicated that they do not want to be part of a second commitment period. Continuation of the Kyoto Protocol in its present form therefore faces serious political challenges. Nonetheless, there is general agreement to allow access to the Kyoto mechanisms for industrialised countries to assist in meeting their reduction targets.

2. A non-binding agreement (voluntary pledges)
The current state of negotiations, with the most recent round being concluded in June 2012 in Bonn, Germany, appear to be signalling a move towards a voluntary approach, with the submission of NAMAs from developing countries and the pledges of developed countries being consolidated from Copenhagen in Cancun. It also appears that such a non-binding agreement will contain guidelines on MRV, International Consultation and Analysis (ICA) and International Assessment and Review (IAR) that are currently under negotiation. Additionally, the pledges made by some countries are contingent on the actions of other countries and the conclusion of an agreement, so there also appear to be conditions attached to these pledges that go beyond domestic policy and have multilateral dimensions. This can pose the multilateral negotiations with an iterative dilemma that now essentially says that domestic policy will depend on a multilateral agreement that in turn will depend on domestic policy!

3. No agreement in the short term
This scenario is more or less the status quo, with voluntary pledges being placed on the table by

developed countries and developing countries (NAMAs), and mitigation actions premised on national circumstances and capability. This scenario is also distinguished from the scenario at 2. above on the basis that the pledges are not formalised into any type of instrument with the associated MRV, ICA and IAR guidelines currently under negotiation. However, both developed and developing countries have indicated their respective intentions to utilise the market in assisting them in meeting their emission-reduction objectives (see above).

From the above analysis it can be argued that, at least in the short term (post-2012), a fragmented market approach would be the most likely scenario to emerge. Accordingly, the challenge for the international negotiations would be how to harmonise these fragments in a holistic whole that would keep in focus the need for a multilateral regime to account for the transactions of these markets, as well as to account for the reductions accruing from these transactions and its role in meeting the global objective of keeping global temperature increases to at least 2 degrees Celsius above pre-industrial levels.

Role of scaled-up market

It is reasonable to suggest that the only way in which the market can be scaled up, regardless of whether any new mechanism relates to crediting or trading, is by creating increased demand – and to do this, the level of mitigation ambition has to be raised. Increased demand can be realised through increased ambition and as a result can generate the volume of credits needed to reduce transaction costs and increase the revenue potential from these markets. More importantly, the balance between supply and demand has to be managed to ensure that the price of carbon can be maintained at a level that would raise the necessary finance, while at the same time incentivising countries to participate through the setting of ambitious reduction targets and objectives.

The following issues would have to be taken into account in the consideration and implementation of scaled-up market mechanisms:

> *Such fragmentation, although still deriving the benefits of the emissions reduced and finance raised, would not provide the framework for monitoring and tracking its collective efficacy in reducing emissions towards a stabilised, post-industrial temperature.*

1. Timing and Capacity

Even if scaled-up market mechanisms can be agreed in the near or short term at the multilateral/UN level, the time it would take for their implementation would need to be taken into consideration, given the capacity constraints in developing countries, as well as the data and information that may be required for participating in such mechanisms. These can include information required for baseline setting and domestic policy development. In order for developing countries to participate in any scaled-up market mechanism, the necessary domestic infrastructure would have to be put in place to ensure a state of readiness for participation, such as monitoring and verification processes.

2. Level of Offsetting

The consideration of any scaled-up market mechanisms must keep one issue in mind, and that is the need to reduce global emissions to a level that will keep the world on track for a stabilisation temperature of 2 degrees Celsius or less. Accordingly, the degree to which such mechanisms will focus on offsetting emissions would need to be given serious consideration in order not to deter

countries from taking a more active part in global mitigation.

In order to realise effective and meaningful emissions reductions, the ongoing negotiations and multilateral politics would need to ensure that the requirements for a scaled-up market are met in a manner that allows for simultaneous entry by all parties wishing to participate. Issues that need to be addressed in this regard relate to MRV standards and establishment of the NAMA registry. Additionally, outside the main UN/multilateral negotiations process, linkages between existing and proposed cap-and-trade emissions trading schemes need to be harmonised across political jurisdictions in respect of their compatibilities, transparency criteria, domestic legislative and policy framework, and the fungibility of credits and allowances. It can be argued that only with such harmonisation and complementarity in a short-term international policy framework and regime can the carbon market perform the role envisaged for it in mitigating emissions. Though parallel, it ought not to be mutually exclusive. However, in addition to this harmonisation and complementarity, an agreed multilateral framework to assess the performance of the market, the associated emissions reductions and its contribution to global efforts may need to be formulated. Even if bilateral and regional ETS can be linked, there will still be a need for a multilateral arrangement for accountability for transactions and emissions reductions in order to ensure environmental integrity and provide some measure of robustness to underpin the operations of the market. Such a framework may also be useful in reviewing commitments and pledges, bearing in mind that the ultimate objective still remains the stabilisation of global temperatures at manageable levels, consistent with the UNFCCC process and procedures.

While a multilateral framework may also be useful in reviewing commitments and pledges, it must also be stressed that such a framework ought not to be a substitute for the international climate regime for addressing climate change or the means for achieving the desired stabilisation levels.

The way forward

The outcomes of the UNFCCC talks to date, particularly the decisions taken at Cancun, do appear to be sending some signal to the carbon market, particularly the decisions on strengthening and improving the CDM and the intention to arrive at a decision on new market mechanisms at COP 17. Governments need to consolidate these approaches in the short term even in the absence of a strong international climate change regime which may not be agreeable in the short term, and this can be used as a stepping stone towards such a regime. In any event, rules and regulations are already in place in the form of the Marrakech Accords and do not necessarily need to be reinvented. The political will required at the multilateral level has to be assessed in the context of the political realities that challenge such political will. Protracted negotiations and political inertia, which inevitably result in delaying progress and action on climate change, are untenable. Governments must arrive at some agreement at the UN/multilateral level to signal to the world that climate change is being seriously addressed. If this means that there is a role for the carbon market in raising the finance necessary for initiating action by developing countries in particular[3] and to assist developed countries in meeting and raising their mitigation ambitions, then the political will to ensure that this aspect of an international climate regime be concluded as soon as possible would need to be demonstrated. There

3 It would defeat the purpose if developing countries were to propose ambitious emissions reduction cuts through their NAMAs and these reductions were limited by, or were not realised, because of the lack of capacity support, technology support or financing.

is therefore a responsibility on all governments to ensure that this will is not only demonstrated, but demonstrated at the multilateral level.

Conclusions

It is beyond dispute that the carbon market has a critical role to play in the realisation of carbon emissions reductions and the raising of finance for mitigation, adaptation (for example, through the proceeds from the CDM or any other such arrangements from a harmonised carbon market) and technology transfer. The extent to which this role may be of significance, however, may be limited by fragmentation in the absence of a cohesive international regulatory framework, or at least in the delay in arriving at such a structure. Such fragmentation, although still deriving the benefits of the emissions reduced and finance raised, would not provide the framework for monitoring and tracking its collective efficacy in reducing emissions towards a stabilised, post-industrial temperature – the very purpose for which the market was designed and which gave birth to it. However, multilateral politics can play a crucial role in the short to medium term by harmonising rules and approaches that can at least provide policy guidance and send the appropriate signals to the market.

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Section 2

Existing instruments


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Making CDM work for poor and rich Africa beyond 2012: a series of dos and don'ts

Abstract

Making CDM and other carbon-resilient mechanisms work for Africa is not impossible. Looking at the situation through a keyhole will reduce our visibility tremendously and hence our capacity to obtain a full picture of the situation. Let us open the door wide to have a better appreciation and bring suitable solutions to the table to make carbon resilience a reality on the Dark Continent.

Climate change is a serious threat to humanity. Among actions undertaken to fight climate change and its disastrous impact on the planet, offsetting/mitigation mechanisms like the Clean Development Mechanism (CDM) are playing an important role in voluntarily but effectively involving developing countries in the global struggle. CDM, established by the Kyoto Protocol in 1997 and the Marrakech Accords in 2001, formally entered into force in 2005. Up to now around 3500 projects have been registered worldwide as CDM projects, with fewer than 2% hosted by Africa.

The first commitment period of the Kyoto Protocol is rapidly coming to an end, in 2012. International negotiations are continuing to find a successor or rather successors to the Kyoto Protocol. The Con-

ference of Parties to the Kyoto Protocol in Cancun (COP16) gave the CDM Executive Board the task of designing new offset mechanisms, Japan is trying out its own bilateral offsetting mechanism, and emerging countries like China, India and Brazil are being pushed to stop hosting CDM projects and become active in the struggle against climate change. China, for instance, is already setting up a local market for the trading of emissions reductions. Whilst other parts of the world are looking beyond 2012, Sub-Saharan African countries have not really hosted many CDM projects, despite their existing potential. Future mechanisms, if they are to include Sub-Saharan Africa, must be carefully designed in order to learn lessons from CDM.

For Sub-Saharan Africa finally to host a goodly share of projects, it is important to analyze the development of CDM in the region, learning lessons from the past to improve the situation in the future.

The world has not been quiet about the 'non-success'[1] of CDM in Africa. There are countless presentations and speeches about making CDM work on the continent. Articles and books have been published preaching the best solutions to make CDM a reality in Africa, and reforms to CDM have seen a shift from bundling to the programmatic and the simplification of the concept of additionality for certain types of projects. Many capacity-building initiatives by international organizations like the World Bank have been organized to train (and retrain) various stakeholders and install DNAs, the CASCADe program moved from theory to give practical support to the carbon asset development of selected projects in French-speaking African countries, and the ACAD Facility financially supports the development of selected projects in the whole of Africa. The countless actions taken to support CDM in Africa are varied and diversified. 'And yet it doesn't move' (we are paraphrasing the UNEP Finance Initiative paper 'And yet it moves' (UNEP Finance Initiative 2010), concluding from the very few CDM success stories from Africa that CDM is at least working on the continent.

CDM and other offsetting mechanisms to be developed will coexist beyond 2012. For Sub-Saharan Africa finally to host a goodly share of projects, it is important to analyze the development of CDM in the region, learning lessons from the past to improve the situation in the future.

For instance, why does Nigeria have five CDM projects registered compared to none for Ghana and Botswana, even though the latter two countries have better investment climates? Why are there more CDM projects in English-speaking Africa? What would happen if a carbon credit were traded at 30 Euros?

This paper provides a series of questions with tentative answers, an explanation of intriguing situations based on our experience and discussions with some stakeholders, and a subjective analysis of the development of CDM in Africa. The hope is that making CDM or any other offsetting project-based mechanism work in Africa will be approached more innovatively.

Africa and CDM: is there any potential?

Before going any further in the analysis, it is important to consider Africa's CDM potential. Without going into details, as this publication is not dedicated to analyzing this potential, here I nonetheless give some pointers to this potential.

1 We are ignoring here the latest CD4CDM Working Paper Series No 10 by Dr. Lütken of the UNEP Risoe Center, entitled 'Indexing CDM Distribution: Leveling the Playing Field' (Lütken 2011). In this paper, relative figures are used to show that CDM is actually not working so bad in Africa as compared to other parts of the world.

The World Bank (WB) (World Bank 2008) has published a book presenting thousands of potential CDM projects in energy sectors. Critics will say that in reality the potential cannot be that high since issues like the baseline, additionality and monitoring, which are crucial for CDM, are not addressed in it at all. But the book gives a sense of the reality of the huge existing CDM potential in all energy sectors in Africa.

Landfill gas

It is possible to use landfill gas to produce electricity in Africa, although the technology is still new on the continent. However, the technology is very expensive and, as showed in the WB book, producing 5MW of electricity from a landfill will cost around $5 million for an internal rate of return (IRR) of around 5% without carbon credits. Selling carbon credits at a conservatively estimated price of $5 will increase the IRR to 14% and make the investment viable.
Any city with around a million inhabitants can have such a project, and almost every African country has a least one such city, many even three, four or five or more.

And landfill gas is not the only potential use of waste. Composting is cheaper and also suitable for small cities and can equally claim carbon credits.

Besides carbon resilience, projects aimed at alternative uses of waste have a positive social impact in many African countries. Waste is usually collected from dumpsites with people living nearby in chaotic conditions, enduring the smell, flies and mosquitoes from the dumpsite. In some cases the waste can even pollute the water table.

Improved cooking stoves

Over 70% of the African population still relies on wood for cooking (and lighting). Many still use the traditional three-stone stoves for cooking, which have many negative impacts, such as the smoke and particles damaging the eyes and lungs, collecting wood for cooking being intensively time- and energy-consuming, and the very low efficiency of three-stone stoves (around 10%), leading to heavy destruction of the forest and contributing to climate change.

It is possible to move from this traditional way of cooking to improved cooking stoves and to claim carbon credits. Nigeria and Zambia have two such projects registered already as CDMs, and many other such projects on the continent are registered under different voluntary standards.

Improved charcoal production

Some of the 70% of the African population that relies on wood for cooking uses that wood in the form of charcoal. Charcoal is a huge source of deforestation and forest degradation, and its production emits a lot of methane into the atmosphere. Improving the production of charcoal will therefore have a positive impact on the environment. The WB book estimates a potential of over 2000 such projects on the African continent.

Replacing kerosene lamps with clean lanterns

In many African countries, more than 80% of the population uses kerosene lamps for lighting. Kerosene lamps are expensive, cause damage to the environment and humans, as they produce carbon dioxide and harmful smoke, and are unreliable and inappropriate for lighting.

Instead of using kerosene lamps, solar lanterns or mechanically charged lanterns like the Nuru Light[2] can be used. These alternative ways of lighting will

2 The Nuru Light technology consists of a LED light (Nuru Light) with an incorporated battery and a human power pedal (PowerCycle) used to recharge the light. A Nuru Light is fixed on the PowerCycle (pedal charging lights). By pedaling the PowerCycle for 20 minutes, 5 lights can be fully charged simultaneously and each will produce 40 hours of light (10 days lighting in rural area). More information on the concept can be found at www.nurulight.com. The concept was developed in rural Rwanda and is now spreading all over Africa.

reduce greenhouse gases and can therefore qualify as CDM projects. The potential in Africa is huge.

Wood processing residue and other

In many African countries, huge volumes of waste are produced after wood processing, which are usually burned or left to decay in nature. Instead this waste can be used to produce briquettes for energy production.

Africa should play an important role in any future mechanism that uses forestry to mitigate greenhouse gas emissions into the atmosphere.

Proliferating plants like typha[3] are also found in Senegal, Mauritania and Mali. This plant is devastating for water and people. Some projects collect the typha, dry it and use it for electricity production. One very innovative project in Mali mixes the typha with rice husks (left to decay in nature after rice production) to produce briquettes and sticks to replace charcoal and wood in Niono, a region of Mali where desertification is speeding up and people must travel for days to find wood for cooking.

Flared gas recovery for energy production

Gas flaring from oil fields[4] is still a common practice in many oil-exploiting countries in Africa. Instead of flaring, the gas can be used for energy purposes. Examples of CDM projects from flared gas recovery come from Nigeria, where two such projects are registered.

3 More information about Typha can be found at http://www.probos.net/biomassa-upstream/pdf/reportBUSB1.pdf

4 Important oil-producing African countries in descending order of production are Nigeria, Angola, Sudan, Equatorial Guinea, Gabon, Republic of Congo, Chad, Cameroon, Côte d'Ivoire, Ghana, South Africa, and Democratic Republic of Congo.

The WB book focused only on CDM in the energy sector. Although this is the sector with the most CDM projects worldwide (more than 60% of CDM projects registered are from energy sectors), in Africa the Land Use, Land Use Change and Forestry sector (the so-called LULUCF) is important.

Forestry and CDM in Africa

Forestry has not picked up at all in terms of CDM worldwide, and only a very few CDM projects are in the forestry sector. The reason is because the Kyoto Protocol did not put any emphasis on forestry and allowed only 1% of emissions reduction from it. Moreover, the European Union Emissions Trading Scheme (EU ETS), the main buyer of carbon credits from CDM, has not admitted forestry credits into the scheme.

In Africa, however, forestry needs to be an important part of CDM because it represents 75% of the continent's total emissions. To date, five forestry projects have been registered in Africa,[5] representing 17% of 29 forestry projects registered worldwide. This shows that the forestry sector is developing faster than other CDM sectors in Africa, but the potential is still largely untapped.

International negotiations around the climate change issue are placing great importance on using forestry to fight climate change, because forestry contributes around 20% of greenhouse gases emitted yearly into the atmosphere. Africa should play an important role in any future mechanism that uses forestry to mitigate greenhouse gas emissions into the atmosphere.

What does it take to get carbon credits issued?

Many people in Africa do not really know what a CDM project is. We have come across people presenting us with a very well-structured and well-

5 Two in Uganda and one each in Kenya, the Democratic Republic of Congo and Ethiopia.

written PDD or Project Design Document and asking if we can find a buyer without any plans for project implementation. This can be explained with reference to the failings of earlier capacity building by the World Bank dedicated to training people to develop PDDs without insisting that a PDD should be the result of real physical studies for a project that will be implemented and will follow certain monitoring procedures. A project can look good and reduce greenhouse gases, but still not qualify for CDM purposes.

To be a CDM project, a project must:

- be considered early: i.e. before any decision to implement the project is taken, a CDM has to be considered. The project developer has to notify the Executive Board of the CDM (EB) and the designated national authority or DNA. This rule can be compared to a woman finding a kindergarten for her child before even planning to become pregnant.
- respect the sustainable development criteria of the host country. This is ensured by the DNA of the host country issuing its approval through the well-known Host Country's Approval document (Letter of Approval). It must also be additional, i.e. reduce greenhouse gases below the level that would have been emitted in the absence of the project's activities. The rules seem extremely simple, but using different approved CDM tools to demonstrate the so-called additionality can be tedious, and the project can still fail at validation when the Designated operational Entity is not 'convinced'.
- have a PDD developed against an approved CDM methodology. If there is no methodology suitable for the project, the project owner must develop a new methodology and bring it to the EB for approval.
- have a stakeholder consultation organized by the project owner with the results compiled in the PDD.
- be validated by a Designated Operational Entity accredited by the EB.
- be verified by a different DOE to check if the project has been monitored as indicated in the PDD.

These requirements show that developing a CDM project needs more than just the will to do so, but rather a clear long-term commitment for many years. A CDM project can easily take two years to be registered, and that is not the end, as carbon credits are issued ex-post, and therefore monitoring needs to be done yearly, before the project is verified and carbon credits – if any – issued. And then issuance is yearly for ten years once or three times seven years. It is therefore impossible to undertake spot capacity-building initiatives and expect miracles to happen.

CDM and sustainable development in Africa

One tonne less of HFCs brings millions of dollars to already rich people, feeding the fat cat, as they say. A tonne less of carbon dioxide in Africa can be life-changing.

> *it is difficult to talk about CDM in Africa as a continent and to try and find the panacea to problems caused by the lack of CDM projects in Africa.*

We talked about the Nuru Light concept earlier, which is replacing kerosene lamps with environmentally friendly mechanically charged lights. According to the CDM methodology, one such light can only claim 0.08 tonnes of CO_2 reduced per year, and thus 0.08 carbon credits. Around thirteen such lights need to be distributed to claim one carbon credit. Many rural families can afford only a single kerosene lamp, but thirteen lights will provide thirteen families with a clean, affordable, reliable and appropriate lighting system.

This new system will remove the risk of children being burned by kerosene lamps and the smoke that destroys users' health. Also, our research in Cameroon shows that a family can reduce its lighting costs by around $50 per year by moving from kerosene lamps to Nuru Lights. Searching for that ton of CO_2 will change the lives of many families!

Cooking-stove CDM projects also have huge social and economic impacts on populations moving from three-stone stoves to improved cooking stoves. Families will cook their meals faster, spend less time finding wood for cooking, and reduce their health bill by drastically reducing the fumes inhaled by the traditional cooking method. Again the tonne of CO_2 reduced will not bring a lot of money, but will be life-changing for a family.

However, these projects are very complex to implement, from sampling to determining the baseline and monitoring of the project before verification to obtain carbon credits. The delivery risk of expected carbon credits is therefore very high. But buyers of carbon credits are banks or compliance buyers, and their analysis when purchasing carbon credits is purely cost/revenue oriented.[6] They do not add any social dimension to their analysis, as they are purely profit-making businesses. And few of the buyers that do add the social dimension to their analysis and take the risk of purchasing credits from boutique African projects do it just to diversify their portfolios and to claim that they have African projects in the pipeline. A perfect commercial strategy is to have 1% of carbon credits in the pipeline to sell billions of unsustainable HFC credits from China.

6 In fact, the costs of CDM development from baseline studies and PDD development to monitoring and issuance of carbon credits are roughly the same, independently of the volume of carbon credits to be issued. And small and scattered projects like cooking stoves projects that are very good and possible in any African countries have very high issuance risks, due to a complex monitoring. Buyers then look at CDM development costs and compare the volume of credits to be secured and go then for large projects that are definitely not in Africa.

Looking at this, one can think that a higher price for Certified Emissions Reductions (CERs) from Africa will boost CDM on the continent. This topic will be tackled later in this publication.

What is Africa?

Africa is a continent of 53 countries (not counting the newly independent South Sudan). Many books and articles claim that CDM is not working in Africa. Does this include South Sudan? Is it possible to put 53 countries in just one category labeled Africa? Many indicators show the contrary. It could well happen that African countries need to be categorized or taken country by country when finding solutions to bringing carbon finance in the continent. For instance:

- Out of 66 projects registered in Africa, 19 are hosted by South Africa, representing 30%. When it is said CDM is not working in Africa, does this include South Africa?
- Egypt and Morocco together host 14 projects, representing 20% of the African pipeline of projects registered. Maybe it can be assumed that CDM is working in these two countries?
- Nigeria has 5 CDM projects registered. The expected volume of carbon credits to be generated per year is over 1% of worldwide expected carbon credits to be generated, making Nigeria the 10th country in the world of CDM in terms of yearly credits to be generated. Is this reason enough to say that CDM is working perfectly in Nigeria?
- Rwanda has 3 CDM projects registered as against none for Botswana. Does this mean that Rwanda is the preferred destination for CDM in Africa?
- 16 projects are registered in the 33 Least Developed Countries (LDCs) in Africa.[7] This represents 24% of projects registered on the conti-

7 Out of these projects, 2 are in the Democratic Republic of Congo, 1 in Ethiopia, 1 in Liberia, 1 in Madagascar, 1 in Mali, 3 in Rwanda, 1 in Senegal, 1 in Tanzania, 4 in Uganda and 1 in Zambia.

nent. But 33 countries out of 53 is 63%. Can we then conclude that CDM is not working in LDC Africa? Or, from a different angle, can one say that the potential in those countries is quite low and hence 24% of the projects are rather very good? And when we realize that almost all the 16 projects have been registered only in 2011, can we say that CDM is at last starting to work in LDCs in Africa?

- The CD4CDM Working Paper Series No. 10 by Dr Lütken of the UNEP Risoe Center (Lütken 2011) gives relative figures like comparing countries' emissions to carbon credits to be emitted and concluding that Africa is not 'the lost continent in CDM', as people keep saying. Although critics will say that it is not always wise to put the whole of Africa into one basket, can we nonetheless conclude that the most debated issue regarding CDM not working in Africa is rather flawed as a result? Or will we join the UNEP Finance Initiative paper, 'And yet it moves', written in 2010, and conclude from the very few CDMs registered from selected African countries that CDM is at least working on the continent?

These situations show that it is difficult to talk about CDM in Africa as a continent and to try and find the panacea to problems caused by the lack of CDM projects in Africa. Although people talk about how CDM is working in China and India, nobody suggests that it is working in the whole of Asia.

Listing these situations is not intended to suggest that nothing should be done to make CDM work in Africa, but rather to show that the approaches to make CDM work on the continent should be more innovative and more deeply thought out.

What has been done to make CDM work in Africa

'There is no doubt: we want to help.

The well-documented horrors of extreme poverty around the world have created a moral imperative that people have responded to in their millions.

Yet poverty persists …'

Anyone who has read the bestseller 'Dead aid: why aid is not working and how there is another way for Africa' (Moyo 2009) knows this quote by heart. If the same person is following discussions about making CDM work for Africa, many similarities will come to his mind. The many problems affecting developing countries – especially in Sub-Saharan Africa – from extreme poverty to the AIDS pandemic to malaria and others have never left any conscious human being indifferent. Yet problems persist and might stubbornly continue to do so for centuries to come. And hurdles related to the success of CDM in Africa are so far not proving an exception to this rule.

There is a strong need to develop pilot projects (based on a bottom-up analysis) with people who are working in the field and have a better understanding of the business culture in the countries in which they are based.

It is impossible nowadays to name all the programs dedicated to making CDM work in Africa.

The World Bank started capacity-building on the continent in 2003. People invited to attend were mostly from the public sector (ministries), with an interest rather in collecting per diem. And this capacity-building was short and totally theoretical. We have come across PDDs developed for virtual projects and people looking for buyers of carbon credits. What carbon credits???

The capacity-building was always carried out by international consultants who cost a lot but did

not have the expected results. Maybe international consultants were more interested in getting their mandates through and cashing them in than in seeing CDM flourish in Africa. It may have been better to train trainers locally and use them to promote and develop CDM projects. By developing projects, they would have had other interests like the provision of success fees[8] on CERs and would then have pushed the project further. CDM is extremely complex, the process is extremely long and it is important to have local support instead of trying to develop it from distance.

What has worked, and what needs to be taken forward

Very few programs have been entirely beneficial to Africa, and there is a strong need to encourage similar programs from the continent.

The CASCADe/UNEP program selected seven French-speaking African countries to develop a program that has brought many carbon-resilient projects to light. To quote their website: 'The program provides a hands-on, learning by doing approach in which local developers are given the opportunity to develop and prepare Project Idea Notes (PINs), Carbon Finance Documents (CFDs) and/or Project Design Documents (PDDs) through direct technical assistance and capacity building to pilot projects'. Such programs should be encouraged because they work on real projects and support project owners in learning by doing. Also they focus on French-speaking Africa, which has been particularly 'neglected' in the CDM platform. The CDMs are designed entirely in English, even though many African countries speak exclusively French. Only 10 registered CDM projects out of 66 are from French-speaking African countries.

8 A success fee is usually a fixed percentage of CERs payable to the project developer by the buyer when CERs are delivered and transferred to the buyer's account.

The ACAD Facility, amongst others, provides grants for early-stage projects to support the costs of feasibility studies, business plan development and CDM development. African projects are always great ideas, but many fail to materialize because they lack a sound business plan to attract investors. The ACAD Facility bridges the gap to help project developers present high-quality documents to investors. Also, the Facility takes some projects throughout the CDM development process: the further the project is in the CDM development process, the lower the risk perception of investors and carbon credit buyers.

The Belgium Technical Facility is focusing only on Uganda, with a two-million Euros grant program to support CDM development from conception to registration, organize financing for the project and above all developing the capacity of local consultants to manage the whole process. This is very practical and needs to be taken forward, to move from talking to practical work.

These three programs are in just a few countries and select very few projects compared to the continent's potential, but their impact is enormous, and real projects are brought to registration and implementation.

Making CDM work in Africa

A lot has been said, written, discussed and proposed during the last five years to make CDM work in Africa. The result is clear today: as already noted, 2% of the CDM project pipeline come from Africa. And discussions are continuing in the same direction.

Initially the main problem seemed to be the lack of CDM institutional support. While a lot of work has been done to install Designated National Authorities (DNA, national authorities representing the UNFCCC and making sure the sustainable devel-

opment criteria of the country are met in any single CDM project developed) in almost all African countries, which is a good initiative, there has not been any noticeable change in terms of the number of CDM projects from the region.

Many people thought and are still thinking that, in order to stimulate the development of CDM projects, capacity-building is urgently needed in Africa. The result in some cases has been a perfectly developed Project Design Document (PDD) to put forward a project that only exists in the said PDD, totally ignoring the fact that the CDM is merely an add-on to an underlying project.

Feed-in-tariffs are under development in many African countries, to follow the example of South Africa. Although this is another very good initiative, there is no certainty that it will be the magical potion that makes renewable-energy CDM projects work for Africa.

On the UNFCCC side, efforts are being undertaken to make CDM a reality in Africa. For example, to solve the problem of the small and therefore unattractive size of projects of Africa, the so-called programmatic approach has been developed. In theory this will help spread small-scale projects in time and space into one program. Although the idea behind the concept is a work of genius, this might end up being even more complex than 'normal' CDM projects.

William Easterly (Easterly 2006) defines 'Planners' as advocates of the top-down decision-making approach and 'Searchers' as the agents for alternative approaches, that is, bottom-up ones. Let us illustrate this with Easterly's own example: 'The short answer on why dying poor children don't get twelve-cent medicines, while healthy rich children do get Harry Potter, is that twelve-cent medicines are supplied by Planners while Harry Potter is supplied by Searchers […] Planners determine what to supply; Searchers find out what is in demand'.

The difficult question of how to make CDM work in Africa always seems to have landed on the desks of Planners. Despite their good intentions and thorough motivations in supporting Africa, nothing noticeable has so far been changed in reality. It may be time to think differently, try to understand clearly and find real solutions to this stubborn disease.

Conventional project finance: still the main hurdle for carbon finance in Africa

The debate about making carbon finance work for Africa will certainly go beyond 2012 if and when new mechanisms are added to existing ones. Africa suffers no shortage of potentially great low-carbon projects that will definitely qualify for existing and forthcoming mechanisms. But for CDM, for instance, carbon finance accounts on average for only 20% of the overall investment need of the project, and carbon credits are by definition converted into cash only after delivery, i.e. when the project has been physically implemented and monitored and verified against CDM rules imposed by a specific methodology.

The huge investment, usually in millions of Euros, to create at least 20,000 carbon credits per year (a minimum threshold of carbon credits for many buyers to be interested in the project) for a CDM project needs to be available to implement the project before carbon credits can be issued. Adding to this the fact investment purely for CDM development is rather insignificant compared to the revenue from carbon credits, we can insist that conventional finance is what is needed first in Africa. Many carbon-credit buyers prove the correctness of this, as they are always willing to cover all CDM-related costs when there is a project that can reach financial closure.

We strongly recommend the focus to be more on finding solutions for making conventional project finance work for Africa. The CDM is the icing on the cake. No matter how much icing there may be, however, it cannot be enjoyed if there is no cake to support it.

The bottom-up approach

External analysts are sometimes prone to think in pan-African terms. Africa, however, is no more homogenous than Latin America or Asia. This simple truth has obvious implications for any analysis of the barriers to CDM development. Africa is a conglomeration of 53 countries, all very different and diverse. Well-designed capacity-building might be of interest to Botswana or Ghana, whilst there is a rather basic need for an institutional framework in Mauritania and Chad. Maybe CDM is thoroughly understood in Senegal and Nigeria and there is a lack of seed money and venture capital to jump start selected projects and create a bandwagon effect that will see many projects in the pipeline within no time. Is English, the official and only language of CDM, a huge and the main barrier to the Central African Republic? The feed-in-tariff may really boost the development of renewable energy in Cameroon, but can that be of some advantage to CDM if the baseline of energy production in Cameroon is hydro? And is grid electricity a useful baseline when more than 70% of Africa's population reportedly still relies on fuel wood as primary energy source for cooking and lighting? Questions like these could span pages without clear answers today.

It is obvious, then, that the situation is extremely complex and that no simple solution can be envisaged.

There is a strong need to develop pilot projects (based on a bottom-up analysis) with people who are working in the field and have a better understanding of the business culture in the countries in which they are based.

The CASCADe program and ACAD facilities we mentioned have probably not spent a tenth of what has been spent for many years to build capacity in Africa. But their impact is far greater because they focus on real projects and work in the field to support the project through the complexity of CDM development.

One recent striking example of a bottom-up approach that can be recommended to any donor country or agency trying to make carbon finance work for Africa is the two-million Euros grant program from Belgium Technical Cooperation to promote CDM in Uganda, mentioned earlier. In brief, the grant will take real CDM projects through the CDM cycle, hire and develop the capacity of local consultants to take the lead on projects, develop the capacity of local project owners and support, develop innovative financing solutions for the selected project, and develop the website of the DNA to allow for transparent communication. The Belgian government would have spent ten or a hundred times this amount to run in a few African countries and organize workshops about CDM without any impact on CDM development.

Success stories

Belgium Technical Cooperation is going to develop success stories as CASCADe did. Success stories can easily have a bandwagon effect on the development of any initiative. The CDM concept is so complex and even looks abstract: many in West Africa will see this, begin to believe and then imitate.

We know of many cooking-stove projects under development in Africa that follow the CDM standard. And many developers mention the cooking-stove projects registered under CDM in Zambia and Nigeria as success stories, proving that the rather

complex cooking-stove project can be developed under CDM. Any capacity-building initiative would have said so forever without any impact, but the climate-neutral group atmosfair took the 'risk' of being the leader and can be followed.

Building the capacity of the private sector

CDM is too complex to be developed remotely. Local consultants are unavoidable if costs and time are to be saved (and success guaranteed) in the CDM development process. Many European buyers today are trying to have local representatives or partners in Africa, as they have seen that there is no success in coming to conferences in Africa and expecting to come across great projects.

In December 2010, we opened the company S² Services Sarl (www.s2-gmbh.com) in Cameroon to develop CDM in the region. To date, many companies that have been struggling to find projects in Africa for many years are approaching us to exploit our experience in win-win cooperation.

Local African-based banks will play a major role in making CDM or any other mechanism work on the continent. If they are taught how to benefit from CDM, they will definitely have a positive impact on it.

Capacity building – if any – should target local consultants and banks so that, once they understand what they can gain in becoming involved in CDM, they will support it on the ground, where projects are actually developed.

Creating an African standard to have a premium on prices?

A simple cost/revenue analysis for pure investment in CDM development shows that no carbon credit buyer will readily come to Africa. In fact African projects are usually very small, their CDMs are constructed in such a way that the costs of development for two projects yielding, for instance, 20,000 CERs and 200,000 CERs per year respectively, are almost the same. Of course, expected revenues per project will be a simple product of CERs by the unit price of CER, and the decision of the buyer not to come to Africa will then be easily made. It is clear that, if there is no extra incentive for buyers to come to Africa, even with new mechanisms, buyers will still follow the cost/revenue analysis and come to Africa only when there is saturation – if ever – in other markets.

But maybe it is time to think of more innovative solutions to speed up the process of approval, especially if CDM is increasingly going to come to the continent together with new carbon-resilient programs.

CDM is a market-based mechanism, with players seeking to increase their profits while reducing costs. The discussions on how to make CDM work in Africa should be more focused on increasing the profitability of CDM projects.

The first CDM projects to be initiated in Africa (excluding South Africa and the North African countries) speak volumes about what CDM investors are looking for. Only four projects were initiated in Africa in 2005, and surprisingly two of those in Nigeria looked at using flared gas to produce energy. Nigeria is not the preferred destination for investors interested in Africa. Nigeria did not even have a DNA installed at that time, and a special presidential committee was put in place to give HCA to projects. This even caused great problems later, when the 'real' DNA was installed in the Ministry of Environment. For a long period of time there seemed to be two DNAs in Nigeria, leaving the project developers very confused, as the Special Presidential Committee on CDM did not

want to cede ground to the other Special Climate Change Unit where the DNA is now installed.

Nigeria is blessed with oil and gas, and CDM projects aiming to use the associated flared gas for other purposes produce carbon credits in the order of hundreds of thousands Euros making the cost/revenue ratio very attractive for carbon credits buyers. And this was enough incentive for investors to look at those projects in Nigeria despite the bad investment climate, instead of trying to develop cooking stove projects in Ghana or Botswana, preferred destinations for foreign investors in Africa.

This example of Nigeria shows that if cost/revenue is attractive for investors, some projects might have an opportunity to be developed in Africa. It is hard to say that a separate standard should be designed for Africa, but if a carbon credit from Africa costs 50 Euros, many CDM buyers will reconsider their strategy for the continent. This is no different from giving coefficients to carbon credits that some innovators are thinking about. It is not impossible to implement a different standard for Africa, as the Gold Standard CDM (GS CDM), for instance, is already ensuring that certain types of project receive a price premium in the market and are still in the same pipeline as the other projects. The Africa Standard CDM (AS CDM) can be conceptualized in the same way as the GS CDM.

If carbon credits improve the Internal Rate of Return (IRR) of projects by ten points, carbon credits buyers will easily be willing to organize the financing of projects and obtain a double return later on (on CERs sales and a share of the project's revenues).

For example, let us imagine a 5MW biomass-to-energy project in Nigeria that needs more than 5 million Euros to be implemented and that will have an IRR of 12%, very low to attract investors. With the actual price of carbon credits at around €10, the IRR will increase to around 15%. If the carbon credit is given a premium because the project is in Africa and moves to €40, the IRR will increase to 25%, and any investor or carbon credit buyer will fight to get the project financed.

Privatizing CDM decisions in host countries

CDM projects are mostly owned by the private sector. Yet one stringent regulation is to get the host country's approval (HCA) that the project is following sustainable development criteria designed by the government. Acquiring the HCA is in many African countries extremely time-consuming and can be a big obstacle in having the project registered.

Many DNAs are organized like the DNA of Cameroon, where it is an inter-ministerial committee of 17 members. PINs and PDDs are submitted in 17 printed copies that are then distributed to the committee members. Then they read the documents – if at all – and a meeting is organized to approve them and to mandate the DNA's representative (the climate change focal point) to issue the HCA. We assume that they have read carefully through the documents. But they are all government officials, and for meetings to happen they expect a per diem to be paid to them. The cost of the meeting becomes high, and as the DNA does not really have a running budget, it can be very difficult to organize meetings. As a consequence, projects can be halted for a year before being issued with the HCA.

It is understandable that any UN-backed program will always work with the government in any country for sovereignty reasons. But maybe it is time to think of more innovative solutions to speed up the process of approval, especially if CDM is increas-

ingly going to come to the continent together with new carbon-resilient programs.

The Gold Standard VER, for instance, does not require HCA approval prior to the certification of projects. But the sustainable development integrity of the projects registered cannot be questioned. CDM can learn from the Gold Standard to avoid the involvement of the government, while ensuring that the projects respect social and environmental criteria. Or the government through, for instance, the ministry in charge of environmental affairs could give the final (symbolic) approval after a nongovernmental UN-accredited committee like DOEs has approved the project.

Making CDM and other carbon-resilient mechanisms work for Africa is challenging. Innovative solutions from all perspectives need to be adopted. There is no miracle solution to suit all situations and all African countries. Simple capacity-building could be enough in Nigeria, whilst Uganda needs pilot projects to learn from. More incentives need to be created for players in the African carbon market. The future for offsetting mechanisms is surely going to be in programs like PoA, LULUCF and REDD, NAMAs and maybe many other new bilateral and multilateral mechanisms. Africa might continue to be lost on the playing field if innovative bottom-up solutions are not adopted.

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Voluntary Market – Future Perspective

Abstract

In less than a decade from inception, compliance and voluntary sectors have steadily expanded and enlarged, outmanoeuvring any other commodity growth. Given the current uncertainty surrounding compliance markets, the voluntary market is seen as a lynchpin on which the mere existence of the global carbon market depends. For developing economies, voluntary carbon trading may provide a solid experience in designing the future compliance framework, be it an Emissions Trading Scheme or NAMAs. This article discusses the potential of the voluntary carbon market in shaping the future carbon trading regime, discuss existing and emerging standards, and on how to expand the stakeholders and service providers needed to support this sector.

Given the uncertainty surrounding the legality, longevity and purpose of the compliance carbon markets, it seems reasonable to look towards the voluntary sector as a possible saviour of the vision of a global carbon market.

By virtue of the fact that the voluntary carbon market preceded and guided the establishment of the compliance carbon market, and given the host of voluntary standard knowledge now utilised by the compliance market, it is likely that the future of the compliance carbon market will also be guided by the voluntary sector.

In contrast, the institutional mechanisms and infrastructure needed to achieve greater liquidity and integrity in the compliance markets are increasingly branching out from the compliance to the voluntary markets. As transparency and accountability continue to drive activity in this sec-

tor, it is hoped that efforts to establish greater liquidity should lead to true price discovery.

The financial crisis halted the momentum of compliance carbon markets, which was then compounded by the setbacks of Copenhagen. With the Cancun conference also failing to outline a path towards a global market, there has been a unique development: the growth of regional semi-compliance markets in the US, and other voluntary transactions in the rest of the World, during 2010 (Peters-Stanley, et al. 2011).

Yet, globally, the growth in the voluntary market for the past decade seems inconsequential due to the negative influence of global economic recessions; high transaction costs; buyers' predilections for geography, project type, recent vintage; oversupply, including flooding of VERs (Verified Emission Reductions); and declining prices. The collapse and ultimate closure of the Chicago Climate Exchange (CCX) has done little to add to the market's confidence.

On the bright side, new and improved standards, enhanced market service providers (such as registries and exchanges in Europe and China) and new sectors (such as REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) and O3 Depleting Substance) have dominated the voluntary market's developments in recent years. Moreover, the confidence of stakeholders in the WCI (Western Climate Initiative) and RGGI (Regional Greenhouse Gas Initiative), and the growing interest in demonstrating corporate social responsibility through carbon-neutral initiatives, have given a fillip to the voluntary market in the developed economies.

Rapidly developing economies, viz., India, China, Peru and Brazil, have also displayed notable maturity by implementing new and innovative measures to support the growth of the voluntary carbon market. In China, for example, voluntary market exchanges have been set up, and the Panda standard has been created.

The voluntary market is packed with new standards, infrastructure service providers and projects, and has constantly increasing participation from corporates in developed and developing economies. Minds are now focussed on raising standards, benchmarking and best practices, as service providers and stakeholders gear efforts towards opening up a new paradigm in the voluntary market. The best use of these positive developments is expected to be made by the developing economies and the regional voluntary trading schemes in the west.

As the roadmap towards a post-2012 compliance market remains absent, the voluntary market is seen as an obvious lynchpin on which the mere existence of the global carbon market depends. Most importantly, and in the absence of a firm and formal global post-2012 agreement, a voluntary carbon market should be embraced by most of the developed and developing economies in the near to long term. For developing economies, voluntary carbon trading may provide a solid experience in designing the future compliance framework, be it an Emissions Trading Scheme, Nationally Appropriate Mitigating Actions (NAMAs) or something entirely new.

Market in action

Since its beginning the carbon market has faced many challenges, hampering the speedy growth many had envisaged. However, in less than a decade from its inception, both the compliance and voluntary carbon sectors have steadily expanded, becoming one of the fastest growing new commodity markets.

While the first voluntary credit was transacted in 1989 between a Guatemala pine and eucalyptus

plantation and a project funded by US-based AES Power (Ecosystem Marketplace 2009), very few people in the market would recall that the World Bank's Prototype Carbon Fund launched its first ever institutional-level carbon procurement based on VERs, later to be converted into CERs (Certified Emission Reductions) upon the Kyoto Protocol's entry into force and establishment of the Clean Development Mechanism (CDM).

Voluntary carbon credits of CDM pre-registered vintage were the most preferred by buyers due to their regulatory assurance for compliance. Such credits mostly qualified under the VCS (Verified Carbon Standard) with transaction costs related to validation, verification and VCS registry hosting. At the same time, credits from projects that were rejected or withdrawn from the CDM found their way on to the unregulated voluntary market. The inclusion of credits from 1999 flooded the market with old vintage credits from India, China and other countries for trading on the self-regulated CCX, serving the voluntary carbon market in North America.

Pricing criteria by buyers covered vintage, country, project type, standard and registry. The pricing of credits thus veered in different directions, with those generating special social and environmental benefits priced differently but lacking a definite standard of their own. The Gold Standard was launched in 2003, and the market recognized the additional value of credits that qualified under its robust and rigorous framework, such that Gold Standard VERs are always priced at a premium.

The voluntary carbon market reached a staggering annual growth rate of more than 100% between 2003 and 2008, though not comparable in volume with the compliance market. The market declined post-2009, due to the global economic meltdown, before recovering in 2010 by climbing back up to 2008 levels (Ecosystem Marketplace & Business for Social Responsibility 2008).

As would be expected, US and European buyers dominate the demand for voluntary carbon. The retail markets in the US and EU are increasingly offsetting emissions for products, travelling and other activities. A few leading corporates and financial institutions, such as Google and HSBC (Ecosystem Marketplace & Business for Social Responsibility 2008), have launched voluntary carbon credits procurement programmes, with a few of them directly funding voluntary projects. Recently, projects with clear social benefits that originate in Africa and other least developing countries are being increasingly demanded by buyers, most notably in the EU. In North America, offsets from agriculture and methane projects dominate the supply.

Registry services offered from 2009, primarily by VCS, provided buyers with the much needed integrity and addressed the double counting and retiring measures. Besides CCX, exchanges such as Climex and the Asia Carbon Exchange auctioned VERs from various standards, while a dedicated trading platform was recently launched by the Carbon Trade Exchange (CTX).

The voluntary market is deepening institutional understanding, increasing integrity and, most importantly, offering flexibility in the design and implementation of projects in different circumstances. Despite this development, investors in voluntary carbon projects are limited. Hence, some innovations are needed to shift from the procurement vested market to a scenario where investments are secured for implementing projects to reap voluntary carbon credits. Such voluntary carbon project-financing initiatives will create a new facet in scaling socially oriented small-scale GHG mitigation projects.

The next phase of the voluntary carbon market

Developing countries and emerging economies are beginning to shape the voluntary market by increasing demand, modifying supply, constructing technical infrastructure and building unique standards. These actions are demonstrative of the significant commitments made subsequent to the signing of the Copenhagen Accord and effective use of market-based mechanisms for protecting environmental assets.

China launched key initiatives subsequent to the energy intensity reduction commitment, such as launching a voluntary standard (CBEX Group 2010), a provincial pilot cap-and-trade scheme and provincial environmental and emission exchanges. Brazil established a state-level sub-national environmental registry for multiple energy and environmental assets. Kenya's forestry project became the first one to generate and issue the VCS-based REDD credits (VCS 2011). (See Box 1 on Developing Countries' initiatives).

India has launched its flagship Perform, Achieve and Trade (PAT) scheme (Climate Connect 2011), where participants trade energy-efficiency certificates. India is also launching a Renewable Energy Certificates (RECs) trading scheme. Taking it further, there is ongoing consultation by the government on a scheme that trades environmental pollutants at the state level. All India's schemes further the objectives of the National Action Plan on Climate Change (NAPCC) (Govt. of India 2008) whilst simultaneously building confidence and knowledge of emissions trading within the public and private sectors.

Global stakeholders welcome such initiatives but expect that any emission reductions from domestic schemes should have a robust accounting framework designed and implemented with high regulatory standards, ensuring that emission reductions are real and additional. The World Resources Institute (WRI 2010) rightly points out that "parties should agree to rigorous and consistent estimation and accounting methodologies."

Future perspective

Developing countries' efforts in establishing large-scale voluntary carbon markets are a clear indication of the determination to design robust frameworks for ensuring the integrity of carbon credits. This, coupled with registries and trading infrastructure, will increase the confidence of buyers.

Standards

Recent initiatives point towards the consolidation of organizations and standards involved in establishing, supporting and administering voluntary standards. The International Emissions Trading Association (IETA) and International Carbon Reduction and Offset Alliance (ICROA) have announced (IETA 2011) the integration of their market-facing associations, which is expected to bring players from both associations together to provide an even stronger base for the already expanding voluntary carbon market. This also reflects the need to facilitate the expansion of national regulators, using voluntary carbon mechanisms as blueprints for compliance market designs, as emphasised by Peters-Stanley, et al. 2011.

The integration of all the voluntary carbon standards seems far off, but it is not impossible. There are two major distinguishing factors to standards: the unit of measurement and the additionality. With regard to additionality, market players view the Gold Standard as more stringent, while the ISO Standard stipulates the use of an established methodology for estimating GHG emissions from existing schemes like the CDM.

IDEAcarbon's Carbon Rating Agency has established a methodology to provide an independent and credible assessment and opinion of the quality of the credits developed under all of the offsetting systems in the global market. The 'quality' of any carbon credit is determined by its compari-

Box 1. ***Developing Countries' voluntary carbon market initiatives***

A Brief Overview of China Carbon Market

China Beijing Environment Exchange (Peters-Stanley, et al. 2011)
China Beijing Environment Exchange (CBEEX) was founded in August 2008. It was established by China Beijing Equity Exchange (CBEX), CNOOC New Energy Investment Co. Ltd, China Guodian Corp and China Everbright Investment Management Corp. The strategic partners of CBEEX include the Financial and Energy Exchange (FEX), the Centre of Environmental Protection Foreign Cooperation of Ministry of Environmental Protection (MEP), BlueNext Environment Exchange; and The Energy Research Institute (ERI) of the National Development and Reform Commission (NDRC). CBEEX offers a range of services in addition to OTC transactions, including facilitation of technology transfer, raising finance, carbon asset management, carbon footprint assessment, carbon offsets and a CDM-related consultation and advisory service. It has facilitated the very first domestic VER transaction in China. It also participated in the development of the Panda Standard.

Shanghai Environment Energy Exchange (Peters-Stanley, et al. 2011)
Shanghai Environment Energy Exchange was founded in August 2008, as a trading platform for asset rights, creditor rights and stock rights, with a focus on environmental and energy sectors. The exchange is backed by the Shanghai United Assets and Equity Exchange. The Shanghai Environment Energy Exchange offers a package of services for business, ranging from consultation on energy-saving and pollutants discharge reduction, project-designing, project appraisal, business planning, marketing, fund operation, financing and technology supporting. Adopting the membership system, SEEE is exploring a new market mechanism to build a complete transaction chain linking technologies, capital and equity in accordance with the requirements of the Clean Development Mechanism. According to its website, it facilitated the transaction for 13 CDM projects, 47 VER projects and other projects. (China Environment & Energy Network 2011)

Tianjin Climate Exchange (Peters-Stanley, et al. 2011)
Tianjin Climate Exchange was founded in September 2008 as a joint venture of China National Petroleum Corporation Assets Management Co. Ltd (CNPCAM), Tianjin Property Rights Exchange (TPRE) and Chicago Climate Exchange (CCX). In addition to its trading service, it also offers consultation on CDM project development and related issues. In June 2010, the Tianjin Climate Exchange launched its online VER trading platform with 375,900 VER listed with unique electronic references for each unit.
Pilot Trading Scheme
By 2020, China has committed itself to reducing its carbon dioxide emissions per unit of GDP by 40 to 45 percent from 2005 levels and using non-fossil fuels for about 15 percent of its energy. The Chinese 12th Five Year Plan announced that the pilot carbon trading schemes will be in the cities of Beijing, Shanghai, Tianjin and Chongqing, and the provinces of Guangdong and Hubei before 2013. It is aiming to set up a nationwide trading platform by 2015. (www.nrdc.org/international/copenhagenaccords/)

Panda Standard (Peters-Stanley, et al. 2011)
The Panda Standard is the first voluntary carbon standard designed specifically for China. In addition to emission reductions, poverty alleviation is one of its primary objectives. The founders and co-founders of the Panda Standard include the China Beijing Environment Exchange (CBEEX), Bluenext China Forestry Exchange (CFEX) and Winrock International. The Panda Standard version 1.0 was launched at COP 15 in Copenhagen in December 2009. Later, the Panda Standard pilot project, the AFD bamboo reforestation project, was announced in Cancun in October 2010. It has developed the AFOLU Sectoral Specifications, which was open for public comment until the end of January 2011 and subsequently published in late 2011. The first transaction of its pilot voluntary carbon credits took place at the end of March 2011. (Peters-Stanley, et al. 2011)
Markit Signs First Sub-National Environmental Asset Registry- Brazil (Peters-Stanley, et al. 2011)

First VCS REDD credit (Peters-Stanley, et al. 2011)
On 7 February (2011), a project in Kenya became the world's first Reduced Emissions from Deforestation and Forest Degradation (REDD) project to issue verified carbon credits under the VCS Program. The Kasigau corridor REDD project – Phase I, developed by Wildlife Works in the Rukinga Sanctuary in Southeast Kenya, issued 1.16 million credits for the initial six-year monitoring period of its 30-year project life, representing 80 percent of the total 1.45 million metric tonnes of GHG emissions avoided during the period. The project deposited 290,066 'buffer credits' – or 20 percent of the net GHG benefit – to the VCS pooled buffer account, where they will be held to insure against the potential loss of credits across all projects in the VCS AFOLU portfolio. Prior to this issuance, Wildlife Works had successfully developed its own REDD methodology and had it approved by the VCS Program on 13 January 2011. The Kasigau corridor REDD project lies in semi-arid tropical forest, but the methodology can be used more broadly in projects throughout the tropics.

son with a high quality standard, specifically: Real - Measurable - Additional - Permanent - Leakage proof - Verified - Unique/Traceable – Transparent - Clear ownership rights - Positive sustainable aspects.

This approach provides a platform to allow any two carbon credits to be compared, providing carbon market participants with an essential guide to the pricing of carbon. Using a similar approach, the standards can be consolidated and integrated with a classification based on well-defined criteria. A remaining potential challenge, however, is the difference in the unit of measurement amongst standards – emissions, biodiversity, etc. There is no immediate necessity to consolidate or equate units of measurement; indeed, there is no reason why projects cannot utilise multiple units of measurement whilst there is simultaneous consolidation of the overall standards.

In the absence of a firm and formal global post-2012 agreement, a voluntary carbon market should be embraced by most of the developed and developing economies in the near to long term.

Infrastructure

Developing countries should consider the adoption of current voluntary and compliance standards for domestic carbon projects, instead of developing new standards entirely. Leading associations like IETA could facilitate such a review, establishing a centralized registry for voluntary programmes. Domestic registries established in developing countries and the US could potentially link to a new centralised registry, ensuring global access and fair trading.

The centralized registry will need to put in place measures that avoid double counting and fraudulent behaviour related to the reuse and recycling of credits traded without retirement. While use of consolidated standards, registries and exchanges within developing countries can grow the domestic voluntary carbon market, the establishment of a centralised registry will ensure there is global linkage.

The domestic voluntary market should be able to provide institutional experience to the participating emissions-intensive industries in developing countries, allowing them to prepare for the ensuing compliance markets. Building the capacity of industrial participants and securing their involvement are critical to ensuring a smooth transition.

Sectors, Methodologies and Regions

Industrial energy efficiency and renewables, landfill gas, agriculture and forestry are expected to grow in their contributions to the generation of credits in the voluntary markets.

Domestic demand for credits from specific sectors within developing countries has yet to be clarified, and China will probably be the first to record trends in the coming years. But most of the emerging voluntary markets are expected to export credits, with forestry a frontrunner in scaling the supply. Indeed forestry credits are very much the rising star in the voluntary market, with all observers anticipating huge growth in forestry projects worldwide. In 2010 REDD and Avoided Conversion accounted for 29% of all transactions, whilst the first REDD credits (as discussed in Box 1) were issued by a major standard – the VCS – for the Kenya Kasigau Corridor project in early 2011. Moreover, of the VCS's forestry-based credits, 90% were REDD.

As is common with voluntary projects, some are designed such that they will eventually be regis-

tered for compliance markets (a.k.a. pre-compliance), whilst some will be designed solely for the voluntary markets. Given the political will behind REDD and the expectations that a REDD compliance regime will emerge from the COP negotiations, some developers are looking at setting up REDD projects so they can enter a compliance market as and when it materialises.

According to the Forest Trends annual report (Peters-Stanley, et al. 2011), one quarter of the pipeline credits from forestry activities will be designed for compliance buyers in 2011, with some being REDD projects. Forestry activities have the largest share of credits designed for – and still awaiting the materialisation of – a compliance market, but the majority of REDD programs will still be sold in to the voluntary market.

It seems that some – although clearly not all – project participants are optimistic about the emergence of a REDD compliance market, and we may therefore expect the number of REDD projects targeted at a future compliance scheme to increase in line with anticipation of the existence of a future compliance scheme. However, this should be tempered with the reality that the EU ETS (EU Emissions Trading Scheme) explicitly disallows the inclusion of REDD credits, and appears unwilling to do so on a large scale until 2020. No other large-scale compliance market yet exists, nor do emerging markets show any sign of allowing large volumes of offsetting via REDD.

This does not mean that there won't be growth in pre-compliance projects – as there undoubtedly will – it simply means that the majority of REDD projects will continue to be voluntary and market-based, and given the relatively higher opportunity costs of land use in voluntary market REDD projects, this will undoubtedly result in a lower uptake of REDD projects as landowners make alternative uses of land in areas that otherwise would have been profitable projects under a compliance market.

Adding another twist to the story, however, is the USA. It seems that the failure of the federal cap-and-trade in the US diminished interest in pre-compliance buying. Sellers are looking towards the California cap-and-trade scheme as a market for pre-compliance REDD credits, with eyes still remaining on the WCI as a whole, albeit a little more hesitantly due to the uncertainty over different levels of participation by different states. California's Climate Action Reserve (CAR) doesn't have a REDD standard at the moment, but there are agreements in place to develop sectoral REDD crediting in Mexico and Brazil, meaning that REDD pre-compliance projects could feel a push from these two countries alone.

While use of consolidated standards, registries and exchanges within developing countries can grow the domestic voluntary carbon market, the establishment of a centralised registry will ensure there is global linkage.

Indeed, this dynamic could shift the regional focus of credit origins over the coming years. As of 2010, the USA dominated the location of credit origins, but as more and more large-scale REDD projects begin issuing, the voluntary market will have a greater focus on the global South, for the obvious reason that most of the world's tropical forests are located in these regions.

Then there's California's effect on the methodologies. Pre-compliance buyers focussed heavily on landfill methane in 2010, transacting 16% of the market share – the second highest. While landfill

methane will no doubt remain high for the precise reason that it is pre-compliance, the CAR's approval of four methodologies will mean that the voluntary market is likely to see a rise in CAR-approved methodologies, notably O_3 depleting substances and livestock methane.

The majority of REDD projects will continue to be voluntary and market-based, and given the relatively higher opportunity costs of land use in voluntary market REDD projects, this will undoubtedly result in a lower uptake of REDD projects.

With regard to standards and scale, the growth in REDD is already having – and will continue to have – an impact on the market share of particular standards and on the scale of projects. As soon as VCS developed a REDD methodology, the market share of VCS credits increased drastically, whilst the average size of projects jumped upwards due to the sudden presence of a relatively small number of projects storing huge volumes of carbon. This trend is likely to continue to bolster the position of VCS as a market leader and also to help in the effort to scale up the size of the voluntary market.

Volume

Turning now to the total volume in the global market, an estimate of voluntary credits that do not achieve successful validation and registration in the CDM pipeline can give a ball park figure of supply: with an estimate of the drop-out rate from the CDM pipeline of 10% for all projects expected in the pipeline until 2020, 1.13 billion tonnes of CO_2e would be generated by 2020 for entry into voluntary schemes, assuming CDM continues and all such projects are implemented and can be validated for a voluntary standard.

Table 1. ***Description of figures for a ball park figure of voluntary credits from CDM pipeline (UNEP Risoe 2011)***

Description	Quantity (billion tCO2e)
a. Annual volume of potential CERs from CDM Pipeline under validation (as of September 2011)	0.40
b. Estimated addition of average annual volume of potential CERs from CDM Pipeline under validation (until 2020) – based on past trends	0.16
c. Estimated total volume of carbon credits in the CDM pipeline (by 2020)	11.31
d. Assumed CDM drop-out rate	10%
e. Estimated share of voluntary carbon credits (by 2020)	1.13

The Ecosystem Marketplace annual report predicts (Peters-Stanley, et al. 2011) that the voluntary market will grow to 1.6 billion tCO_2e in 2020. This would require a significant step-change in the voluntary markets' share of the global carbon markets.

Voluntary markets transacted 2% of the volume in compliance markets in 2010 (Peters-Stanley, et al. 2011). We assume that 2% is also the voluntary market's share of the global REDD market and that this figure does not grow by 2020, and we use a mid-range, mid-term estimate of globally available supply of REDD-based reductions of 5.5 billion tCO_2e in 2020 (Madeira, Coren and Streck 2010), then a quick back of the envelope calculation shows that 2% of this 5.5 billion tCO_2e is 0.11 billion tCO_2e (c in Table 2). This 0.11 billion tCO_2e, equates to 6.9% (d in Table 2) of 1.6 billion tCO_2e, the projected size of the voluntary market in 2020.

Table 2. ***Description of figures for a back of the envelope calculation of total volume in the voluntary market***

Description	Quantity (billion tCO_2e)
a. Size of global voluntary market in 2020	1.6
b. Size of global REDD market in 2020	5.5
c. Voluntary market's share of REDD market in 2020	0.11 (2%)
d. REDD's share of voluntary market in 2020	6.9%

If only 6.9% of the 2020 supply for the voluntary sector will come from REDD, the sector projected to grow the most, it begs the question of where the rest of the supply will come from. One option, and perhaps the most apparent, is to shift the share of global carbon markets dramatically in favour of the voluntary sector, thus growing the voluntary market's share not just in absolute but also in relative terms.

Conclusion

REDD will no doubt dominate the market in years to come due to the large scale of emissions reductions achievable by REDD projects. Activity in the pre-compliance market should also increase, but excitement here should be tempered by the reality that a compliance market in REDD is still uncertain, no methodologies have yet been approved, nor have any limits been placed on REDD offsetting so as to avoid flooding of the compliance market.

Nonetheless, action directed by developers in California will be the area to watch, and whilst other sectors approved by CAR will begin to rise in the pre-compliance market – such as O_3 depleting and livestock methane – the potential inclusion of REDD in this scheme and its anticipated growth as a solely voluntary project, irrespective of pre-compliance projects, is likely to begin to shift the standards and methodologies used, and the dominance of the USA as the country of credit origin, towards REDD.

Excitement here should be tempered by the reality that a compliance market in REDD is still uncertain, no methodologies have yet been approved, nor have any limits been placed on REDD offsetting so as to avoid flooding of the compliance market.

It seems that the future of the carbon markets will continue to be shaped by the voluntary markets through their influence on standards, methodologies and technical infrastructure. As this continues, developing countries may adopt existing voluntary standards for domestic compliance regimes, whilst existing stakeholders at varying levels may consider consolidating existing standards with a view to centralising not only standards, but also their technical infrastructure, such as the

registries. Indeed centralisation of infrastructure becomes increasingly important in order to avoid double counting.

Furthermore, as activity in the voluntary market sector continues to grow in the coming years, it will not only need to increase in absolute levels but also to shift its contribution to the global carbon markets in favour of the voluntary sector, particularly if it hopes to contribute to emerging market mechanisms.

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Section 3

New instruments

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Sectoral Approaches as a Way Forward for the Carbon Market?

Abstract

For almost ten years now, there has been a discussion on how to scale up the project-based Clean Development Mechanism (CDM) or complement it with new carbon market mechanisms. This article aims to analyse to what extent the proposed new mechanisms do actually hold out the promise of improving and going beyond the current CDM. The article first considers how the new mechanisms would be defined and would operate based on the current status of discussions. Secondly, it analyses the possible advantages and disadvantages of the new mechanisms. Key questions in this respect are how robustly emission reductions could be quantified under the new mechanisms, what incentives the new mechanisms would provide for reducing emissions, and which sectors and countries would in practice be capable of and appropriate for employing the new mechanisms.

Introduction

For almost ten years now, there has been a discussion on how to scale up the project-based Clean Development Mechanism (CDM) or complement it with new carbon market mechanisms. The European Union even has the stated aim of completely phasing out the CDM in more advanced developing countries and instead move to sectoral approaches. This discussion is driven by the perceived weaknesses of the CDM regarding additionality, sectoral and geographical coverage and scale.

While this discussion was at first mainly academic, in 2005 it entered the political negotiations and ultimately led to the decision of the Conference of the Parties serving as a Meeting of the Parties to the Kyoto Protocol (CMP) in Montréal in 2005 to allow Programmes of Activities (PoAs) in the CDM. PoAs offer the opportunity to aggregate high numbers of small-scale decentralised activities into larger projects. At the same time, though, the conference also decided not to allow policies and

standards under the CDM, which had been one of the focus areas of the discussion thus far.

The topic was taken up again in the negotiations for a future climate agreement that was also started in Montréal. In particular industrialised countries are pushing for the creation of new carbon market mechanisms, and three main proposals have been put on the table: sectoral crediting (often also referred to as sectoral no-lose targets), sectoral cap-and-trade trading, and crediting of nationally appropriate mitigation actions (NAMAs) taken by developing countries. In addition to this top-down negotiation process under the UNFCCC, analysts are also considering the potential of PoAs and standardised baselines under the CDM to serve as a stepping stone to sectoral approaches.

This article aims to analyse to what extent the proposed new mechanisms actually hold out the promise of improving and going beyond the current CDM. The article first considers how the new mechanisms would be defined and would operate based on the current status of the discussions. Secondly, it analyses the possible advantages and disadvantages of the new mechanisms. Key questions

Table 1: ***Types of Mechanisms***

	What	Objective	Who
Programmatic CDM	Aggregation of many/ all possible activities in a sector or sub-sector, initiated by political or similar actor	Assisting Annex I countries in achieving targets cost-efficiently, contributing to sustainable development of host country	Private entities, governments
Standardised Baselines, 'Sectoral CDM'	Setting a baseline for all installations or activities in a sector or sub-sector in a country	Assisting Annex I countries in achieving targets cost-efficiently, contributing to sustainable development of host country	Private entities, governments
Sectoral Crediting	Decoupled from specific activities, credits are awarded if emissions from a sector are kept below a pre-defined level	Achieving large-scale net emission reductions in developing countries in the context of sustainable development, and assisting Annex I countries in achieving targets cost-efficiently	Governments, private entities?
Sectoral Trading	Decoupled from specific activities or policies, allowances are issued ex ante based on a sectoral target, with penalty for missing target	Achieving large-scale net emission reductions in developing countries in the context of sustainable development, and assisting Annex I countries in achieving targets cost-efficiently	Governments, (private entities?)
NAMA Crediting	Crediting of specific NAMAs or based on sectoral thresholds	Achieving large-scale net emission reductions in developing countries in the context of sustainable development, and assisting Annex I countries in achieving targets cost-efficiently	Governments, (private entities?)

in this respect are how robustly emission reductions could be quantified under the new mechanisms, what incentives the new mechanisms would provide for reducing emissions, and which sectors and countries would in practice be capable of and appropriate for employing the new mechanisms.

Defining Sectoral Approaches

Sectoral approaches have been discussed for almost ten years now in the hope that they will be able to deal with some of the shortcomings of the current CDM and allow for larger-scale emission reductions. However, a wide variety of concepts and definitions have emerged, with some concepts being the same as others but using a different label, and others using the same labels but referring to different concepts (for the early discussion where most of the key concepts were coined, see e.g. Samaniago and Figueres 2002; Bodansky et al. 2004; Cosbey et al. 2005; Bosi and Ellis 2005; Schmidt et al. 2006; Sterk and Wittneben 2006). Based on the ongoing discussions in the literature and the negotiations (see e.g. UNFCCC 2011), five basic types of mechanisms or proposed mechanisms to address the sectoral level can be distinguished, as illustrated in Table 1.

As noted in the introduction, PoAs were in fact an interim outcome of the discussion on sectoral approaches. Under a PoA, an unlimited number of projects – CDM programme activities (CPAs) – can be implemented and added to the PoA at any time over the lifetime of the programme. The individual CPAs are not subject to the same lengthy CDM processes as individual CDM projects. These streamlined processes are intended to reduce transaction costs and promote dispersed small-scale activities such as end-use renewable energy and energy efficiency projects.

In addition, PoAs may consist of concrete actions to implement policy goals, making it possible to fill the gap between the project and policy levels. Governments themselves may be PoA coordinators and directly coordinate activities under their policy framework. The potential is illustrated by a government-led PoA in India which aims at the large-scale distribution of compact fluorescent lamps. The PoA is coordinated by the Indian Bureau of Energy Efficiency, which has the task of accelerating market transformation towards energy-efficient appliances (Castro et al. 2011).

If a standardised baseline has low stringency, non-additional projects are able to claim credits, while with high stringency no projects may be feasible.

A recent study by Puhl et al. (2011) delves further into the possibility of scaling up PoAs. The study analyses four specific PoAs and shows how they might be scaled up to NAMAs. The authors stress that the streamlined PoA procedures lower transaction costs, shorten the time to market for carbon credits, allow for scalability and reduce the risks of non-registration. This in turn facilitates carbon finance and increases bankability. In addition, by designing a NAMA through scaling up an existing PoA, one can use existing technical expertise in design, implementation and measuring, reporting and verification (MRV), as well as government procedures. The study finds that PoA elements can indeed be useful as building blocks for NAMAs, in particular for defining eligible activities, baselines and MRV provisions, and that scalability is especially good if a PoA is based on standardised parameters and closely integrated with domestic policies. However, the study also notes that real-life experience with PoAs is still very limited.

Another approach that is based on the existing CDM is to establish standardised baselines, this

sometimes being referred to as 'sectoral CDM'. For example, Amatayakul and Fenhann (2009) propose a scheme based on a national CO_2 emission intensity standard (gCO_2/kWh) for new power plants. The climate conference in Cancún authorised the further development of standardised baselines. While standardisation has been present in CDM methodologies for some time already, for example in the form of grid and fuel emission factors, as in the case of PoAs it is still too early to see how far this approach can go. Butzengeiger-Geyer et al. (2010) note that standardised baselines are most feasible in homogeneous sectors with similar technologies. Even in sectors which are often seen as relatively homogeneous, such as cement, various technologies are in use, and emissions are also influenced by factors such as the quality of raw materials. They also note the difficulty of hitting the 'right' baseline level. If a standardised baseline has low stringency, non-additional projects are able to claim credits, while with high stringency no projects may be feasible.

In addition to these initiatives to scale up the CDM, the UNFCCC negotiations have mainly revolved around three proposals for new mechanisms: sectoral crediting, sectoral trading and NAMA crediting (see e.g. Parties' submissions in UNFCCC 2011).

Sectoral crediting would be based on an agreed emissions threshold or 'no-lose target' at the sectoral level. That is, countries would agree on a level of emissions for a sector. This threshold could either use absolute emissions or be intensity-based, for example, using emissions per unit of GDP, emissions per unit of electricity generated, etc. The developing country could then undertake actions to reduce its emissions to the agreed level, either unilaterally or with some international support. If emissions are reduced below the target, the developing country would receive credits. If the target is not achieved, there would be no penalties.

By contrast, sectoral trading would follow the cap-and-trade approach. The sectoral target would be a mandatory cap, and the developing country would receive tradable units ex ante, essentially equivalent to the assigned amount units (AAUs) industrialised countries receive under the Kyoto Protocol. If the country manages to reduce its emissions below its target, it would thereby achieve a surplus of trading units which it could sell. If the country does not achieve its sectoral target, it would need to buy trading units to cover the shortfall.

As for NAMAs, from the negotiations so far it appears that these will be defined very broadly to include any type of action that reduces emissions, from specific investments to national policies such as financial incentive schemes or regulations. The proposal to credit NAMAs therefore initially seemed to be related to earlier discussions about allowing the crediting of policies under the CDM. However, in most submissions of Parties the proposal for crediting NAMAs is hardly different from the proposals for sectoral crediting and trading. A country might implement individual NAMAs such as financial incentives or regulations, but crediting and trading would take place on the basis of a sectoral emissions threshold. One exception is South Korea, which in its recent submission does mention crediting individual NAMAs. South Korea distinguishes NAMAs where emission reductions can be measured more or less easily, and proposes to use 'success indicators' as a basis for crediting in the latter case. For example, credits might be issued on the basis of the percentage of energy-efficient appliances or the average carbon intensity of the vehicle fleet.

Among all these existing and proposed mechanisms to scale up the carbon market to the sectoral

level, a basic distinction can be made between approaches which retain the activity-based character of the CDM but use sectoral instruments, namely programmatic CDM and standardised baselines, and approaches that aim at the performance of a sector as a whole, namely sectoral crediting, sectoral trading and NAMA crediting. These approaches will only become possible under the UNFCCC if Parties manage to achieve a consensus in the current negotiations.

Given the limitations of space, and since all activity-based approaches are possible and indeed already being implemented under the current CDM, the following discussion will focus on the proposals for creating entirely new sector-wide mechanisms.

Potential Advantages and Disadvantages of Sectoral Mechanisms

In the discussion about new mechanisms, four main advantages are mentioned:

- Scaled-up mechanisms are supposed to mobilise carbon finance on a much larger scale than so far.
- It is hoped that at an aggregate level the new mechanisms will be better able to reach sectors the CDM has so far hardly tapped, especially transport and buildings.
- The new mechanisms are supposed to give incentives to developing countries to implement climate-friendly policies.
- Finally, it is hoped that at an aggregate level the mechanisms will be more environmentally robust than the project-by-project approach of the CDM.

The first three points essentially relate to the incentive structure that the new mechanisms would provide. The second point also relates to the approach to quantifying emission reductions, as MRV has been one important reason why implementing the CDM has so far been difficult in the transport and building sectors. The following will therefore discuss the incentive structures and MRV aspects of the proposed new mechanisms. A third factor that is important for points 1 and 2 is which sectors and countries would actually be able to make use of new mechanisms.

Incentives for Sector-Wide Emission Reductions

If implemented successfully, the proposed new mechanisms at sectoral level would by definition set incentives for sector-wide transformations in developing countries. Years ago authors were already arguing that sectoral approaches might specifically give a major boost to decentralised small-scale renewable energy and energy-efficiency activities or make it possible to implement fuel efficiency standards or comprehensive traffic management (Browne et al. 2005; Figueres 2005). This argument has been taken up again in recent years, for example, by Schneider and Cames (2009).

Sectoral approaches would operate at the government level, at least in the first instance, as private entities can hardly take responsibility for entire sectors. This would introduce an intermediary (the developing country governments) between the carbon market and those who actually undertake the investments. It would therefore be necessary for developing country governments to implement appropriate policies to pass the incentive on to investors or those affected by the policies. As an alternative to governments implementing policies, sectoral mechanisms may also be devolved to the installation level. These two cases of operation, government level and installation level, will therefore be discussed in turn.

In principle, operation at the government level need not be a barrier to achieving substantial emission reductions. Governments have a broad arsenal of policy tools at their disposal which they could use to reduce sectoral emissions below the baselines,

such as taxes, financial incentives, standards or infrastructure investments. Dransfeld et al. (2011) discuss nine possible configurations of how to use government policies and measures to pass the carbon price incentive on to private entities.

Nevertheless, the International Emissions Trading Association (IETA) is highly sceptical of government-level mechanisms. IETA (2010) highlights three key risks:

- Implementation risk: the risk that the developing country fails adequately to implement or enforce emission reduction policies and measures due to insufficient capacity, negligence, or institutional inertia;
- Default risk: the risk that, after issuance, the developing country fails to honour emission reduction purchase agreements into which it has entered; and
- Performance risk: the risk that the policies and measures used, despite being fully implemented and well enforced, fail to deliver the expected reductions.

The proposed new mechanisms at sectoral level would by definition set incentives for sector-wide transformations in developing countries.

IETA also cautions that the risks of government-operated mechanisms may be too high for buyers to be willing to provide upfront financing. IETA concedes that this option may nevertheless be the most attractive for developing country governments that prefer centralised control of their economy and have sufficient capital available domestically.

In addition, it may be questioned whether emission trading mechanisms would in fact constitute a strong incentive for governments to implement ambitious emission reduction policies and measures. The reliability of funding under crediting mechanisms is characterised by significant structural limitations related to the high levels of risk and uncertainty at various stages, relatively high transaction costs and complexity, and the timing of credit generation. Especially in developing countries, the financing need is most acute before the start of implementation. Emission credits, however, are only generated when emission reductions have already been achieved. In addition, the carbon revenue is subject to high risks. Ex ante, participants cannot be sure whether their project will be registered, whether it will actually achieve the expected amount of emission reductions and what price they will receive for the credits. Some critics claim that for these reasons the CDM is in fact hardly ever a make-or-break factor when deciding to proceed with a project and that this has been confirmed by project developers themselves (Haya 2009).

The sectoral trading proposal has been put forward as a solution to the upfront financing problem: if governments received trading units ex ante, they would be able to sell some of them and use the resulting revenues to finance their policies. However, governments may only wish to do this if they can be very sure that the planned policies will in fact be able to deliver the expected reductions, as otherwise they would ultimately need to buy back the trading units they had sold initially.

Due to these factors, Ward et al. (2008, p.71) question whether sectoral mechanisms would in fact provide a strong incentive for developing countries to implement climate-friendly policies: ‘As governments are not investing in policies and measures to speculate in carbon markets, the volatility of carbon credits may be a serious problem for governments.’ This limitation could probably only be overcome if Annex I countries were willing to provide significant amounts of upfront financing.

If a sectoral mechanism is broken down to the installation level, installation owners have a direct incentive to reduce emissions as long as their abatement costs are lower than the price of carbon. While not explicitly envisaged in the negotiation texts, not only sectoral trading but also sectoral crediting mechanisms could be broken down to the installation level (Marcu 2009). The process would be similar to an allocation in a cap-and-trade system, but instead of allowances, each installation would be given a crediting baseline. The regulatory risk would be much lower than under the CDM as there would be no issue of eligibility. Due to the low regulatory risks, top-down crediting at the installation level might even be able to actually drive financing decisions.

However, crediting individual installations on the basis of a sectoral target raises the question of how to handle a situation where individual installations reduce their emissions below their baselines, but the sector as a whole does not. If installations that reduce emissions ran the risk of not being rewarded because of the failures of others, the system would hardly provide an incentive to reduce emissions. The crediting of individual installations would therefore need to be decoupled from the performance of the sector as a whole. One option would be for the government to buy trading units to make up for any shortfall that may exist. Other options, which would probably be politically more acceptable to developing countries, would be to hold back a share of the credits issued to form a reserve, or to make the installation-level baselines mandatory, with penalties attached (Baron, Buchner and Ellis 2009; Helme et al. 2010; Marcu 2009).

Sectoral trading in the form of cap-and-trade at installation level would further simplify issues. As units are issued ex ante, they could be traded under standardised contracts. This would probably result in exchange-based trading, which would further facilitate the operation of the mechanism. Entities could manage their allowances as assets and sell them whenever they liked, rather than having to wait for the ex-post assessment of their performance. However, for most developing countries the adoption of binding sectoral caps is probably still far away (Marcu 2009).

Crediting individual installations on the basis of a sectoral target raises the question of how to handle a situation where individual installations reduce their emissions below their baselines, but the sector as a whole does not.

A final question related to the strength of the incentive is the price credits would fetch, which depends on the balance between supply and demand. Given the uncertainty about the future climate regime, any estimates are rather speculative. Nevertheless, given that industrialised countries' emission reduction pledges are currently rather weak, any demand for credits could conceivably by met by the project-based CDM.

Environmental Integrity

The proposed new mechanisms imply establishing the baselines or targets at an aggregate level instead of for specific activities. They would thus have the advantage of removing the necessity to determine the additionality of individual investment decisions. However, sectoral approaches also pose new challenges for baseline-setting.

The quantification of emission reductions at aggregate levels would have to rely on modelling and projections, which always possess a degree of uncertainty. Baseline projections need to be based on assumptions about the future impact of current policies, the development and penetration of technologies and the development of economic activity.

Uncertainties are likely to be especially great for countries that are growing rapidly and where the GHG-intensity of production can vary significantly over the period of the baseline projection, either through technology choice or technology developments. Also, many developing country economies rely heavily on manufacturing and commodities, which are more sensitive to economic fluctuations than service sectors. Growth rates are therefore more variable and difficult to predict in developing than in industrialised countries (Helme et al. 2010). Ellis and Moarif (2009) highlight an example from China, where in 2000 the IEA projected electricity generation of 1.5 trillion kWh in 2005, whereas actual generation in 2005 ended up at 2.5 trillion kWh.

Schneider and Cames (2009) discuss in detail the practical challenges associated with establishing reliable baselines. As it is not possible to verify assumptions on key emission drivers such as future economic growth and fuel prices, it may not be possible to assess proposed baselines purely on technical grounds and in an objective manner. One key political risk is that countries have an incentive to inflate their baselines in order to weaken the level of effort they have to make.

These problems can be avoided to a certain extent by using intensity targets, for example, in the form of emissions per unit of GDP, per unit of electricity produced etc. Changes in these key drivers of emissions would then be factored into the baseline. Intensity targets would probably also be more palatable to developing countries, as there would be no danger that the targets might become a 'cap on growth'. The disadvantage is that absolute targets provide certainty regarding environmental outcomes, whereas intensity targets do not.

Overall, it is not yet clear whether baselines at aggregate levels would be more reliable than project-by-project additionality testing. The experience of the EU ETS, the first large-scale real-case sectoral approach, also gives cause for caution. In its first trading phase from 2005 to 2007, the EU ETS was substantially oversupplied, in part due to faulty baseline data. The second trading phase is also set to be substantially oversupplied due to the impacts of the financial crisis.

Further complexities would arise if the scope of crediting NAMAs did include the crediting of individual actions. Specific actions can in principle be of two types, either specific investments or policies. Specific investments can be credited through the CDM, so in principle no new mechanism seems necessary to allow crediting of this type of NAMA. The possibility to measure, report and verify the implementation and impact of policies varies from case to case. In the case of a policy involving a renewable electricity feed-in tariff, one can straightforwardly count each kWh that benefits from the tariff and multiply the total by the respective grid's average emission factor. By contrast, while it is possible to determine whether a vehicle efficiency standard has been introduced and to measure whether transport emissions are declining, it is difficult to determine to what extent the decline of emissions is attributable to the policy rather than to other impacts, such as changing fuel prices. Further complexities would arise if governments implemented several overlapping policy-based NAMAs, for example, NAMAs tackling electricity supply and demand.

If policies are supposed to be incentivised through the carbon market, in many cases it may therefore be more straightforward to use a sector-wide approach, rather than try to pinpoint the reductions achieved specifically by a certain individual policy. This points back to the proposals which essentially envisage NAMA crediting as sectoral crediting or sectoral trading.

The Viability of Sectoral Mechanisms for Specific Countries and Sectors

The complexity of the proposed new mechanisms gives rise to the question of which countries would actually be able to make use of them. On the one hand, poorer countries might find it easier and cheaper to implement policies and measures than to try and attract individual investment projects. On the other hand, given the amounts of technical capacity and data required, it can be expected that only the most advanced developing countries would be able to make sectoral mechanisms work.

In addition, sectoral mechanisms may not be appropriate for every sector. Helme et al. (2010) examine the electricity, iron and steel, and cement sectors in Brazil, China and Mexico. They find significant limitations in data availability and, in some cases, host country administrative capacities, a wide range of efficiency performance across firms in the same sector in some countries – from world class installations to highly outdated ones – substantial administrative and policy barriers to the implementation of even low-cost mitigation opportunities in some cases, and weaknesses in the financial infrastructure needed to finance investments. Serious data gaps and uncertainties about projections became apparent, in particular in China, the world's largest emitter.

In a similar exercise, Butzengeiger-Geyer et al. (2010) examine six economic sectors in nine non-Annex I countries. Importantly, they find that most sectors in most countries are actually too small to warrant a sectoral approach. In most cases there are only a handful of installations, so a sectoral approach would have no advantage compared to the project-based CDM. Among the nine countries, generally only China and India have industrial sectors that are large enough to warrant sectoral approaches. However, here the problem is that the sectors usually consist of very efficient large installations on the one hand and large numbers of very inefficient small installations on the other. Effectively addressing emissions would mean including these small installations in a sectoral approach. However, this would cause high costs for the monitoring and verification of emissions.

Current Sectoral Market Initiatives in Developing Countries

While the UNFCCC negotiations to create new mechanisms are progressing very slowly, if at all, some non-Annex I countries are exploring options for domestic systems outside the UNFCCC framework (Sterk and Mersmann 2011). South Korea is most advanced, having already started two small voluntary pilot trading systems, and it is currently developing a 'Greenhouse Gas & Energy Target Management System' to ensure that the internationally pledged emissions reduction target of 30% below business as usual by 2020 will be met. The national target will be broken down to company level, and individual targets for the country's 470 largest emitters will be imposed. While this system will probably include only very little trading possibilities, it is supposed to form the basis for a full-fledged cap-and-trade emission trading system to start in 2015 (Reklev 2011a).

Sectoral mechanisms may not be appropriate for every sector.

China is currently envisaging developing several pilot systems at the city and provincial levels which are to form the basis for a national system that is to start in 2015. Pilot schemes are to be developed before 2013 and will be based on provincial energy consumption targets that are derived from the national energy consumption target of approximately four billion tonnes of standard coal in 2015. The designated provinces are currently envisaging very different design routes. For instance, Guangdong

is likely to put in place a trading system based on absolute emission caps, while Tianjin and Beijing have indicated that their trading scheme might be based on energy saving credits (Reklev 2011b). China has also recently announced intentions to impose absolute caps on specific industries such as steel and cement and to establish carbon trading programmes on that basis (Reklev 2011c).

Mexico's National Strategy on Climate Change (ENAC) of 2007 inter alia envisaged the creation of a sectoral system for the oil and electricity sectors with a view to the later integration of other sectors (Mexico 2007). However, the current Special Climate Change Program 2009-2012 (PECC) does not mention cap-and-trade as an option to mitigate GHG emissions domestically (Mexico 2008). Mexico's Expression of Interest to the World Bank's Partnership for Market Readiness envisages the development of credited NAMAs on energy efficiency in housing, appliances and other end uses, methane destruction or use in solid waste disposal, improved cement blended production, and urban transport. Mexico envisages part of the financing for these NAMAs coming from crediting, but the ideas revolve around improving national regulation or establishing local projects rather than introducing an emission trading system (Mexico 2011).

Looking at these initiatives, the question is if and how such domestic systems would interact with the UNFCCC system. As non-Annex I countries do not have legally binding caps, they also do not dispose of Kyoto-valid trading units which they could use to back up the trading units in their emission trading systems. To allow industrialised countries to purchase and use trading units from these systems, it would therefore be necessary to implement some form of certification of these systems under the UNFCCC. Interestingly, several of the recent UNFCCC submissions entertain the idea of such a decentralised system, as opposed to the centralised system of the CDM. The EU, Japan and Papa New Guinea envisage possibilities for both in their submissions, on the one hand a centralised model with a strong supervisory body, and on the other hand a more decentralised model, where the UNFCCC would define core rules, but host countries would have flexibility regarding the definition and functioning of the mechanism. Australia advocates a very flexible approach which would allow Parties to submit a broad range of market mechanisms under a 'common framework'. Des Sepibus and Tuerk (2011) discuss various options for centralised and decentralised governance systems for new mechanisms.

Conclusions

Industrialised countries in particular have strongly advocated introducing new emission trading mechanisms at the sectoral level. The expectation is that scaled-up mechanisms will be able to mobilise carbon finance on a much larger scale than before, be better able to reach sectors the CDM has so far hardly tapped, give incentives to developing countries to implement climate-friendly policies, and be more environmentally robust than the project-by-project approach of the current CDM.

Sectoral approaches would by definition be better suited than the CDM to achieving sector-wide transformations and might in particular give a boost to small-scale decentralised renewable energy, energy efficiency and transport projects. They would also remove the necessity for testing additionality on a project-by-project basis.

Sectoral approaches would probably operate at the government level, at least in the first instance, as private entities can hardly take responsibility for a whole sector. Hence, these approaches would introduce an intermediary (the developing country governments) between the carbon market and those who actually undertake the investments.

As the carbon market has anyway had difficulties so far in reaching some sectors such as the building or transport sector, sectoral approaches could potentially provide the necessary stimulus for developing country governments to introduce policies and measures such as building codes to redirect investments to these sectors. However, sectoral mechanisms would still retain the limitations of the current CDM in terms of only receiving the revenue ex-post and not being able to predict accurately how much revenue will be received. Developing countries would therefore need to prefinance sectoral schemes and run the risk of not being able to recoup their costs through emissions trading. These limitations could probably only be ameliorated if industrialised countries were willing to finance a significant part of the costs upfront.

For the energy and industry sectors, potentially sectoral schemes could immediately be devolved to the entity level through installation-level baselines or a domestic cap-and-trade emission trading system. Such installation-level schemes would give a direct incentive to companies to reduce emissions. Since eligibility would not be an issue, regulatory uncertainty for investors would be much lower than under the current CDM.

However, the quantification of emissions and reductions for sectoral approaches would have to rely on sectoral modelling and projections, which always possess a degree of uncertainty. Projections at an aggregate level may therefore be more reliable than project-by-project additionality testing, but on the other hand they might be even more unreliable. The history of over-allocation in the EU ETS gives cause for caution in this regard. It is therefore imperative to assess further the reliability of quantifying developing country reductions at the sectoral level before scaling up uncapped trading.

The first studies to have examined the applicability of sectoral mechanisms to specific countries and sectors have indeed found that data availability and reliability is a serious constraint in many countries. They have also found that in many countries the relevant sectors comprise only a few installations so that there would not be a great advantage compared to the project-based CDM. At the other end of the spectrum China and India have large sectors, but these are very diverse, being composed of very modern large installations on the one hand and very small and inefficient ones on the other. Including these small installations in sectoral mechanisms would be recommendable in terms of achieving emission reductions but would substantially increase the effort necessary for data gathering and continuous monitoring.

Who is supposed to buy the hoped-for flood of credits from sectoral approaches?

One may therefore conclude that sectoral mechanisms are interesting, but for most countries actual implementation will probably not be feasible before the middle of this decade, even in purely practical terms. Butzengeiger-Geyer et al. (2010) estimate that, once a mechanism has been agreed, developing detailed rules would take three to four years, while collecting data for baselines, agreeing on the baseline and establishing an MRV system would take at least another four years.

On the positive side, the Cancún Agreements and the ongoing process under the UNFCCC may provide the opportunity to address the data problems. Under the Agreements, developing countries have committed to submitting national communications including emission inventory reports every two years, while Annex I countries have pledged to provide 30 billion USD in fast-start financing until 2012 and to mobilise up to 100 billion USD

per year jointly by 2020. Building the necessary capacity to measure, report and verify emissions reliably should be made one of the priority uses of this funding in the years to come.

In addition, while for most developing countries sectoral mechanisms are probably a rather distant prospect, some countries such as China and South Korea are actively considering the introduction of domestic multi-sector emission trading systems. While it remains to be seen how quickly these schemes will actually develop and how robust they will be, Parties are already considering ways to accommodate such bottom-up systems within the UNFCCC.

Nevertheless, for the foreseeable future this will at best apply to a handful of developing countries. As an alternative to sectoral approaches, some analysts see substantial potential in scaling up the CDM through PoAs and standardised baselines. However, real-life experience with these instruments is still limited, so it remains to be seen whether they can indeed become stepping stones towards comprehensive sectoral approaches. Other analysts point out that even sectors such as cement are not as homogenous as has sometimes been thought, so the challenge to develop standardised baselines on a sectoral scale may be almost as formidable as developing new sector-wide mechanisms. To cover all developing countries and sectors with adequate support mechanisms, substantial efforts should therefore also need to be invested in supporting comprehensive transformational NAMAs through fund-based financing instruments.

A final question is who is supposed to buy the hoped-for flood of credits from sectoral approaches. Based on the currently rather low level of ambition reflected in industrialised countries' targets, any demand for credits might easily be met by the existing project-based CDM. Making large-scale sectoral approaches work would therefore require substantially strengthened industrialised country targets.

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Bangkok Climate Change Talks

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The Durban Outcome A post 2012 Framework Approach for Green House Gas Markets

Abstract

Among the cornerstones of the climate regime that is emerging post-2012 are the new market mechanisms that will help developed countries meet their commitments, as well as provide developing countries with the opportunity to innovate and find new actions to contribute to the challenge of climate change. They are expected to differ from what we have used during the first commitment period of the Kyoto Protocol in a number of ways. First, they will depart from the top-down only definition and approval by the meeting of the Parties to the Kyoto Protocol (CMP), and allow for far more innovation by all Parties in the design stage. Secondly, they are also likely to depart from the project-by-project approach of the CDM (Clean Development Mechanism) and JI (Joint Implementation), and cover broader sectors of the economy. Finally, an offset-only system is not expected to survive post-2012, since the need to go beyond that and achieve the next round of emission reductions will be an important characteristic of any new mechanisms that emerge. To conclude, there are many challenges, but also many opportunities, in designing and operationalizing this new market architecture.

Introduction

This paper will analyze the challenges involved in producing new market mechanisms that will allow the level of ambition that is emerging post-2012 to be met, which must be much higher than in the first commitment period of the Kyoto Protocol. The paper offers the vision that we are moving into a world where a greater variety of actions will be developed, which will be healthy, as it will allow a market place of ideas to emerge from which Parties can choose those that meet their local realities, from a top-down approach only to an approach that is both top-down and bottom-up.

At the same time, the paper discusses the framework, and its governance, that will allow the challenge of trying to glue all these new approaches into a coherent system to be met, one that will ensure environmental integrity, that 'a ton is a ton', that units are fungible across systems and that we have a deep and liquid global market place, well regulated, that will be efficient and deliver environmental objectives.

Finally some of the challenges of meeting the fundamental conditions that will make such an approach viable are discussed, such as providing predictable and transparent approaches for market intervention to ensure a well-functioning market place, technology neutrality, going beyond simple offsetting, and providing the right incentives for all actors, including the private sector, to participate.

Background

The 1997 Kyoto Protocol (KP) provided a complex, but orderly framework for the implementation of the UNFCCC, which was negotiated as part of the 1992 Rio Conference. It essentially provided for targets (according to the principle of common but differentiated responsibilities), timetables and the instruments to reach those targets. Markets, and the market mechanisms that the KP provided, were not always an obvious outcome of the Kyoto negotiations, and only came in after heavy lobbying by some Parties, especially the United States.

Whatever else can be said about the KP, it cannot be denied that it provides a clear top-down model, one that has coherence and cohesion provided by the Assigned Amount Units (AAUs) that formed the backbone of the KP accounting system and allowed for the further development of a nascent greenhouse gas (GHG) market. The world was clearly divided between high income, high emission countries, which could use international emissions trading under Article 17, and low income, low emissions countries able to use the offset mechanisms of CDM and JI.

The offset mechanisms provide revenue for developing countries to develop and have the ability to take on targets as points in the future, while the offsets allowed developed countries to meet their obligations at a lower compliance cost.

The logical result of the KP was a two-layered GHG market architecture that was tied together by the offset mechanisms. One layer was Article 17 on trading in AAUs between Parties that were in Annex 1.

Underneath Article 17 trading a second layer developed, as the EU introduced a Domestic Emissions Trading Scheme (DETS) to meet its KP obligations, allowing installations to trade with each internal EU compliance unit. There was the full expectation that other Annex 1 countries would follow suit and then link their DETS with the EU one. AAUs shadowed the internal EU compliance units, the EUAs, which allowed for KP accounting reconciliation.

CDM and JI sat in the middle and were accepted both for sovereign compliance under Article 17 and EU compliance under EU ETS.

It was a great disappointment when it became evident that, with the notable and laudable exception of New Zealand, no other developed countries developed their own DETS. Some came close, but the systems never became operational.

Post-Copenhagen and post-Cancun, as we approach the 2012 end of the KP First Commitment Period, defining a future for the GHG market becomes more critical. Substantial resources and energy have been poured into creating the market reality that exists today, systems and infrastructure built, lessons learned. All this must not be lost, and the post-2012 architecture will need to take into account not only the political and economic realities of the end of the first decade of the 21st century, but also what we have on the ground, and what we have learned over the last six years from a functioning GHG market.

Current GHG Market Situation

The GHG market developed on two pillars – the EU ETS and the two KP offset mechanisms, CDM and JI. However, a number of important lessons need to be learned and considered when we start thinking of a post-2012 GHG market.

The EU ETS started by learning much about the importance of good fundamentals, such as baselines, banking from one period to another and registry security. It can be said that the EU ETS has gone through growing pains but has resulted in a well-functioning market, one that responds to economic signals. The types of issues that we faced did not shake confidence in the concept, but were sometimes painful and were clearly exploited by some. The importance of good infrastructure and an experienced regulator with good and tested market practices must be the lesson learned.

A second reality is that the result of an incomplete KP, with major Parties staying out of the Protocol, was that ad hoc measures had to be applied to the EU ETS to try and adjust for this situation, and also to provide assistance in arriving at price that would drive GHG reduction measures at EU installations. The implementation of what are perceived to be ad hoc regulatory measures in a pure regulatory market has created a state of uncertainty and some lack of trust on the part of market participants.

While most of the time the market was driven by real market drivers such as the price of other energy commodities, the weather, economic growth and hydroelectric conditions, regulatory decisions also played an important part, maybe too much so.

Towards the end of the second ETS compliance period, new EU legislation brought some questioning of the stability of the instrument in the long term. While unrealistic, this was to some degree driven by the unease in a market that had already been hurt by the financial crisis and the lack of response from other developed countries in establishing a price for carbon comparable to the EU ETS.

The lessons learned are the importance of good regulation, and of insuring that the national and international frameworks have enough flexibility to adapt to national changing international and national political circumstances.

CDM and JI are not an afterthought, as they impacted in a major way on the influence that markets exerted during these years on the climate change agenda, the image of markets and the supply-demand balance. Both extremes of the political spectrum amplified and used questions about CDM to attack the very heart of the GHG market concept, which they disliked for more fundamental reasons, such as the transparency that markets bring to environmental compliance or opposition to markets in general. To some degree this was the

result of the questioning of the KP structure itself and changing economic and competitive positions over the past fifteen years.

The lessons learned are the importance of good regulation, and of insuring that the national and international frameworks have enough flexibility to adapt to changing international and national political circumstances.

What CDM and JI has taught us, and what needs to be incorporated into future designs, is the need for a balance between economic incentives and environmental perfection, the need to provide incentives and unleash the entrepreneurial spirit to drive in GHG mitigation, the fact that pure offsetting is no longer an acceptable approach except for the least developed and most needy countries, and the importance of public support driven by simplicity and environmental credibility.

The Post-Cancun Agenda

The Conference of Parties (COP- 16) to the UNFCCC in Cancun decided to consider, at its seventeenth session in Durban, the establishment of one or more market mechanisms to enhance the cost effectiveness of the Convention. These new approaches are an important part of the Bali Road Map and an important element in the architecture that is emerging from the Long-term Cooperative Action (LCA) negotiations.

This was not an easy decision, as some Parties saw the discussion on markets as undermining the very principles of the UNFCCC and felt that it was premature to enter into these negotiations in light of the lack of any serious mitigation commitments by developed countries. Those that supported the new market initiatives did not have the opportunity to articulate detailed views during Cancun, with some thinking emerging in the submissions provided during 2011 in response to the Cancun mandate.

Questions were raised about the contribution to the environment of the existing mechanisms. One additional and very relevant question was that of need for new market approaches given the perceived current oversupply and the unknown source of new demand. Indeed, why create new machinery if the product is not needed?

Parties should continue to support and improve existing mechanisms, learn from the experience gained from them and promote the development of new mechanisms. The three Kyoto Protocol mechanisms were built for the level of ambition of the Protocol. Meanwhile, the science is indicating that we need to ramp up that level of ambition with a target of 350 ppm. The agreements in Cancun point to an objective of 2 degrees Celsius, which, many feel, the current mechanisms effectively cannot cope with on the required scale of collective effort.

In addition, the required effort will need significant resources. As the demand on scarce public resources increases, the use of market approaches can encourage effectiveness and efficiency, as well as harness the entrepreneurial innovations of the private sector.

Copenhagen, and then Cancun, seem to be offering the glimpse of a world that will be different from the Cartesian world in which we have been living since 1997. The lack of a binding international agreement that would allow for the continuation of the coherent KP double-layered market architecture and the emergence of NAMAs as a developing country contribution to mitigation actions point to the emergence of a bottom-up approach.

The development of new approaches for GHG markets has not progressed much at the international multilateral, regional, national or subnational levels. What we see are tentative steps for the development of national initiatives, which, however, due to the lack of a clear international framework, are moving independently.

A number of initiatives, such as the World Bank's Partnership for Market Readiness (PMR), have emerged, which while not specifically wanting a coordination role - may end up filling that demand as the need increases. There is a clear need to ensure that ideas that emerge can be fitted into a framework. That framework can be created to bring together national market initiatives and give them coherence, a development that will start through bilateral and small multilateral agreements. Such an approach will take time and will lead, during this transition period, to a market that is not as efficient and effective as it could or should be and that will detract from its contribution to sustainable development.

The alternative is to put in place a framework under which a credible market place of ideas can emerge, one that is flexible and decentralized, without compromising its environmental credibility.

The future market architecture also needs to find a way to reconcile the need to allow a number of potentially contradictory forces.

- An important priority is the desire to maintain a tight control over the quality and environmental integrity of any units that are used to meet commitments under any post-2012 regime. Simple bilateral agreements, without any international quality control, do not meet this criterion.
- Developing countries wish to be able to choose the type of mitigation actions that they find acceptable for their national circumstances and to choose how they define sustainable development.
- There is a strong interest in also ensuring national control over low-cost abatement and how it is used.
- The modalities of financing the mitigation actions of developing countries is another issue.
- Good market functioning, smart regulation and transparency are seen as essential.
- Allowing national characteristics to play an important role and the creation of a market place of ideas are also important characteristics of an outcome.

Cancun Agreement

Agreement was reached in Cancun on a number of topics that are important to reiterate. Under 'Nationally appropriate mitigation actions (NAMAs) by developing country Parties', Cancun:

61. *Also decides* that internationally supported mitigation actions will be measured, reported and verified domestically and will be subject to international measurement, reporting and verification in accordance with guidelines to be developed under the Convention;

62. *Further decides* that domestically supported mitigation actions will be measured, reported and verified domestically in accordance with general guidelines to be developed under the Convention;

Under 'Various approaches, including opportunities for using markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries':

80. *Decides* to consider the establishment, at its seventeenth session, of one or more market-based

mechanisms to enhance the cost-effectiveness of, and to promote, mitigation actions, taking into account the following

It is therefore envisaged that the new needs for mitigation efforts will lead to a number of new approaches/mechanisms that will be appropriate for the national circumstances of each country's NAMAS

- *Some NAMAs* could be financed through the sale of resulting reduction from market-based NAMAs as credits in international carbon markets (carbon market-financed NAMAs)
- Some of the *credits resulting from* market-based NAMAs could be allowed by Parties for use in international markets.
- Which market-based NAMAs are allowed by Host Parties for use in international carbon markets is a matter of Party choice.

Framework for Post-2012 GHG Markets

The current situation and future trends described above point to the need for an international framework under the UNFCCC, which will allow a top-down approach to coexist with a new bottom-up reality. Under this approach, the UNFCCC could define the framework under which market NAMAs are defined, to be used in the international GHG market and for UNFCCC compliance while allowing a level of decentralization that meets the aspirations of individual Parties.

Such a framework will contain a number of critical elements:

- Market approaches that will be defined both top-down and bottom-up.
- A regulatory Board that will ensure coordination between all emerging market mechanisms.
- A body that will play the role of a carbon bank to ensure that any intervention in the market is done in a predictable and transparent manner.
- Market-based NAMAs will be adopted and implemented by Parties from a menu of top-down and bottom-up defined NAMAs, on a voluntary basis by Parties, according to:
  - The desire of Parties to make use of mechanisms.
  - Parties meeting certain criteria that would qualify them to apply that particular type of NAMA – similar to qualifying for ET and JI T1 and T2 under the current KP mechanisms.
  - Using low-cost abatement NAMAS for domestic purposes and high abatement cost NAMAs for international markets is a strategy that ought to be considered, but the choice should remain a Party-driven choice.

At this stage, one can say that a number of options are being profiled, a relatively 'loose' approach, one under which there is no central review and approval process, and where Parties provide information on what approaches they will use. The consistency and strictness would emerge through the willingness of the Parties to ensure their good behaviour in a voluntary way and their strong desire to ensure that they meet standards that are in line with the expectations of the global community.

At the other end of the spectrum, the international community would provide for the recognition and definition of a limited number of approaches. These new approaches would be defined internationally to a large degree, but would also allow for Parties to adapt some of their elements to local conditions. This is to ensure that there is strong environmental integrity and consistency in the units that emerge, especially as buyers wish to see a guarantee of quality and to avoid political pressure to allow less than solid systems to be approved. Some of the flexibility and innovativeness is sacrificed to ensure quality control.

Finally, an intermediate approach seems to be on offer, one which creates a framework or proposal that would allow any new approach to be considered and vetted in a systematic way. This would, or could, combine the desire for flexibility with the desire for environmental integrity. Some would argue that political reality will get in the way of such a design and that the political pressure to approve approaches that are less than strict may become hard to resist at some point. In addition, those Parties that have developed approaches that create the demand may not welcome the need to take the politically difficult decisions that would lead to the banning of some units from their markets. The bitter debate over Qualitative Restrictions for CERs from HFC projects is much too recent for many.

Top-down Market Mechanisms will be *defined and approved by the COP* and can take two forms:

- *A specific, well-defined mechanism* that can be applied by each country on a voluntary basis. Such a mechanism will be well defined *and applied as is* by each Party that is willing to do so. An example of such an approach could be a CDM-like mechanism.
- *A more general COP definition* whereby the COP provides the general outline and protocols to ensure consistency and environmental integrity, but that allows flexibility for each Party *to adapt it to its national circumstances.* A sectoral crediting mechanism, whereby each party defines how it will incentivize the participation of the private sector in its country could be a good illustration.
- *Potential top-down mechanisms.* Some top-down mechanisms, like those mentioned below, have been extensively mentioned without ever being seriously elaborated in detail or tested in the field.
- *Crediting approach.* Under such a mechanism, at the end of the period, emissions from a defined area of the economy (subsector defined regionally, one sector, multi-sector etc) are compared to an ex-ante defined baseline. The quantity of emissions under the baseline will be credited. This could be a no-lose target, in that there will be no consequences for emitting above the defined baseline. There will have to be significant flexibility for national approaches regarding how such an approach is implemented, while ensuring both consistency and environmental integrity.

The alternative is to put in place a framework under which a credible market place of ideas can emerge, one that is flexible and decentralized, without compromising its environmental credibility.

- *Trading approach.* Under such a mechanism, a cap (national, sectoral, subsectoral etc.) is defined ex-ante. The allowances issued can be sold in the global market for emissions rights. If emissions at the end of the period are above the defined cap, then that party must purchase the equivalent number of emissions in the market. Flexibility will have to be provided to Parties on how they implement such an approach, taking into account national circumstances.

Bottom-up approach will emerge at the country level. Each country may innovate, and find new ways, to implement international market NAMAS that can meet its national circumstances.

Units created through these NAMAs could follow different national Protocols, and as such the comparability of these units ('a ton is a ton'), will not be addressed without any international coordination.

One of the key conditions for the effectiveness and credibility of these new NAMAs is to ensure

the environmental integrity and credibility of the whole system if the created units are to be used to meet developed country commitments.

In order to ensure a common protocol for issues such as addressing double counting, monitoring, reporting and verification (MRV), baseline definition, additionality etc. depending on the type of mechanism envisaged, the COP will have to approve standards, protocols etc. that will ensure that 'a ton is a ton'. These NAMAs will have to be validated and accepted under international rules approved by the COP.

The current situation and future trends described above point to the need for an international framework under the UNFCCC, which will allow a top-down approach to coexist with a new bottom-up reality.

For both top-down and bottom-up approaches, the COP and its international regulator will approve the 'mechanism/system' and not individual projects or activities that result in reductions. The international level of regulation will play the role of defining the minimum conditions for the recognition of a market mechanism, and approve the mechanism itself. This will result in significant amount of flexibility and decentralization.

Market Standard-Setting Board (MSSB) will be created as a body under the COP and will be the global regulator for market approaches under the UNFCCC. The MSSB will:

- Administer and apply the standards that the COP develops.
- Administer the mechanisms that are created top-down by the COP.
- Provide guidelines for their implementation at the national level according to national circumstances of top-down developed mechanisms.
- Examine new mechanisms that are emerging as NAMA market mechanisms to ensure that they meet COP-defined criteria and approve them for use by Parties
- Define and recommend to the COP conversion factors to allow conversion from different based units resulting from different mechanisms to tons of CO_2 equivalent.
- The MSSB would play the critical role of SMART global market regulator to ensure coherence at the global level that must work hand-in-hand with the flexibility that Parties must develop in implementing measures that are nationally appropriate.
- Provides for transparency and ensure that 'a ton is a ton'.

Stimulating mitigation action across broad segments of the economy

Experience with CDM-type mechanisms has discovered that they have stimulated action globally and directed flows of funds to mitigation actions. At the same time, the level of ambition that can be achieved under such mechanisms is limited, given the project-by-project approach and the need for complexity in the system to process a large quantity of projects and ensure their environmental integrity.

The required mitigation actions need scaling up and must have the ability to influence changes that are material in the efforts to reach the levels of mitigation required by science.

It is envisaged that such new market-based mechanisms would cover broad sectors of the economy, possibly being at the intersection of one sector, multi-sector, or subsector with national and subnational sectors, etc.

To facilitate environmental integrity, all actions would need to be reported within the context of a National GHG Inventory Report, applying the most recent International Panel on Climate Change (IPCC) Guidelines. Finally, how to define the covered sector of the economy will be the prerogative of the Party implementing the market-based approach.

Compliance and Reduction Objectives

Project-based mechanisms such as CDM lead to contractual-based compliance to deliver emissions reductions between two or more Parties, whether business and/or public bodies. National compliance comes through the obligations of the Designated National Authorities (DNAs), but Parties take on no obligations to deliver and or monitor the delivery of reductions.

The new market-based approaches will require state actors to play an important role and, under either the crediting or trading type of mechanism, will have to have responsibility for compliance with reduction objectives.

The reduction objectives selected can be absolute or relative, this being the choice of the Party implementing the market-based approach.
Reduction objectives can be:

- *Non-Loose,* where non-attainment does not lead to any penalties or obligations, OR
- *Mandatory* (such as under trading described in 18a above), where allowances may need to be purchased to meet an agreed objective).
- Meeting reduction objectives will be the obligation of the Party implementing the market-based approach.

To ensure environmental integrity, such reduction objectives could be guaranteed by an international institution (GEF, WB) or through the Green Fund. For purposes of illustration:

- A party could implement a market-based approach in the form of a trading scheme.
- As part of this approach, it would distribute allowances ex-ante to the companies or installations covered, in a manner consistent with its national priorities and circumstances (grandfathering, auctioning etc.).
- These enterprises would sell the units in the international market and then out to be short at the end of the compliance period.
- The Party would then be responsible for ensuring that the reduction objective is met by purchasing credits in the international market.
- Should it not be able to do so, it would undermine the environmental integrity of the approach globally.
- An international institution (GEF, WG, Green Fund) could guarantee that a Party implementing such an approach would be able to meet its target/objective.

One of the key conditions for the effectiveness and credibility of these new NAMAs is to ensure the environmental integrity and credibility of the whole system if the created units are to be used to meet developed country commitments.

Reduction objectives can be expressed in different units depending on the type of market-based mechanism employed. For purposes of illustration:

- GHG emissions trading, cap & trade-type mechanisms would be expressed in tons of CO_2.
- Energy efficiency trading schemes could be expressed in other units.
- It would be the responsibility of the MSSB to establish protocols leading to exchange factors resulting in conversion of all units to tons of CO_2.

Incentives for Business to Participate

The role of market-based approaches is to ensure efficiency and effectiveness and to capture the entrepreneurial innovation of the business sector and stimulate direct flows of finance to clean energy and other such areas, where it would not otherwise flow.

The new market-based approaches will have to be designated such that they incentivize the participation of the business sector at both the national and international levels.

The engagement and participation of the business sector, within the framework that is nationally appropriate and defined by each Party, is critical.

The new market-based approaches will have to be designated such that they incentivize the participation of the business sector at both the national and international levels. They will have to ensure that individual enterprises have direct incentives to contribute to meet the objectives set by the Parties in the market-based NAMAs.

Technology Neutrality

Market-based approaches will have to be defined by national priorities and circumstances.

Each Party will have its own technology preferences and priorities defined by, among other things, its expertise, natural resources and historical circumstances. Sustainable development criteria will be defined by each Party.

The criteria for recognizing the credits produced by NAMAs for use in the international market will be technology-neutral, allowing for new ideas and approaches to be developed in areas such as mitigation, developing new or maintaining existing sustainable development pathways and CO_2 absorption through natural or technologically innovative means.

Ensuring a Net Decrease in Emissions

Market-based reductions must generate real emissions reductions, beyond offsetting. For this purpose the baseline must be ambitious and go beyond business as usual.

In the case of crediting, for example, two baselines will have to be defined.

- One baseline will be for business-as-usual thresholds (BAUT) that will recognize the additionality of the approach.
- The second will be the crediting threshold (CT), which will be lower than the BAU.

This will allow for developing country Parties to claim as their own contributions those emissions reductions that are between the BAU and the CT. Internationally generated and used carbon finance units would be between the ACTUAL emissions line and the CT.

Capacity-building

The CDM and JI experience has shown the importance of capacity-building in implementing market based approaches.

This was seen in developing DNA capacity, Designated Operational Entity (DOE) non-Annex 1 basis capacity and the capacity of the business community in both developed and developing countries.

The capacity of the regulator to address the issues it has faced has been more complex than expected and full use was not made of lessons learned from existing national and international regulatory regimes and institutions.

Where there was need for data collection, the complexity of accessing and using such confidential data became painfully clear.

All of the above will apply to the new market-based approaches proposed above, only in much greater complexity in many cases, especially in terms of:

- Data collection
- Recognition of national approaches internationally while ensuring environmental integrity
- Capacity-building
- Designing new approaches and tailoring existing ones to meet national circumstances

Capacity-building is a prerequisite for the development, deployment and implementation of such market-based approaches.

International institutions will have to be designated to provide the finance and the expertise in this area, while avoiding duplication and reinventing or rediscovering existing knowledge and experiences.

Conclusions

New market mechanisms will form an important part of the package of any post-climate regime. We have learned valuable lessons from this first period, but the most valuable lesson is the reality of a political and regulatory market, and the need to acknowledge and address that. Trying to pretend that this is a 'normal' commodity market will only result in outcomes and actions that will, in the end, damage environmental credibility and good functioning.

The key will be in allowing as much flexibility as possible, while balancing that against the realities of capacity to develop new mechanisms and the need to find an acceptable level of intrusiveness.

All this is possible, but will require a significant departure from deeply held beliefs by many Parties. Are they ready to compromise in Durban?

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This year's Perspectives from UNEP and its UNEP Risoe Centre focuses on the mushrooming of initiatives that are filling the global vacuum while waiting for a post-2012 climate agreement. These may provide the building blocks and lead the way for carbon markets in the future. Local and regional initiatives have emerged in countries like India, South Korea, China, Japan, Australia, Brazil and others. Compared to the situation prior to negotiating the Kyoto Protocol, the international community may find that it no longer shapes the global carbon market, but will need to find ways of integrating the market fragments that have already established themselves.

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