CLIMATE FOCUS

ECOFYS

GtripleC

THE ROLE OF *SECTOR NO-LOSE TARGETS* IN SCALING UP FINANCE FOR CLIMATE CHANGE MITIGATION ACTIVITIES IN DEVELOPING COUNTRIES

Prepared for the

International Climate Division
Dept for Environment, Food and Rural Affairs (DEFRA)
United Kingdom

Editor and Convening Lead Author:
Murray Ward

Main contributing authors:
Charlotte Streck
Harald Winkler
Martina Jung
Markus Hagemann
Niklas Höhne
Robert O'Sullivan

MAY 2008

Acknowledgements

This paper has benefitted significantly from the contributions to a separate paper *Emerging program based and sectoral approaches for investment in climate change mitigation activities – and their interface with the World Bank's new Carbon Partnership Facility*.

That paper, prepared for the Carbon Finance Unit of the World Bank, was written during a similar period by some of the same author team as this paper, and also by:

- Jose Alberto Garibaldi, Energeia – in particular on developing countries adopting a strategic *program approach* to encouraging low carbon investments
- Kate Hampton, Climate Change Capital – in particular on the private carbon finance sector's views of new *compliance carbon* policy tools for scaling up investments

The paper has also been improved by very helpful review comments on earlier drafts from DEFRA and Maria Paz Cigaran, Joergen Fenhann and Richard Baron.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The big picture context

Some stark facts face the international community. To have a reasonable probability of keeping average global warming below 2°C we need what the IEA in its new *Energy Technology Perspectives 2008* study refers to as "a new energy revolution".

This reaffirms information provided in the IPCC's Fourth Assessment Report. These reports, combined with others such as the UNFCCC report in 2007 on Investment and Financial Flows and the McKinsey cost curves, provide a clear and consistent picture:

- We already have commercially available all of the technologies and systems that, deployed at scale and globally, could lead to the needed peaking of global emissions in the next one to two decades.
- Additionally there are some key technologies, in particular carbon capture and storage, that in the next one to two decades need to be commercially proven at scale, so that in the following decades the world can transform its energy systems to enable global greenhouse gas emissions to be reduced at least in half by 2050, and more thereafter.
- The additional needed investment and financial flows in low carbon technologies and systems (e.g. in 2030 to reduce global emissions to today's levels by then) are large by today's measure, but only a tiny fraction of total global investment (under 2% in 2030).
- Much of the location of the needed deployment of low carbon technologies and systems in the next one to two decades, and in the longer term, is in developing countries. This is because of the rapid expansion of energy systems infrastructure due to:
    - population and economic growth;
    - the rural-to-urban population shift;
    - the fact that developing countries are increasingly manufacturing the energy intensive goods consumed by the industrialised world;
    - and, **critically**, the need for improved energy services to alleviate poverty.

In the light of this challenge, the international community is moving towards the next (post-2012) 'global deal' on mitigating greenhouse gas emissions – and adapting to the effects of climate change made inevitable by emissions that have already occurred and those that will even as we mitigate emissions. The UNFCCC 'Copenhagen Agreement' sought by the end of 2009 will be the centrepiece of any such global deal.

A particularly challenging aspect of any such agreement and deal is the role that developing countries will play in the global mitigation effort. Any agreement that includes emission reductions in defined sectors in developing countries must be complemented with appropriate financing mechanisms. Traditional sources of funding, e.g. pledged additional funds by industrialised countries administered by the GEF, are inadequate for this purpose. In particular they lack the scale necessary by at least an order of magnitude.

New sector based policy instruments for developing countries

There are a number of possible forms of sectoral agreements that together can help provide the comprehensive coverage of sectors and sources where abatement potential exists in developing

countries – assuming adequate financing support is forthcoming. Two, in particular, that can be seen as mutually supportive, are Sustainable Development Policies and Measures (*SD-PAMs*) and Sector No-Lose Targets (*SNLTs*), the focus of this paper. *SNLTs* would be targets taken on voluntarily by some developing countries for some sectors. The 'no lose' feature means that developing countries would not face compliance penalties if they did not meet their *SNLTs*.

A key distinguishing feature (which also speaks to the complementary nature of these two policy instruments) is that the support for *SD-PAMs* would not come from carbon finance whereas *SNLTs* is specifically conceived as a scaled-up carbon finance mechanism. Such mechanisms exist in the context of 'cap and trade' emissions trading schemes for industrialised countries, complemented by schemes that allow credits to be generated through emissions reduction and sink enhancement activities in developing countries. *SNLTs* do this at the sector level.

Scaling up of the magnitude required will require very purposeful programs that aggregate on-the-ground activities in ways never previously achieved. A policy tool such as *SNLTs* not only needs to be seen as just one 'compliance carbon' policy tool among a number of others, but the role and applicability of carbon financing needs to be seen in a broader strategic sense – i.e. as just one of many elements. By taking a strategic *program approach* to low carbon investments, it can be expected that all elements, and all carbon finance policy tools, can operate at a scale thus far not achieved.

The feature that particularly distinguishes *SNLTs* from CDM-type policy instruments is that once *SNLTs* are agreed as part of a quantitative multilateral agreement the concept of additionality no longer applies – nor any of the CDM institutional constraints that go along with this. This is because in the quantitative elements of the post-2012 agreement the fixed and binding targets of industrialised countries would be set in the light of the scale of credits that would be expected to be generated by *SNLTs* from developing countries – as indeed they are in the light of each other's targets. So *SNLTs* (and the credits that may stem from them) are explicitly accepted and factored into the elements of the overall agreement that set a quantitative emissions outcome.

It can be expected that developing countries may be attracted to consider *SNLTs* in sectors for which they seek significantly scaled up private sector investment according to their sustainable development priorities, and where current carbon market policy tools, such as the various forms of CDM, are not considered adequate to the task.

But, *SNLTs* are unlikely to be feasible for all key sectors, and even for those sectors where they may be feasible, this may not be true in all developing countries. Like all credit based mechanisms, it is necessary with *SNLTs* to establish (and have agreed) a baseline, and then measure (and report and verify) performance against this. Given that the use of this tool is in developing countries, the performance metric is typically framed in intensity terms to ensure that it does not operate as a cap on development. Having intensity baselines means the need for both the parameters in the numerator and denominator to be measurable – and measured, reported and verified. In practice, this limits the applicability of *SNLTs* in the near term.

Some likely candidates of sectors (and baseline metrics) are:

- electricity generation: tonnes CO_2e per MWh generated. It might also be feasible to do a separate sector baseline for resultant emissions associated with electricity losses in transmission and distribution systems.
- cement or aluminium or steel production: tonnes CO_2e per tonne produced. Other similar type industrial commodities may also be feasible, e.g. bricks, pulp and paper, some chemicals including refined oil products, some mining and mineral processing etc.

- 'upstream' emissions of oil and gas production (e.g. gas venting and flaring): tonnes CO_2e per barrel of oil delivered to refineries or export facilities, or volume of gas delivered.

While the potential for *SNLTs* therefore has these limits, it must be noted that these particular sectors (especially electricity generation) account for a very significant portion of emissions and emissions growth in developing countries. Importantly, they represent sectors where trillions of dollars of new capital investment in long lived (and usually emissions intensive) capital 'plant' is expected in the next two decades. Avoiding such lock-in of emissions is a critical issue in the global mitigation challenge.

The demand-supply issue

To be successful as means to scale up investments in low carbon technologies and practices in developing countries, credit-based mechanisms such as *SNLTs* rely on there being a demand for credits. The carbon market will not function if there is not – carbon will have no value. In short, significant reduction targets of all industrialised countries are needed – which is consistent with the science-based calls for reductions of -25 to -40% by 2020. And on the supply side, the CDM process needs to be cautious about the automatic renewal of projects that have already produced large volumes of credits. Otherwise, credits from existing CDM projects, and those currently in the CDM pipeline, could already provide a very significant portion of the demand expected from industrialised countries' targets.

This demand-supply balance issue is already leading to a growing awareness that mechanisms that may 'flood' the market with large numbers of 'low cost' compliance credits from developing countries may not be good for the overall health of the carbon market, or global mitigation efforts. This suggests that there will continue to be close attention to baselines, whether these are part of CDM-based mechanisms or of the form of *SNLTs*.

Preparing for and negotiating *SNLTs*

In the immediate term, the greatest challenge to have SNLTs become a viable part of the post-2012 agreement is having developing countries become aware of and interested in this potential scaling up mechanism, and then undertake the necessary in-country work to prepare and present proposals for *SNLTs.* This is a process that is likely to require significant institutional capacity building and technical assistance.[1] This is true within interested developing countries and for the multilateral negotiation process itself.

A key issue is how the post-2012 negotiations are going to cope with the need for objective and accurate data and analysis on countries' national circumstances and proposals that is transparent and accessible. This issue applies equally to industrialised countries' proposals for targets as it does to any proposals by developing countries for *SNLTs*. A neutral technical expert body is needed, drawing on expertise from a range of institutions.

A key issue that needs to be dealt with is how to deal with the situation where proposals for *SNLTs* for some key sectors in some key developing countries are not sufficiently developed at the time it is expected that industrialised countries' targets should be agreed. The best way to address this 'timing mismatch' is to accelerate capacity building efforts targeted to key sectors (e.g. electricity generation) in key countries. Also, the World Bank's *Carbon Partnership Facility* may be a possible learn-by-doing 'vehicle' for some key sectors and some countries. But the reality will still likely exist that a

[1] A *sectoral proposals template* has been developed by Ecofys/GtripleC (so far with promise, in particular, in the electricity generation and cement sectors, with development of other sectors underway).

process will need to be determined to agree *SNLTs* after industrialised countries targets have been set.

Implementing *SNLTs*

To achieve sectoral emission reductions and 'beat their targets', national governments could implement domestic policies and measures with direct links for entities to the international carbon market, e.g. schemes that allocate credits to emission reduction actions by entities in the relevant sector; or establishing internal emissions trading schemes like the EU ETS;

Governments could also implement new and additional domestic policies, or enhance enforcement of existing measures, that do not rely on carbon finance and emissions trading. Carbon taxes, enhanced law enforcement, intensity or efficiency standards, and subsidies (either adding or removing subsidies as the case may be for a particular sector) are examples of these types of policies and measures. Governments can then sell the received credits directly on international carbon markets.

A critical issue for developing countries with *SNLTs* is how can the interest of project developers and carbon financiers, whose activities thus far under the CDM have focused at the project level, be maintained when crediting occurs at a sector level and, in the first instance, is directed to governments. In the circumstance where private sector carbon market players may see it as difficult to work via domestic governments, it may be possible to nest more traditional project based carbon market activities within sector programs occurring at the government level.

Concluding remarks

SNLTs are not a scaling up 'silver bullet'. But they have some characteristics which suggest that for some sectors in some key developing countries they may be the best new carbon finance mechanisms identified thus far. Moreover, in conjunction with SD-PAMs, they may be what is needed to strike the appropriate political balance (regarding mitigation) between industrialised and developing countries in the post-2012 agreement.

However, to realise this potential a very large effort is needed in a very short time. This will require proactive leadership by world leaders – in industrialised and developing countries, and in governments and business.

GLOSSARY OF TERMS

Additionality
A project is additional if the resulting emission reductions 'would not have happened in absence of the project', i.e. are reduced the baseline emissions.

Allocation
Process or methodology to set the total cap for an emissions trading system and the distribution to individual participants. Can in the context of the EU ETS also refer to the amount of allowances received by an individual participant.

Allowance
Amount of emissions that a country may be emitted in a certain period. Can refer to allowances at the country level, i.e. the amount an Annex I Party is allowed to emit in the commitment period (see also assigned amount, credits, cap, target) or to allowances at an installation (company) level, i.e. the amount an EU ETS participant is allowed to emit in a year.

Annex I
For the purpose of differentiating commitments, the Convention contains an Annex, that lists the countries that are considered developed countries (OECD members and countries in Eastern Europe and the (former) Soviet Union), the so-called 'Annex I countries'. For an overview of Annex I countries see Annex B of this guide.

Annex I countries
For the counties listed in Annex I, stronger commitments were established, including the implementation of policies and measures aiming to return greenhouse gas emissions levels to 1990 levels by the year 2000 (in the Convention) and the reduction of emissions in 2008 to 2012 about 5% below 1990 levels (for Annex I countries as a whole). All countries that are not listed in Annex I are referred to as Non-Annex I countries.

Assigned amount
For all Annex I countries, the emission reduction target is translated into an initial emission allowance, the assigned amount. It is calculated as the base year emissions times five times the reduction target, e.g. 0.95 for a 5% reduction (see **Error! Reference source not found.** and **Error! Reference source not found.**). This assigned amount is expressed in assigned amount units (AAUs).

Baseline
The baseline of a JI/CDM project activity is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the project activity.

Cap
Total amount of allowed emissions. Can refer to the country level Kyoto target, i.e. the amount of emissions that a country may emit in the commitment period (see also assigned amount, credits, allowance, target).More often it refers to the total amount of emissions allowed in an EU Member State under the EU ETS cap, i.e. the total number of EU allowances available in a country (either on an annual basis or over the trading period).

Carbon market
Combined market for trading CO2 or GHG-based commodities, such as allowances (EUAs, AAUs) and credits (CERs, ERUs, VERs) by direct participants (countries and companies) or market intermediairies. Can include the Kyoto-compliant market as well as the voluntary market.

Clean Development Mechanism (CDM)
Annex I counties invest in projects that reduce greenhouse gas emissions by sources, or enhance removals by sinks, in non-Annex I countries. The Investor country can use the resulting "certified emission reductions" (CERs) against its own emission target. The project has to contribute to sustainable development in the Host country.

Commitment period
The period in which emissions of Annex I countries have to be reduced. The first commitment period is from 2008 to 2012. Subsequent commitment periods have to be defined.

Convention
Shorthand for United Nations Framework Convention on Climate Change (UNFCCC)

Crediting period
Time interval for which a JI or CDM project generates emission reductions

Credits
Amount of emissions that are reduced through a project. For the Kyoto-compliant market measured in ERUs, CERs and RMUs (see also assigned amount, cap, allowance, target).For the voluntary carbon market measured in VERs or other types of credits.Sometimes also used to refer to the whole set of emission (reduction) units, i.e. also icluding AAUs and EUAs.

Determination
The process in which JI are evaluated, consisting of two steps: Determination whether a project meets the requirements on the basis of the project design document before the implementation of the project, and ensuring reductions meet the requirements after the implementation of the project, by an accredited independent entity. This is equivalent to validation and verification for CDM.

Emissions Trading (ET)
General term for systems in which emissions targets can be met (partly or wholy) by purchasing emission reduction credits or emission allowances from other parties. Often distinguishes beteen International Emissions Trading (IET) and national/regional systems, such as the EU Emissions Trading System (EU ETS)

Host country
The country where the JI or CDM project is physically based. For JI this must be an Annex I country. For CDM it must be a Non-Annex I country.

Installation
GHG emitting plant or stationary equipment covered by one permit under the EU ETS, run by the operator.

Joint implementation (JI)
Annex I countries implement projects that reduce greenhouse gas emissions by sources, or enhance removals by sinks, in other Annex I countries. The Investor country can use the resulting "emission reduction units" (ERUs) against its own emission target.

JI Supervisory Committee (JISC)
See Article 6 Supervisory Committee

Kyoto Protocol (KP)
International treaty on climate change, developed as an annex to the UNFCCC. The protocol enters into force once it is ratified by at least 55 parties to the Convention and by those parties, whose emissions account for at least 55% of Annex I emissions in 1990. From that moment Annex I countries that have ratified the Protocol, will be legally bound to the targets and other obligations specified in the Protocol.

Leakage
The net change of emissions which occurs outside the project boundary, and which is measurable and attributable to the project.

Monitoring
Estimation or measurement of the actual emissions within the project or installation boundary.

Monitoring plan
Plan that describes the collection and archiving of all relevant data necessary for assessing the level of greenhouse gas emissions, either from a JI/CDM project (all emissions during the crediting period) or from an EU ETS installation (in a yrear).

National Communication (NC)
Regular report all parties to the Convention must submit to the UNFCCC, describing sources and sinks of emissions, projections, policies and measures, vulnerability, etc. If this reporting requirement (and others) are not met, a country is not eligible to use the Kyoto Mechanisms.

Operator
Participating entity in the EU ETS, responsible (legal) person operating the installation covered by the EU ETS. Responsible for permit application and compliance.

Phase
Trading period under the EU ETS, consisting (after a 3-yr pilot phase – Phase I) of 5 years, for which allocation needs to be decided before the start of the Phase and in which allowances can be banked and borrowed.

Phase III
Trading period of the EU ETS to start in 2013. Rule for the system (including length of trading phases) may have changed by then (see phase).

Protocol
Shorthand for the Kyoto Protocol.

Validation
Independent evaluation of the CDM project against the requirements of the CDM by a designated operational entity. Note that in the past, ‘validation’ was also used for the

independent evaluation of both JI and CDM projects, while in the Marrakech Accords it is reserved for CDM projects only. For JI, the Marrakech Accords use the term ‘determination’.

Verification
For CDM, the independent review and ex-post determination that the emission reductions have occurred as a result of the CDM project by a designated operational entity. Note that in the past, ‘verification’ was also used for the independent review of emission reductions from both JI and CDM projects, while in the Marrakech Accords it is reserved for CDM projects only. For JI, the Marrakech Accords use the term ‘determination’.
For the EU ETS, verification refers to the independent determination that the annual emissions of an installation have been reported correctly.

Voluntary carbon market
Part of the carbon market that deals with voluntary credits (and the use of compliance credits or allowances for voluntary targets).

1. INTRODUCTION

1.1 BACKGROUND

The international climate change community is urgently looking for means to 'scale up' investments in clean technology and systems worldwide, especially in developing countries. The need for this to happen is signalled by the recent fourth assessment of the IPCC, in particular by Working Group III which noted:

> *With current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades: CO_2 emissions between 2000 and 2030 from energy use are projected to grow 45 to 110% over that period.*
>
> *Two thirds to three quarters of this increase in CO_2 emissions is projected to come from non-Annex I regions, with their average per capita energy CO_2 emissions being projected to remain substantially lower than those in Annex I regions in 2030.*

Currently, the Clean Development Mechanism (CDM) is the only contribution by developing countries that is formally acknowledged under the international climate change regime. The need for something more than the current CDM is well documented, in particular something that addresses the scale issue by going beyond a project by project approach.

The declaration of leaders at the 2007 G8 Summit held at Heiligendamm, Germany contained the statement *(**bolding** added)*:

> *We stress that further action should be based on the UNFCCC principle of common but differentiated responsibilities and respective capabilities.....*
>
> *Action of emerging economies could take several forms, such as sustainable development policies and measures, an improved and strengthened clean development mechanism, **the setting up of plans for the sectors that generate the most pollution so as to reduce their greenhouse gas emissions compared with a business as usual scenario.***

At a policy level, a "sectoral approach" is increasingly being talked about as a possible 'scaling up' modality[2]. In the UNFCCC policy community, a sectoral approach is also seen as a means to further engage developing countries in climate change action in ways acceptable to them and to industrialised countries expected to take on much deeper emission reduction commitments.

But the details of what this means in practice, indeed including what is even meant by "sectoral approach", has received limited in-depth attention and investigation thus far.

1.1.1 Different forms of 'sectoral approaches'

To help locate the discussion in this paper, it is useful to see where it fits in the broader typology of 'sectoral approaches'. Recent work by the IEA on sectoral approaches culminated in a workshop on 14-15 May 2008.[3] The IEA identified what they see as four different models of sectoral approach.

---

[2] e.g. Bosi and Ellis (2005), Ellis and Baron (2005), Sterk and Wittneben (2005), Baron and Ellis (2006), Höhne et al (2006), Schmidt et al. (2006), Ward (2006), Bodansky (2007), Cosby et al. (2007)

[3] See http://www.iea.org/Textbase/work/workshopdetail.asp?WS_ID=380 for presentations and reports.

The type (and some summary characteristics and issues) of these four models are:

1. **No-lose sectoral targets and crediting mechanism**
    - Developing countries adopt non-binding quantitative sectoral goals
    - Excess emission reductions are eligible as credits to be sold to industrialised countries to help them meet their fixed and binding targets
2. **SDPAMs or policy-based instruments**
    - Sector-specific policies and measures in developing countries that have sustainable development as primary objective (SD-PAMs)
    - Provision of funding for SD-PAMs that, with MRV, reduce emissions beyond BAU
    - Binding or non-binding
3. **Transnational sectoral agreements**
    - Transational agreement for a given industry
    - Substance of agreement:
        - Quantitative and/or qualitative goals (hier evtl. Auch Punkte statt Striche wählen (ist kein Pfeil)
        - Concerted R&D effort
    - Nature of agreement:
        - Voluntary industry agreement?
        - Voluntary industry-govt agreement?
        - Legally binding or non-binding govt-govt agreement?
4. **Sectoral approach to technology cooperation.**
    - Identify sectors where significant mitigation could be achieved through enhanced international cooperation
    - Develop specific task forces / work programmes for unique needs of each sector
    - Collaborative activities:
        - Technology transfer, *but also* technology needs assessments, audits, data collection, staff training, capacity building for implementation of technology, R&D efforts
    - Funded through existing UN funds (SCCF, GEF), a new UN tech fund, a separate fund?
    - Lessons from APP?

1.2 OBJECTIVE AND CONTENT OF THIS PAPER

The objective of this paper is to provide a comprehensive and robust analysis of the first of these models, i.e. taking an in-country sectoral targets and crediting approach to climate change action in developing countries[4]. This approach is intended to sit squarely within a negotiated,

[4] Annex I countries might also consider sectoral dimensions in achieving national targets. However, in those countries, sectoral approaches should be considered only as policies and measures that help meet national targets, whereas for developing countries they could be a form of commitment in itself.

multilateral, quantitative model for a post-2012 climate regime. To be precise, we use the term *sector no-lose targets* (*SNLTs*) to describe the particular policy 'tool' that is the topic of this paper.

To clearly distinguish this *SNLTs* concept from the other sectoral proposals in the literature, it is helpful to identify some of its key components, which consistently will be the basis of the discussion in this paper:

- It is implemented domestically in developing countries, not through agreement among transnational companies;
- 'No-lose' means the exceeding of a specified crediting baseline entitles a country to trade surplus emission reductions, but there is no penalty for not achieving that baseline;
- By the same token, *SNLTs* would be implemented voluntarily by developing countries, as there is no penalty for non-compliance to enforce, or even facilitate;
- *SNLTs* should be seen as a specific policy tool within an overall program approach to low carbon investment in developing countries;
- *SNLTs* are distinct from CDM, in its current form, as well as programmatic and policy CDM, and sectoral CDM. In particular, *SNLTs* are negotiated at the same time as industrialised country targets – i.e. are part of the negotiation where overall quantitative outcomes are agreed. So additionality is <u>not</u> a core issue at the sector level.

To be clear however, it is not the position of this paper that *SNLTs* are somehow the best of the sectoral models as they may apply to developing countries, or that they are even applicable in all sectors or in all developing countries. Rather, the view is that this may be a very valuable policy instrument in some sectors in some developing countries – among, and potentially alongside, other policy instruments that may be sectoral in nature.

This paper, then, is intended to objectively assess how this policy tool can work in practice. Moreover, beyond just the possible end-point of the use of this policy tool for some sectors in some developing countries in a post-2012 framework, it explores potential transition steps that can be taken now to work towards this, e.g. programmatic CDM or other similar policy instruments. In particular, how might proposed new carbon fund facilities such as the World Bank's new "Carbon Partnership Facility" and other private sector funds help provide 'financing pull' to such ideas, and support low carbon growth in developing countries, even before 2012 – e.g. as the original Prototype Carbon Fund did prior to the completion and agreement of the rules for the CDM.

This paper carries over an important conceptual distinction, developed in Ward, Garibaldi et al (2008), that is drawn between 'compliance carbon'[5] policy tools such as *SNLTs* (or 'classic' project CDM or programmatic CDM) and an overall strategic *program approach* to low carbon investment in developing countries (see section 2.2). Such an approach may use these tools along with a broad array of others in the policies and measures 'toolkit', e.g. sustainable development policies and measures (SD-PAMs) also mentioned in the Heiligendamm declaration.

[5] The term *compliance carbon* can be used to distinguish between (1) emission units and credits developed within some form of regulatory (or compliance) emissions management program (i.e. 'cap and trade plus offsets' schemes), and (2) offset credits generated within the *voluntary carbon* market.

Note that, while this paper focuses specifically on *SNLTs*, section 4 explores linkages with SD-PAMs, and in doing so describes the SD-PAMS model in quite some detail.

This paper is organised as follows:

- **Section 2** sets out the broad concepts and context that help frame the key issues that are covered in this paper. In particular, as noted above, it locates the discussion on *SNLTs* under an overarching strategic *program approach* to scaled up low carbon investment in developing countries. It also distinguishes the key attributes of *SNLTs* from other compliance carbon policy tools involving developing countries, including the current classic CDM and programmatic CDM, and future notions such as policy CDM and sectoral CDM. Having made clear what are the defining characteristics (and constraints) of *SNLTs*, this section then introduces what are seen as the critical issues and questions about this policy tool that are then taken up in following sections of the paper.

- **Section 3** focuses on immediate term issues relevant to getting international agreement to this new expanded form of compliance carbon mechanism. Picking up from the constraints identified in section 2, it describes key tasks that must be taken up to facilitate the future successful negotiation of such an approach in a post-2012 multilateral agreement, e.g. capacity building, data gathering, use of proposal templates, expert analysis and review, and securing the interest and engagement of private and public financing. This section also addresses the crucial (and in cases likely a determinative) issue of the data needs and monitoring, verification and reporting (MRV) systems that must be in place for this mechanism to be viable.

- **Section 4** focuses on the linkage between sectoral crediting and the concepts and details of sustainable development policies and measures (SD-PAMs). A part of this linkage question is what sources of funding separate from compliance carbon markets are available for the implementation of SD-PAMs – and how these can be complementary and non-conflicting.

- **Section 5,** considers in greater detail the question of what type of domestic policies and measures can most effectively connect with the incentive of international carbon market financing applied at a sector level. A key issue is how can the interest of project developers and carbon financiers whose activities thus far under the CDM have focused at the project level – including, importantly, the issuance of carbon credits – be maintained when crediting occurs at a sector level and, in the first instance, is directed to governments. This section also explores key compliance and legal issues. It assesses the nature of the legal framework, including transaction structures and contracts, required both in an international setting (e.g. between external international carbon market financing and domestic governments and/or on-the-ground local project or program hosts) and in the domestic setting (e.g. between domestic governments and internally with on-the-ground local project or program hosts).

- **Section 6** pulls together some overall insights and conclusions.

2. CONTEXT AND KEY CONCEPTS

Key Messages Of This Section

Scaling up needs new policy instruments and a strategic *program approach*

- The scale of investments needed in low carbon technology are very large by comparison with today's levels (as supported by today's mechanisms to encourage low carbon investment) – 100's versus 10's of billions of US$ annually. Developing countries' expected rapid economic growth means that they will require a large share of these investment and financial flows (I&FF).
- Investments in the energy supply sector are of particular significance, especially in power generation, industry and transport. By their nature these are long-lived capital investments – and the scale of these investments is very large.
- There is reason for both optimism and pessimism. The UNFCCC I&FF study in 2007 notes that the around US$200 billion in 2030 estimated to be needed to get global emission back to today's levels by 2030 is small in relation to estimated global GDP (0.3-0.5%) and global investment (1.1-1.7%) in 2030. But, on the other hand, changes of even this magnitude (small in percentage terms, but 'large' in absolute amounts) require a significant change from the business-as-usual behaviours of a large number of I&FF actors, public and private. Notably, global emission trends are still on a rising path.
- Any post-Kyoto agreement that includes emission reductions in defined sectors in developing countries must be complemented with a financing mechanism. Traditional sources of funding, e.g. pledged additional funds by industrialised countries administered by the GEF, are inadequate for this purpose on three grounds: they fail to link funding with performance or success; they are typically slow and cumbersome; and they lack the scale necessary. Sectoral agreements involving developing countries are usually discussed in the context of 'cap and trade' emissions trading schemes for industrialised countries, complemented by offset schemes that allow compliance credits to be generated through emissions reduction and sink enhancement activities in developing countries.
- Scaling up of the magnitude required will require very purposeful programs that aggregate on-the-ground activities in ways never previously achieved. A policy tool such as *SNLTs for developing countries* not only needs to be seen as just one 'compliance carbon' policy tool among a number of others, but the role and applicability of carbon financing needs to be seen in a broader strategic sense – i.e. as just one of many elements. By taking a strategic *program approach* to low carbon investments, it can be expected that all elements, and all carbon finance policy tools, can operate at a scale thus far not achieved.
- There is a continuum of possible 'compliance carbon' crediting 'tools' from the existing 'regular' project-based CDM and now programmatic CDM, to new CDM models such as sectoral or policy CDM, then to *SNLTs*. All of these may play a possible role in a 'scaled-up' future. The feature that particularly distinguishes *SNLTs* is that once these are agreed as part of a quantitative multilateral agreement the concept of additionality no longer applies – nor any of the institutional constraints that go along with this.

Attributes and 'issues' of *sector no-lose targets*

- It can be expected that developing countries may be attracted to consider *SNLTs* in sectors for which they seek significantly scaled up private sector investment according to their sustainable development priorities, and where current carbon market policy tools, such as the various forms of CDM, are not considered adequate to the task.

- But, *SNLTs* are unlikely to be feasible for all key sectors, and even for those sectors where they may be feasible, this may not be true in all developing countries. Like all credit based mechanisms, it is necessary with *SNLTs* to establish (and have agreed) a baseline, and then measure (and report and verify) performance against this. Given that the use of this tool is in developing countries, the performance metric is typically framed in intensity terms to ensure that it does not operate as a cap on development. Having intensity baselines means the need for both the parameters in the numerator and denominator to be measurable – and measured, reported and verified. In practice, this limits the applicability of *SNLTs* in the near term.
- However, the sectors, and countries, where it may be applicable are significant, so a considerable *scaling up* potential exists. Some likely candidates of sectors (and baseline metrics) are:
  - electricity generation: tonnes CO_2e per MWh generated. It might also be feasible to do a separate sector baseline for resultant emissions associated with electricity losses in transmission and distribution systems.
  - cement or aluminium or steel production: tonnes CO_2e per tonne produced. Other similar type industrial commodities may also be feasible, e.g. bricks, pulp and paper, some chemicals including refined oil products, some mining and mineral processing etc.
  - 'upstream' emissions of oil and gas production (e.g. gas venting and flaring): tonnes CO_2e per barrel of oil delivered to refineries or export facilities, or volume of gas delivered.
- Two variants of the *SNLTs* concept have emerged, one by the Centre for Clean Air Policy (CCAP) and the other by Ecofys/GtripleC. One key distinguishing feature is whether international benchmarks would feature explicitly as a negotiation parameter, i.e. to draw links with the performance of these sectors in industrialised countries for competitiveness reasons (CCAP does; Ecofys/GtripleC doesn't.)
- To be successful as means to scale up investments in low carbon technologies and practices in developing countries, credit-based mechanisms such as *SNLTs* rely on there being a demand for credits. The carbon market will not function if there is not – carbon will have no value. Given the supply of credits already prospectively in the pipeline from existing CDM projects, demand from the EU-ETS Phase III (2013-2020) provides limited extra demand, even if the EU takes on the -30% target they've proposed for 2020 if a comprehensive multilateral agreement is struck in the post-2012 period. In short, significant reduction targets of all industrialised countries are needed – which is consistent with the science-based calls for reductions of -25 to -40% by 2020. And on the supply side, the CDM process needs to be cautious about the automatic renewal of projects that have already produced large volumes of credits.
- This demand-supply balance issue is already leading to a growing awareness that mechanisms that may flood the market with large numbers of compliance credits may not be good for the overall health of the carbon market. This suggests that there will continue to be close attention to baselines, whether these are part of CDM-based mechanisms or of the form of *SNLTs*.

2.1 'SCALING UP', SECTORS AND TECHNOLOGY

Any discussion of a specific policy instrument (or 'tool') like *SNLTs* for developing countries needs to be placed in the context of what it is that is trying to be achieved. A good sense of this has recently been provided in the UNFCCC commissioned study *Investment and Financial Flows to address Climate Change.* Some of the key findings of this 'I&FF' study are that:

(i) To get global emissions in 2030 back to today's levels, the additional I&FF needed in 2030 is estimated to be around US$ 200-210 billion, broken down as follows:

- *in energy supply:* reduced investment of about 67 billion because of additional investment in efficiency and biofuel (included below)
- *in industry*: about 36 billion
- *in buildings*: about 51 billion
- *in transport*: about 88 billion
- *in waste*: about 1 billion
- *in agriculture*: about 35 billion
- *in forestry*: about 21 billion
- *in technology R&D and deployment*: about 35-45 billion

(ii) These additional I&FF amounts are large compared with current funding available under the UNFCCC and the Kyoto Protocol, but small in relation to estimated global GDP (0.3-0.5%) and global investment (1.1-1.7%) in 2030.

(iii) Investment in new physical assets is projected to triple between 2000 and 2030 so there is significant opportunity to direct I&FF in new facilities that are more climate friendly and resilient.

(iv) It is important to focus on the role of private sector investments as they constitute the largest share of I&FF (86%).

(v) Particular attention will be needed to be given to *developing countries*, because although they currently account for only 20-25% of global investments, their expected rapid economic growth means that *they will require a large share of I&FF*.

(vi) With appropriate policies and/or incentives a substantial part of the additional I&FF needed could be covered by the currently available sources. However, improvements in, and an optimal combination of, mechanisms such as the carbon markets, the financial mechanism of the Convention, ODA, national policies and in some cases *new and additional resources* will be needed to mobilize the necessary I&FF to address climate change.

(vii) The *carbon market*, which is already playing an important role in shifting private investment flows, needs to be significantly expanded to address needs for additional I&FF.

(viii) *National policies* can assist in shifting I&FF made by private and public investors into more climate-friendly alternatives and optimize the use of available funds by spreading risk across private and public investors. *Additional external funding for climate change mitigation and adaptation will be needed*, particularly for sectors in developing countries that depend on government I&FF.

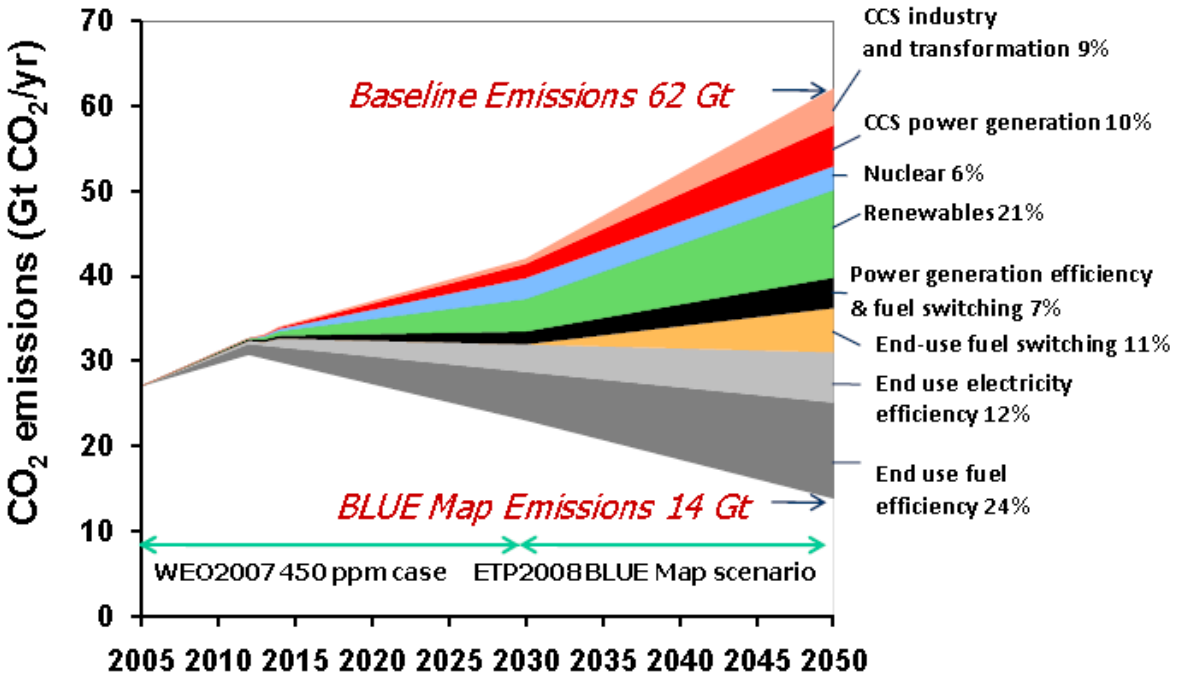
It needs to be noted that the dollar amounts provided in (i) above are additional I&FF amounts, not total amounts. For energy supply, where there are savings of about US$60 billion due to additional investment in efficiency and biofuel, the total global investments in the *mitigation scenario* in 2030 are about $695 billion, broken down as:

- Transmission and Distribution 130 billion
- Power generation 302 billion
- Coal, oil and gas supply 263 billion

One key point to be taken from these figures is that the scale of investments needed in low carbon technology is very large by comparison with today's levels (as supported by today's mechanisms to encourage low carbon investment). Another key point is the significance of investments in the energy supply sector. By their nature these are long-lived capital investments. And the scale of investment is very large. These are both key indicators of the importance of 'scaling up' in this sector.

Further sectoral differentiation is provided by recent work of the IEA. Figure 1 is taken from the new *Energy Technology Perspectives (ETP) 2008* study.

Figure 1: Cutting Energy related CO_2 emissions – The 450ppm case

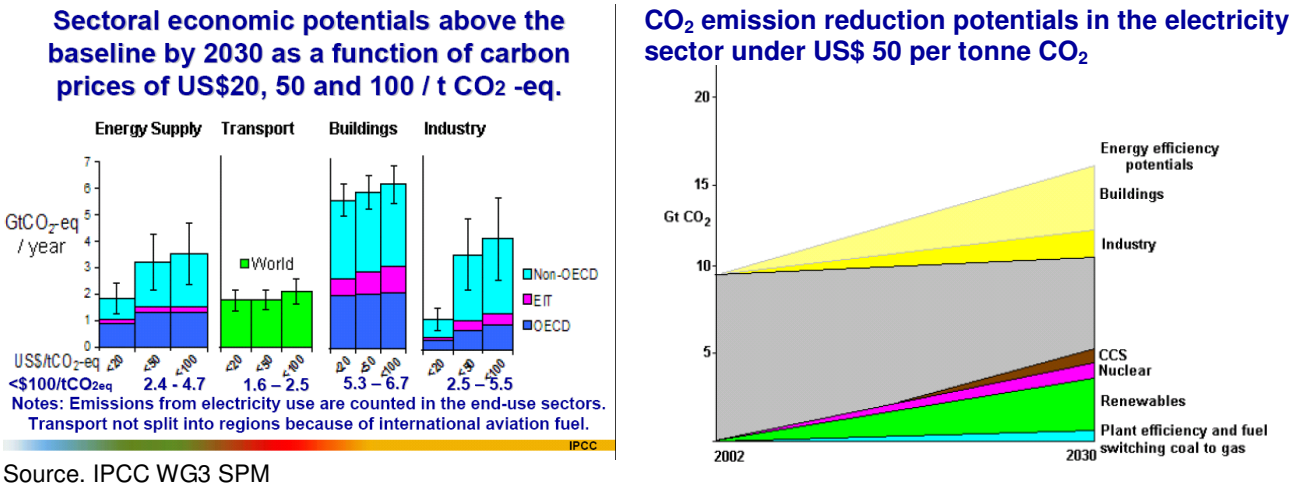


Source IEA (2008)

The key relevance of this IEA ETP (2008) data to the topic of this paper is the sense it provides of where the big mitigation potential exists, in particular in power generation, industry and transport – with a major contribution from energy efficiency on the end-use side.

These messages have similarly been provided in the recent Fourth Assessment Report of the IPCC. Figure 2 below shows emissions reduction potentials in the energy sector. In the right hand figure, the reference emissions line is reduced from the top by energy efficiency measures and the bottom by supply side measures, leaving the residual gray band declining from about 9.5 Gt CO_2 in 2002 to about 5.0 Gt CO_2 in 2030 (instead of rising to about 17 Gt CO_2). Figure 2 additionally provides a sense of geographical mitigation potential in its split of OECD, non-OECD and EIT countries.

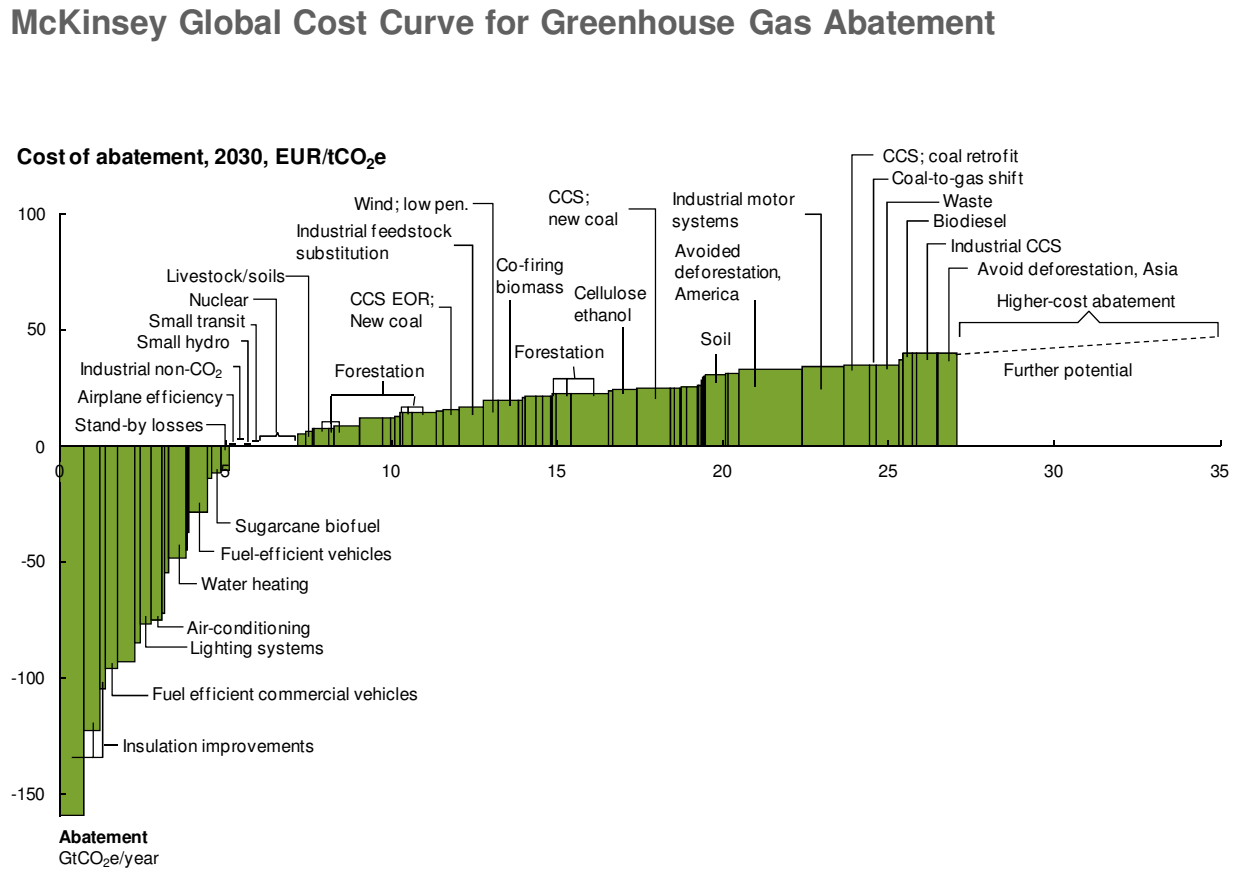
Figure 2: Emission reduction potentials in energy sector



Source. IPCC WG3 SPM

The McKinsey cost curves shown in Figure 3 tell a similar sectoral story and in addition make the point that a very significant portion of the mitigation potential is in the negative or low cost zone.

Figure 3: Global cost curve for ghg abatement measures beyond "business as usual", GtCO$_2$e



Source: McKinsey Climate Change Special Initiative

2.2 MOVING BEYOND TRADITIONAL FUNDING SOURCES

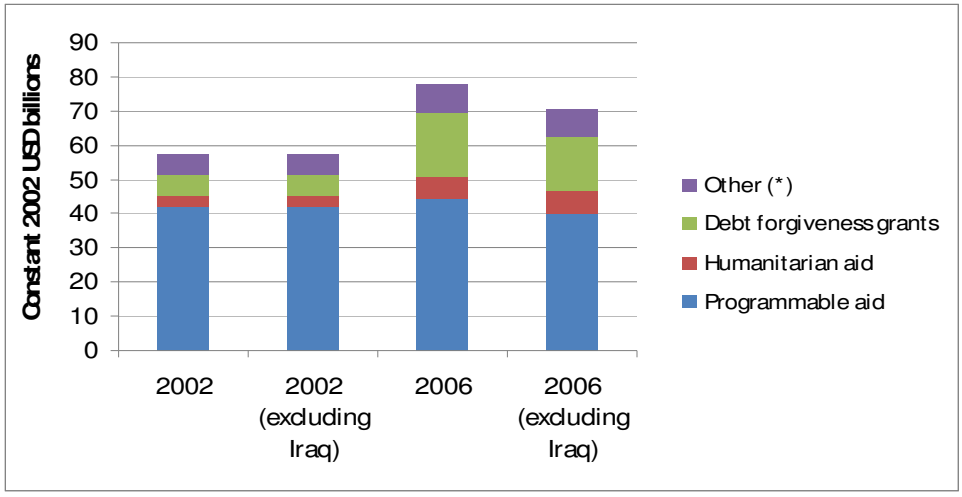
It is unlikely that developing countries will accept any voluntary or mandatory emission reductions without a proper financing framework. The underlying assumption of the post-Kyoto negotiations, as much as any other negotiations of multilateral environmental agreements in the last twenty years, is that the provision of funds is a condition for their participation in any effort to address global environmental concerns that are priorities for many policy makers in industrialized countries. The calls of developing countries to provide "new and additional" financial resources need to be addressed in order to persuade them to sign environmental conventions. As industrialized nations are mostly responsible for creating the problem, they are expected to facilitate developing countries' participation in international efforts to mitigate rather than worsen the global problem – but, without sacrificing aspirations to improve the welfare of their citizens.

Any post-Kyoto agreement that includes emission reductions in defined sectors in developing countries must be complemented with a financing mechanism. Traditionally, such mechanisms involve the pledge of additional funds by industrialized nations administered by the Global Environment Facility. However, developing countries argue that there are three main challenges to relying on the modalities of these traditional funding options to climate change.

First, these traditional sources of funding are not always linked to performance or success. Traditional official development assistance is targeted towards implementing particular programs or projects without sufficient drivers linking funding and performance. Second, GEF and other multilateral funding programs are slow and cumbersome and ineffective in involving broader sectors of the society. Rooted in intergovernmental cooperation, the existing programs have had limited success in involving private sector actors in their programs.

The third shortfall of this traditional funding source is scale. The amount of ODA available is not sufficient to address climate change on its own – and it has recently declined as a share of OECD countries' GDP. Figure 4 shows that once debt forgiveness, humanitarian aid, and other administration related costs are removed, the remaining ODA ("programmable aid") tracked by the OECD amounted to USD$42 billion in 2006 (excluding Iraq).[6]

Figure 4: Net ODA flows by type



[6] OECD, *Development Co-operation Report 2007* – Volume 9, No. 1, (OECD: 2008)

This amount, however, is for all sectors. In 2006 only 3.9% of all bilateral ODA was directed towards energy projects. These numbers were higher within the operations of the World Bank (9.6%) and the regional development banks[7] (15%), but still fall short of the estimated needs.[8] The GEF, the single biggest environmental trust fund and the financial mechanism for four international environmental conventions, administers a fraction of the funding needed to reward emission reductions of developing countries in a meaningful way.

Whereas the CDM mobilized EUR4.8 billion in 2006, the GEF received USD3.13 billion in August 2006 from thirty-two donor governments for its operations between 2006 and 2010.[9] Proponents of complementing traditional sources of funding with market based approaches emphasize that it will be difficult to mobilize the required level of investment and induce GHG emission reduction activities at a scale that would be adequate for pursuing the ultimate objective of the UNFCCC without significant private sector investment.

Moreover, developing countries will not allow the diversion of ODA for the purpose of rewarding emission reductions. This means that existing ODA flows are not a source that can be tapped into when creating a new UNFCCC financing mechanism. And even if it were, the amounts of funding it could mobilize are not sufficient to help financing the incremental costs of bringing large sectors of developing country economies to a low carbon development path.

Traditional sources of funding are, however, needed for capacity building (e.g. supporting training and policy development) and other technical assistance (e.g. supporting data collection). These sources of funding are essential to creating an enabling environment to stimulate reductions. They may be able to finance limited amounts of emission reductions directly, but they are not an adequate source of funding to sufficiently reward emission reductions in developing countries across the board. Additional funding not sourced from the public sector coffers directly are needed for this.

To meet the financing challenge posed by sectoral agreements, intergovernmental funding will have to be complemented by new sources of funding and policy measures. Policy measures could include carbon taxes, technology standards, policy harmonization or various emission targets. Taking into account the limitations posed by traditional international funding mechanisms, sectoral agreements with developing countries are usually discussed in the context of emissions trading schemes. These primarily involve cap and trade mechanisms for industrialised countries, complemented by offset schemes that allow compliance credits to be generated through emissions reduction and sink enhancement activities in developing countries.

2.3 A STRATEGIC APPROACH TO 'SCALING UP'

The information in section 2.1 can give rise to both optimism and pessimism. On the one hand, the UNFCCC I&FF study shows that the additional I&FF flows needed in 2030 to reduce global emission to today's level by 2030 are less than 2% of total global investments in that year. On the surface, this would seem a small investment to make to help ensure securing a more stable global climate system in the upcoming century. But, on the other hand, changes of even this magnitude (small in percentage terms, but 'large' in absolute amounts) require a significant change from the business-as-usual behaviours of a large number of I&FF actors, public and

[7] African Development Bank, Asian Development Bank and Inter-American Development Bank

[8] OECD, *Development Co-operation Report 2007* – Volume 9, No. 1, (OECD: 2008)

[9] See Capoor and Ambrosi, "State and Trends of the Carbon Market 2007"; documents relevant to the GEF fourth replenishment are at www.gefweb.org/interior.aspx?id=48.

private. This is signalled by the reference lines in the IEA figures compared with the mitigation scenario/potential lines.

Scaling up of this magnitude will require very purposeful programs that **aggregate** on-the-ground activities. It is instructive to consider what types of 'actors' in the economy are best suited to aggregate these actions and investments. From there, one can consider what types of international and domestic policy environments may lead these 'natural' aggregators to want to do this.

Vertical aggregations represent a multiplicity of similar actions in a given sector, or sub-sector. For example, these could be large scale lighting retrofit or higher efficiency appliance or vehicle programs; or conversions to better technologies in industrial sectors such as cement or brick making; or investments in renewable electricity generation or 'CCS-ready' fossil-based power plants; or energy efficiency and fuel switching programs for industrial boilers; or old car destruction programs. The main coordinating actors behind these aggregations could be central, regional or local governments. Or they could be energy utilities or associations of the industries concerned, or multinational companies in specific industries.

Horizontal aggregations represent a multiplicity of actions coordinated by a given main actor across a range of sectors, or sub-sectors. An obvious possibility here is local or regional government programs that may involve many different types of actions, for example across buildings, the transport sector and urban forestry.

The point of delineating things this way is that different enabling policy frameworks at both the international and domestic levels are likely to be needed for effective engagement of investment in general, and carbon finance in particular.

Importantly, the perspective taken in this work is <u>not</u> that *"Carbon finance is the answer....what is the question?"* Rather it is that countries, industrialised and developing, should be approaching the challenge of investing in low carbon futures in a very strategic way. A hierarchy of questions could be seen as being:

- Who are the 'natural' key coordinating actors for the desired aggregations?
    - Are they policy makers or policy 'takers'?
- To what extent is the provision of financing likely to 'unlock' the desired aggregation of activity – or are there other key barriers to be overcome or other means to achieve this end?
- Where the provision of financing is key, where might it be available? Among such choices, what is the potential role for carbon financing, i.e. where 'carbon assets' are being generated and acquired? Is it important in a leveraging sense, or can it alone provide most of what is needed to tip the economics of the actions sought?
- Where carbon finance is key, what mechanisms are needed? Is moving from project-by-project CDM to CDM programs of activity likely to achieve the scale-up needed and possible? Or is a sectoral CDM or *SNLTs* approach preferred? And is it possible that financing through the non-compliance voluntary carbon market may be an appropriate and quicker route to follow?
- Implicitly coupled with the notion of acquiring carbon assets, whether in the compliance or voluntary markets, is the development of baselines beyond which credits apply. Given the preferred carbon finance mechanisms, how are these baselines to be developed?

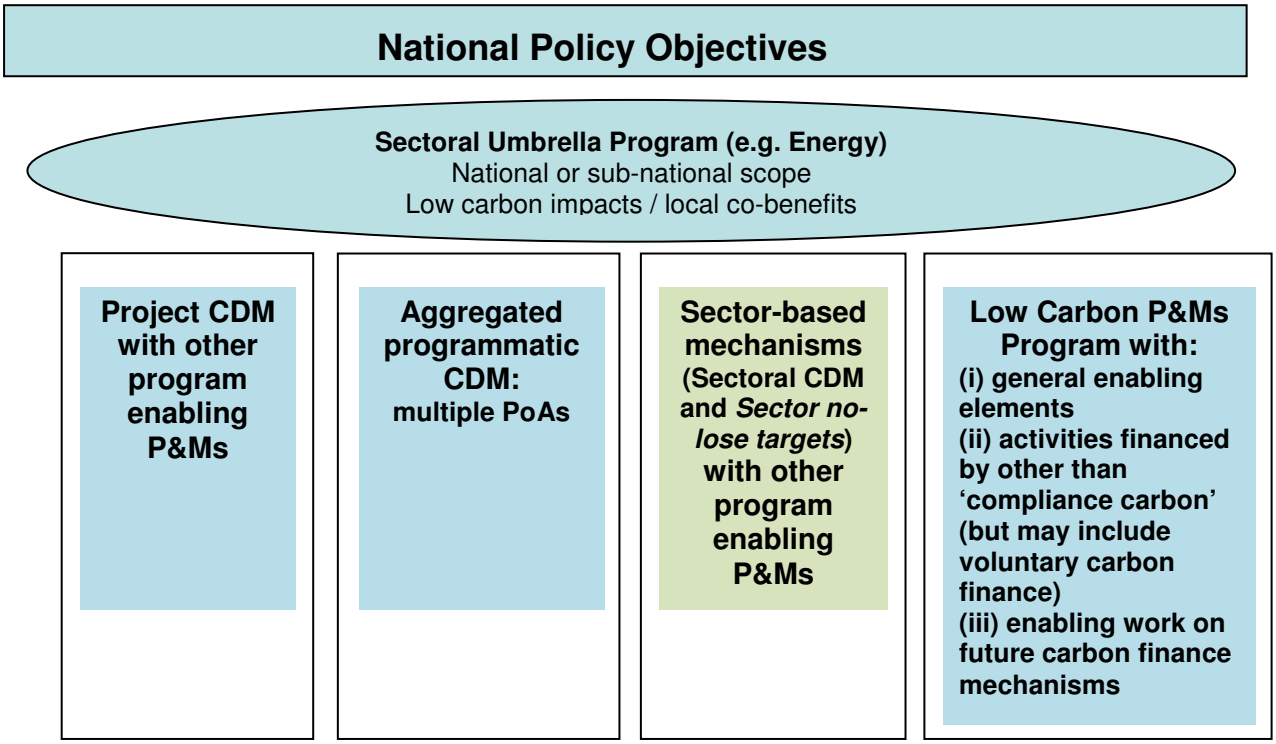
And what institutional process approves these baselines and monitors performance against these baselines and issues credits for performance beyond these baselines?

The point, then, is that a policy tool such as *SNLTs for developing countries* not only needs to be seen as just one 'compliance carbon'[10] policy tool among a number of others, but the role and applicability of carbon financing needs to be seen in a broader strategic sense.

Indeed, by taking a strategic *program approach* to low carbon investments, it can be expected that all elements, and all carbon finance policy tools, can operate at a scale so far not achieved. This includes tool existing today as well as those being considered for the future.

Figure 5, below, is a depiction of how developing countries might implement a program, within the type of strategic setting set out by the above questions.

Figure 5: A strategic *program approach* including future sectoral 'compliance carbon' policy tools



Source: Ward, Garibaldi et al (2008)

2.4 'COMPLIANCE CARBON' POLICY TOOLS[11]

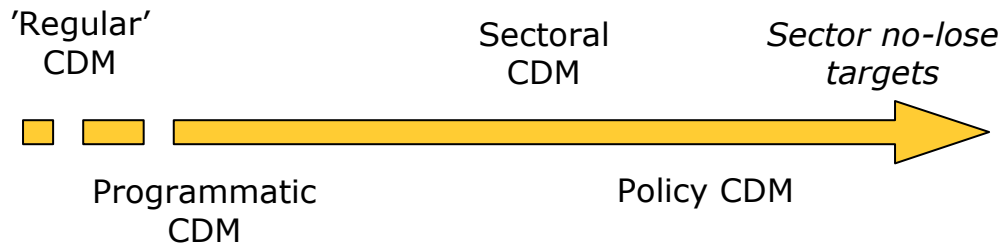
Scaling up discussions under the UNFCCC primarily relate to (1) broadening the participation in the climate regime and (2) means to enhance carbon finance beyond the use of the initial

[10] This term is used to distinguish compliance-based carbon finance mechanisms such as the CDM from the voluntary carbon market, which has a totally different set of demand drivers

[11] It has become something of a habit for literature to loosely refer to such policy tools as "approaches" (e.g. *sectoral approach*). But to avoid confusion, a distinction is clearly drawn here between overarching policy approaches (e.g. the *program approach* set out above) and policy tools that may be used in the implementing of such programs. Compliance carbon policy tools are mostly just different ways of establishing crediting baselines at progressively greater levels of aggregation.

project-based CDM tool. A variety of policy tools are on the table for 'scaling up' from project-based CDM. Figure 6 illustrates schematically the 'scaling-up' continuum of the various policy tool options proposed as elements of a future climate regime.

Figure 6. Options for scaling up from project-based CDM



Note that, for this next stage of the climate regime, the continuum does not include that developing countries may take on fixed and binding targets, i.e. be part of the Kyoto Protocol-like 'cap and trade' scheme that is expected to still form the basis of the commitments of industrialised countries[12]. In a cap-and-trade system the regulator sets an absolute emissions ceiling specified as a given amount of the pollutant that can be released with a defined compliance period. The regulatory authority creates and allocates allowances free or by auction, in the form of individual allowance, each representing a fixed amount of a pollutant, to the various sources under the regime. At the end of a compliance period each participant must hand over to the regulatory authority an amount of allowances equal to its emissions in the specified compliance period. Examples of such systems include the authorization to transfer AAUs under Article 17 of the Kyoto Protocol and the European Emission Trading Scheme.

Instead, the continuum in Figure 6 represents variations of baseline and credit schemes. Entities (or governments) covered by such schemes have to earn the credits before they can use or trade them. Participants are given a relative or absolute emission reductions target, which is a specific ceiling on emissions for a given compliance period, and then have to reduce the emissions against a certain baseline. At the end of the period, participants that have demonstrated that they have reduced their emissions as compared to the baseline are granted emission reduction credits equalling the difference between the baseline and the actual emissions.

In essence, then, the Figure 5 continuum represents a 'scaling up' of baseline and credit policy tools from the project-by-project version represented by 'regular CDM' that, thus far, has been the basis of developing country participation in the compliance carbon market initiated by the Kyoto Protocol.

Programmatic CDM (pCDM) would allow many project activities to become constituent parts of one large CDM project. The distinguishing feature of pCDM is that an unlimited number of

[12] This is because developing countries see economy-wide fixed and binding targets in the light of being caps, hence constraints on development. Technically this would not be the case if any such targets allowed sufficient head room for such development. Indeed a generous allowances based system may be the easiest of all mechanisms to provide financial assistance to developing countries. But the current geopolitics of climate change policy appears to rule out this option, for now at least. Moreover, having economy wide targets implies robust economy wide national MRV systems and this is not considered feasible for developing countries at this time.

program activities following the same methodology can be added under the 'umbrella' of an overall given approved pCDM program.

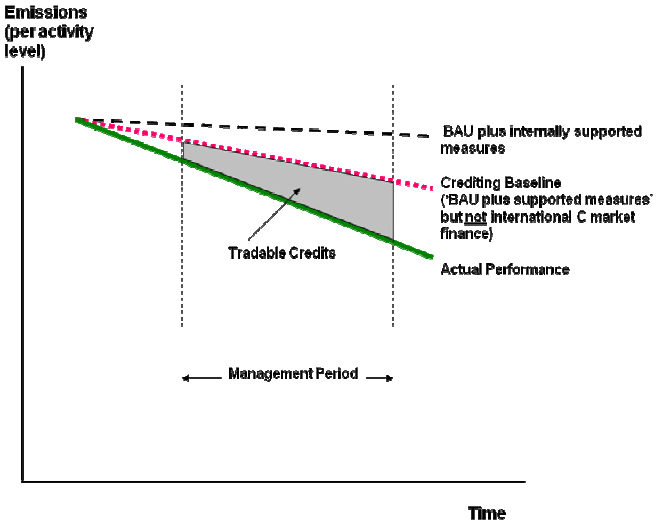
Sectoral CDM would cover a whole sector (or a meaningful part of a sector) of a country as a single CDM project. Two different concepts are discussed under the term *sectoral CDM*. One version (multi-project baseline) would grant credits to private entities which emit less than a sectoral emission baseline (or benchmark) defined for the sector. This, however, has been seen by some as contrary to the logic of additionality under the CDM, as credits would automatically be given to all those private actors already producing more efficiently than the baseline. The second version (baseline for entire sector) deviates from the traditional CDM thinking of having credits granted directly to private companies. It includes the development of a national sector baseline (e.g. expressed as the emission intensity of the sector as a whole) by the government of a developing country, and thus shifts activities under CDM to the government level. The government would be responsible for implementing policies and measures to reduce emissions in the sector and would receive credits first if emissions are below the baseline**.** It may then decide to distribute them to plants according to performance.

Policy CDM would allow any activity that falls under a government policy to claim credits, potentially over several sectors. But the CDM Executive Board and the COP has struggled with this notion because of difficulties to quantify and measure emission reductions actually achieved by policies. So the risk of generating excessive credits, thus causing worse environment outcomes (than not having this mechanism), is perceived as high.

SNLTs are a form of non-binding emission targets, that could encourage sector-wide emission reductions. This idea is based on a similar concept to sectoral CDM of the second version noted above. Developing countries could voluntarily propose a sector crediting baseline (most likely a national emission intensity of the sector in question over a commitment or 'management' period of time) which would be negotiated at the international level. Reductions below the baseline generate credits issued to the government, but no penalties would occur if the target is not met for the whole sector. (See Figure 7)

The main difference between sectoral CDM and *SNLTs* is that the technicalities referring to baselines, monitoring and verification, as well as the supervision and approval by the CDM Executive Board, would be maintained under a sectoral CDM, while the national sector baseline for a sector no-lose target would be negotiated at the COP level. Proponents of the sector no-lose target mechanism propose that this would be done at the same time as Annex I country targets for post-2012 are being agreed, so additionality would no longer need to be an issue – as it is not for actions taken by Annex I countries that have targets.

Figure 7. Simple depiction of a sectoral crediting baseline



Source Ecofys/GtripleC (2006)

This *additionality* distinction between *SNLTs* and any form of CDM is what distinguishes this policy tool in particular, and suggests it might have the greatest potential for scaling up investments – in appropriate sectors anyway. The single main reason for constraints in the CDM is the institutional decision-making processes associated with additionality and environmental integrity.

It can be expected that developing countries may be attracted to consider *SNLTs* in sectors for which they seek significantly scaled up private sector investment according to their sustainable development priorities, and where current carbon market policy tools, such as the various forms of CDM, are not considered adequate to the task.

But, *SNLTs* are unlikely to be feasible for all key sectors, and even for those sectors where they may be feasible, this may not be true in all developing countries. Like all credit based mechanisms, it is necessary with *SNLTs* to establish (and have agreed) a baseline, and then measure (and report and verify) performance against this.

The 'metric' of this baseline, then, must be something that is measurable in practice and where a measured change is representative of reduced tonnes of emissions to the atmosphere (or enhanced sequestration). As you move away from project scale CDM projects towards something at a sector level this becomes increasingly challenging. Moreover, given that the use of this tool is in developing countries, the performance metric is typically framed in intensity[13] terms to ensure that it does not operate as a cap on development. Having intensity baselines also means the need for the parameter that is the denominator in the metric to be measurable – and measured, reported and verified.

Some examples of possible sectors and baseline metrics are[14]:

- electricity generation: tonnes CO_2e per MWh generated. It might also be feasible to do a separate sector baseline for resultant emissions associated with electricity losses in transmission and distribution systems. Note also that this would be tonnes of emissions emitted to the atmosphere, so reductions from carbon capture and storage (CCS) would be picked up under this metric.
- cement or aluminium or steel production: tonnes CO_2e per tonne produced. Other similar type industrial commodities may also be feasible, e.g. bricks, pulp and paper, some chemicals including refined oil products, some mining and mineral processing etc
- 'upstream' emissions of oil and gas production (e.g. gas flaring): tonnes CO_2e per barrel of oil delivered to refineries or export facilities, or volume of gas delivered

Notably, most of these examples are industrial in nature and probably reflect smaller numbers of large sources. By comparison, sectors such as buildings and transport have large numbers of small sources. A sector no-lose target approach here is much more complex and perhaps not feasible – although some sub-sectors may be able to be defined, including perhaps regions of

[13] At the end of a given 'management' period when the performance of the 'denominator' parameter is known, intensity targets are able to be converted into absolute tonnes and compared with tonnes of emissions – enabling. credits to be issued in 'tonnes'.

[14] Note that this paper does not include in its scope the sector issue of reducing emissions from deforestation and forest degradation in developing countries (REDD). However, some of its content can be seen as being as generally applicable to REDD as for other sectors in developing countries that are more the focus of this paper. Moreover, in section 5.4 it draws from ideas developed in the REDD context on a "nested approach".

sub sectors that are less than national in scale. Note also that this same set of constraint issues would apply for sectoral CDM of the second version.

It can be seen that these carbon finance policy tools vary substantially in their characteristics. One key element is to whom credits are issued. Under the current CDM and pCDM, they are issued directly to the companies involved in the project. But under some options they could be issued to national governments. The geographic scope of activities increases when going up the scale towards *SNLTs*. Approval of the baseline methods can lie with the CDM Executive Board or, potentially, directly through the COP.

The scaling-up step of granting credits to governments instead of private entities is considered one of the most important, and potentially contentious ones. The government would therefore be responsible for passing the incentives to reduce emissions on to the private actors. It would be the prerogative of the host country to decide how this is done. Host governments could turn to any of the range of possible instruments, ranging from regulatory measures such as setting standards to market approaches such as a cap-and-trade system.

The set of policies and measures to achieve the targeted emission reductions might therefore be very different from one country to the other. Moreover, it is quite likely that policies and measures may not be framed in climate change terms, per se. Rather, they may be framed as sustainable and development policies and measures (SD-PAMs) addressing a broader set of issues including energy security, local environmental quality, health, traffic congestion, etc.

But all this introduces considerable uncertainty to the private sector actors in the carbon market, for whom it is critical that they know how they will get the value of the carbon assets created by their investments. It has been suggested that this uncertainty may cause capital to flee the carbon markets and go elsewhere.

While the above policy tools are set out as options for scaling up, it is likely that a mix of the tools will prove to be desirable and necessary. This will be true between and within countries. The ideal mix of tools for large rapidly industrialising developing countries is unlikely to be suitable for small and less developed countries. Even for the most developed of the developing countries, only some sectors may be candidates for the 'top' scaling up tool, *SNLTs*.

The reasons behind this 'horses for courses' point are made clearer in Table 1, below. This summarizes the different characteristics of the different carbon finance tools for scaling-up beyond the classic project-based CDM. Criteria for evaluating tools with regard to their desirability are, for example, their prospects for achieving a large-scale transformation of the economy/sector, the level of transaction costs to achieve the respective carbon finance, the difficulty of determining and dealing with additionality as well as the extent to which the mechanism does not only offset emissions (zero-sum), but leads to additional emission reduction beyond the one determined by the emissions cap for Annex-I countries. The complexity of tools with regard to implementation can be distinguished by criteria like the capacity needed at government level and at private-sector level to develop baselines as well as the requirements for data availability, monitoring, reporting and verification.

Table 1: Characteristics of the scaling-up 'compliance carbon' policy tools

Option	Classic CDM	Programmatic CDM (PoA)	Sectoral CDM		Policy CDM	*SNLTs*
			Multi-project baseline	Baseline for entire sector		
Applicability / Suitability (for *scaling up')*		Wide deployment of specific individual technologies	Relatively large site and homogenous commodity sectors		Only for easily regulated and monitored sectors / activities	Relatively large site and homogenous commodity sectors
Examples of typical application		Program for efficient light bulbs	Electricity: Multi-project baseline of 600g/kWh	Cement: Country average measured in tCO_2 / t	Efficiency standard for buildings or vehicles	Cement: National baseline measured in tCO_2 / t
Prospects for achieving large-scale transformation of sectors / economy	Small	Potentially significant, depending on technology and program	Depends on the level of the baseline	High, depending on applicability of sector	High in theory, but in practice limited by concerns of additionality	High, depending on applicability of sector
Transaction costs	High since project by project	Lower, but still complexities of CDM project cycle	Lower effort for baseline development, once baseline is set	Low	Low	Low
Additionality	Difficult to determine	Difficult to determine	How to set baseline to avoid that credits awarded for non-additional reductions?	Difficult to determine	Very difficult to determine	No longer an issue once baseline is set
Contribute to overall global reductions	Zero sum at best	Zero sum at best	Zero sum at best	Zero sum at best	Zero sum at best	Potentially positive
Required government capacity	Low	Low	Low	High, since credits are issued to governments, which have to pass on the incentive	High, since credits are issued to governments, which have to pass on the incentive	High, since credits are issued to governments, which have to pass on the incentive
Required private sector capacity	High	High	High	Depends on national rules	Depends on national rules	Depends on national rules
Data availability, monitoring, reporting, verification	Project specific monitoring plans	Statistical methods necessary	Relatively simple	At national level with greenhouse gas inventories	Difficult to set boundaries	At national level with greenhouse gas inventories

Colour coding: Reddish cells indicate limitations or problematic issues. Greenish cells indicate more positive scoring. Neutral shaded (but not white) cells are "depends".

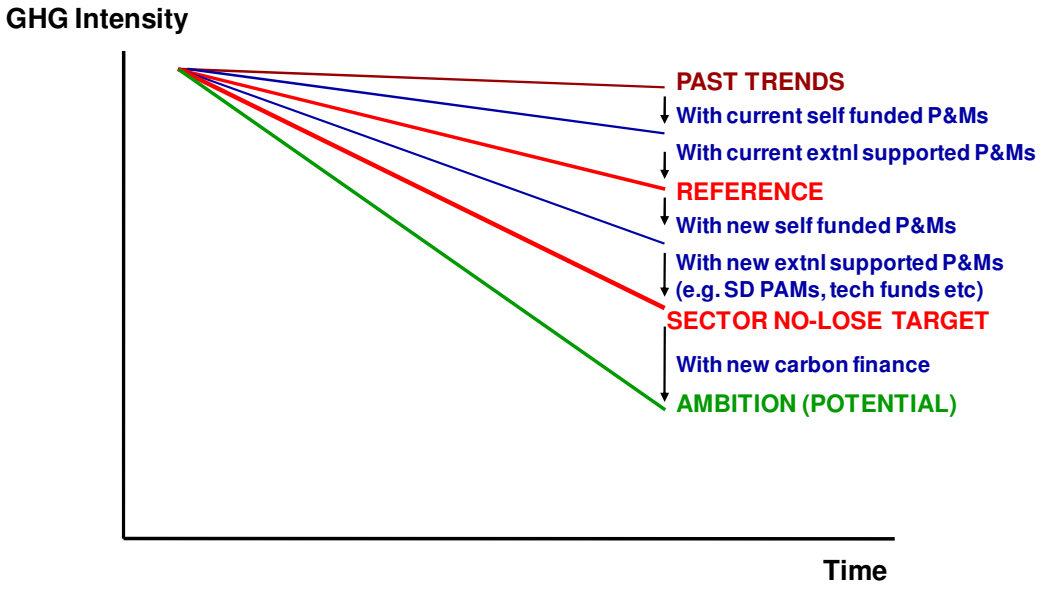
From the details in Table 1 it becomes apparent that those tools which have the greatest scaling-up potential are also the ones requiring higher government capacity with regard to data collection, baseline development, monitoring, reporting and verification. Therefore, only more advanced countries will be able to easily participate in those mechanisms which involve setting a baseline at a national (or even sub-national) level. "Readiness" capacity building is likely to be a necessary pre-requisite and part of an overall program strategy for such countries for relevant sectors.

For sectoral CDM and *SNLTs*, a related issue is the capacity of the multilateral decision-making process which is required to agree on more broad-based sector crediting baselines. It is likely that neither the CDM Executive Board nor the COP in their current form would be able to handle appropriately the complexity of sector baselines. Therefore, for both sector approaches, an independent technical advisory body may need to be tasked to support the UNFCCC during the technical target setting phase(s) of the post-2012 negotiations.

SNLTs are like Annex I country targets to the extent that additionality does not apply and the simpler mechanism of 'zero-sum' emissions trading applies, meaning that one tonne of CO_2 reduced in one place can be emitted elsewhere. Also, for such trading to occur relies on a sufficient demand for credits coming from Annex I countries.

The national contribution by the host developing country is one means to achieve additional emission reductions beyond Annex I targets at the global level. External funding or technological support other than carbon financing (e.g. funding of SD-PAMs) may also be used by these countries to assist them to achieve outcomes beyond what their self-funded programs may be able to achieve. Indeed, in setting the crediting baselines beyond which carbon market financing would apply, it will be necessary to understand what such external support is already available for low carbon investment in the sectors in question. This is depicted in Figure 8.

Figure 8: Development of *SNLTs*



Source: Ward, M (2008)[15]

[15] Also see www.sectoral.org which describes the development of *sectoral proposal templates*.

In thinking about their scaling up priorities, developing countries will need to decide which sectors or technologies are most effectively addressed by, say, a pledged sector no-lose target and which sectors might be more effectively dealt with by e.g. programmatic CDM or other funding mechanisms. These are issues which, by their nature, fit well under the concept of developing countries taking a strategic *program approach* to securing low carbon investment. . Since the answers to these questions are very country-specific, there is a need for external support of developing countries in analysing their situation at this level of detail and in initiating the processes needed to build the capacity for implementing these more scaled-up approaches.

Therefore, an important step in the process will be to start the in-country processes in developing countries that will analyse the

- where do we stand?
- where do we want to go?
- what can we achieve by which policies and measures?
- when do we need to take which steps to achieve this?
- which sectors/technologies should be addressed by which mechanism?
- Which data do we have, and where should we increase our knowledge?

Financing will be needed to support developing countries in the technical and analytical work of this phase, e.g. filling-out sector proposal templates, studies on cost curves, data collection. It will also be needed to build the institutional capacity needed to kick-start and maintain the processes. The involvement of key stakeholders, including the private sector actors that are likely to be the ones implementing and financing the underlying activities of any emissions reduction programs will also be crucial in this phase.

In order to gain sufficient experience to be able to implement such scaled-up policy tools, countries can be encouraged to start their internal processes to develop and discuss possible baselines. Only learning-by-doing will reveal the relevant problems and tricky issues with regard to such scaled-up tools, for example the question of the necessary aggregation level of a baseline versus the accuracy of monitoring, reporting and verification of actual emissions at this level. These learning processes are essential in order to be able to take well-based decisions on a possible policy framework for the post-2012 period.

2.5 VARIATIONS ON A THEME

The idea for *SNLTs* stems from discussions occurring as far back as 2004 in the *Future Actions Dialogue* facilitated by the Centre for Clean Air Policy (CCAP). Two variants of this idea have now developed, largely independent of each other.

Of the two, the CCAP approach[16] can be seen as the more prescriptive version. Also it has elements intended to 'speak to' international competitiveness concerns. This approach would focus on the ten largest developing country emitters for each of the major sectors proposed (e.g. electricity, iron and steel, chemical and petrochemical, aluminium, cement and limestone, paper pulp and printing). A technology and financing package would be provided to these countries to offset the costs of their involvement. These costs stem from the requirement for crediting baselines to incorporate a non crediting element that represents these countries' "contribution to

[16] See Schmidt et al (2006)

the atmosphere". The competitiveness focused elements relate to the use of pre-set benchmarks established by third party independent expert bodies. These benchmarks provide the starting out basis for negotiations with developing countries on what their specific crediting baselines should be. The benchmarks also are intended to guide allocations for industries in these sectors operating in the EU ETS, and presumably other industrialised countries.

The other variant of the sector no-lose target idea, developed by GtripleC and Ecofys, has centred around the development of sectoral proposal templates (see www.sectoral.org). The purpose of these templates – which could be used by any developing country seeking to voluntarily propose such a target within the post-2012 negotiations – is to provide a standardised tool by which countries can prepare and propose crediting baselines (see Figure 8). These templates are initially seen as a capacity building tool for countries to use internally. In turn, they become a negotiation facilitation tool to help the process of negotiations by providing some level of standardisation of information, presentation and transparency. The templates include details of best practice as it exists in other countries, but as an information item, not with a view to this being seen as benchmarks and used as the basis for negotiations. And instead of the notion of having a negotiated "technology and finance package", the templates provide the 'space' for countries to describe what internationally provided support they may be receiving in the given sector (or might receive in the future) that can allow them to achieve lower emissions separate of the support of carbon finance.

These summary differences aside, both concepts share the characteristics of these voluntarily proposed targets being intended for developing countries and the metric for these targets most likely being set in intensity terms, e.g. tonnes CO_2 per tonne of cement or per MWh electricity. This distinguishes these concepts from so-called 'transnational sectoral targets' (or industry sectoral targets) where the intent would be targets for industries operating in both industrialised and developing countries.

While the CCAP proposal does have an element of this competitiveness-focused thinking in its use of international benchmarks, as it applies to developing countries it is clearly in the same family of ideas as the GtripleC/Ecofys variant. So to be clear, this paper is explicitly about the policy tool of *SNLTs for developing countries*. In particular, where this paper focuses on domestic implementation issues, these should generally apply to either variant of the concept.

2.6 SCALING UP MEANS ON THE DEMAND SIDE TOO!

The case has been made in a range of studies for the need for scaling up investments. Moreover, there seems to be an expectation that the private sector, and the carbon market specifically, will play a, if not the, major role in providing this investment. But where is the market demand to come from? Discussions about enhanced mechanisms serving the supply side such as *SNLTs* will be moot if there is not a compelling answer to this question.

There are reasons for concern. First, the primary demand driver of the market for CERs has been the EU ETS. The Commission's 23 January proposal for amendment of the ETS Directive does not provide any demand for imports from new CDM projects starting after 2012 in the absence of an international agreement. Second, governments are unlikely to devolve the responsibilities associated with their targets agreed to in international negotiations fully to the private sector for the following reasons:

- Governments may exercise a preference for policies other than emissions trading in some sectors, such as regulation for energy efficient appliances;

- Governments may wish to subsidise low carbon technologies like CCS and renewables directly; such efforts have an implied carbon price that will be further enhanced by emissions trading either directly or indirectly;
- Governments may wish to buy CDM or CDM-type credits as a commitment to particular sectors, countries or co-benefits such as biodiversity or poverty reduction; to date, public procurement in the carbon market has delivered only a small fraction of the financing associated with private activity in carbon market.

Third, is the concern about the supply of credits potentially coming from renewal of existing CDM projects. CDM projects can be registered for 7 or 10 years. Project activities registered for 7 years can request renewal for a second and third crediting period. This means that current CDM projects registered for 7 years could effectively have a 21 year life cycle if renewal does not change the baseline for these projects. For the period 2013-2020, if there is renewal of all projects beyond their first crediting period, there is a potential supply of CERs from projects already implemented or in the pipeline of about 5.3 billion CERs[17], which could easily meet import demand from the EU ETS after 2012, significantly limiting the incentive for new investment.

Summarising then, for there to be significant new demand for 'compliance carbon' commensurate with expectations on the supply side, in addition to this renewal issue needing to be addressed, industrialised countries (and not just the EU) will need to take on significant emission reduction obligations in the post-2012 climate 'deal'.

But this demand-supply balance issue will also lead to a growing awareness that mechanisms that may flood the market with large numbers of compliance credits may not be good for the overall health of the carbon market. This suggests that there will continue to be close attention to baselines, whether these are part of CDM-based mechanisms or of the form of *SNLTs*.

[17] Source: J Fenhann, UNEP Risoe

3. PREPARING FOR *SECTOR-NO LOSE TARGETS*

Key Messages Of This Section

- A series of steps can be seen as being needed to get international agreement on *SNLTs* as a new and expanded form of compliance carbon mechanism. This is true at both the national level of interested developing countries and at the international intergovernmental level. With COP15 in Copenhagen 'looming', it will be important that the national and international steps proceed in parallel – and expeditiously. Care must be taken to ensure these steps do not become potentially insurmountable and self-defeating barriers.
- It is important to not apply a set of expectations of developing countries that are beyond what is expected of industrialised countries. *SNLTs* for developing countries need to be seen in the context of targets voluntarily taken on in a multilateral negotiation process. To this extent, they are not unlike the targets that will be taken on by industrialised countries, albeit there are some key technical differences. Differences in treatment need to be grounded in objective realisations of facts, e.g. different capacities and capabilities relating to monitoring, reporting and verification (MRV) systems.
- Significant and targeted capacity building will be needed. This is true within interested developing countries and for the multilateral negotiation process itself. A key issue is how the post-2012 negotiations are going to cope with the need for objective and accurate data and analysis on countries' national circumstances and proposals that is transparent and accessible. This issue applies equally to industrialised countries' proposals for targets as it does to any proposals by developing countries for *SNLTs*. A neutral technical expert body is needed. But how? And where? This mustn't become a barrier to timely outcomes.
- Within developing countries, the key national level steps involve:
  - generating national interest and preparing information and data
  - testing the viability of possible sector baselines, e.g. the appropriate baseline metric
  - preparing for national implementation

  The use of proposal templates can facilitate these in-country preparatory efforts. A financing package is likely needed for many developing countries to undertake the necessary in-county work to get them to the point of being ready to present proposals foe SNLT's.
- For the international process, the key steps involve:
  - agreeing on details of the *SNLTs* mechanism, for example (1) to what extent, if any, issues of international competitiveness should be explicitly addressed through measures such as the use of sector benchmarks; and (2) what minimum MRV standards should apply (which may pre-determine for which sectors this mechanism might be applicable)
  - some expeditious 'proof of concept' piloting at either national or sub-national level in key candidate sector(s) – e.g. through the World Bank's *Carbon Partnership Facility*
  - negotiating *sector no lose targets*
- A crucial issue highlighted is the potential timing mismatch between when industrialised countries are expected to take on targets and when some key developing countries may be ready to negotiate the detail of *SNLTs* in some key sectors. Some form of 'doorway mechanism' seems needed. But what?

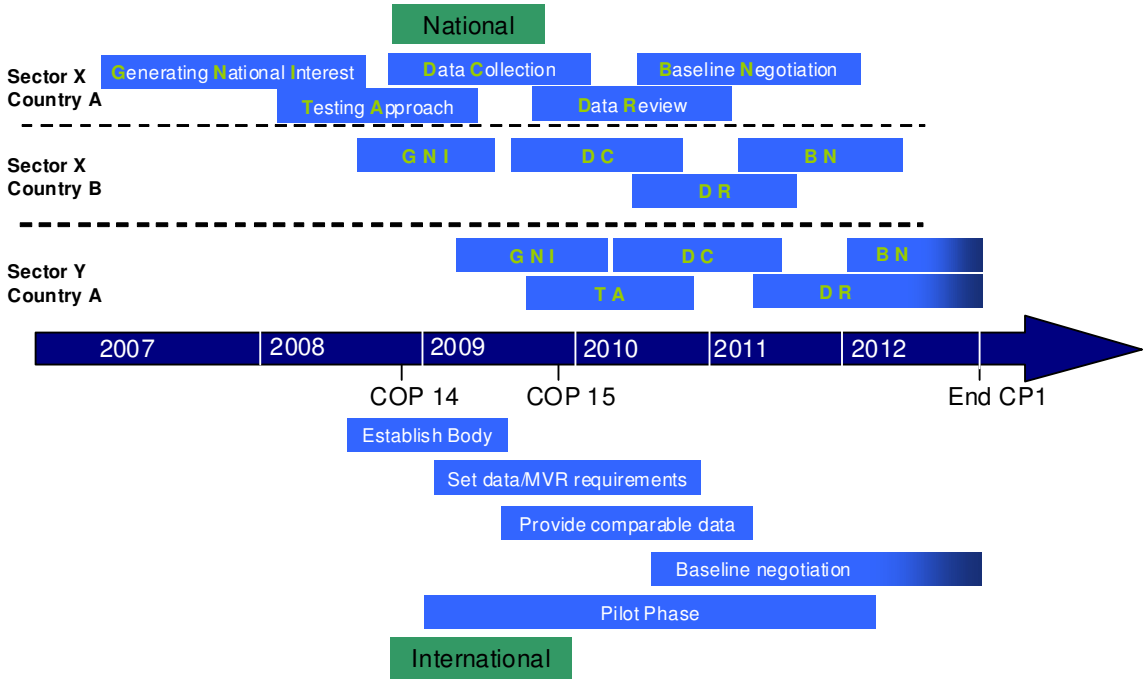
THERE IS MUCH WORK TO BE DONE – AND TIME IS OF THE ESSENCE!

3.1 INTRODUCTION AND HIGH LEVEL ISSUES

This section focuses on immediate term issues relevant to getting international agreement on *SNLTs* as a new and expanded form of compliance carbon mechanism. Given this is a new policy tool, a number of crucial steps are needed to prepare for its application.

A proposed set of steps are summarized in Figure 9 below and described in this section. This gives an overview of the tasks that will have to be dealt with on a national level for countries that seek to take on sector no-lose target(s), and the negotiations that have to take place on an international level. It also provides an illustrative timeframe for these activities.

Figure 9: Overview of steps and exemplary timeframe for implementing *SNLTs*



A series of steps can be seen as needed at both the national level of interested developing countries and at the international intergovernmental level. In the interests of time and given that this new policy tool is proposed as potentially a key new mechanism in the post-2012 period, it will be important that the national and international steps proceed in parallel – and expeditiously!

A careful balance needs to be struck in determining which steps are needed and how they are framed. If the steps are too onerous or are likely to be particularly contentious, especially where these may involve decisions by the UNFCCC COP, these steps can instead turn into potentially insurmountable and self-defeating barriers. To the maximum extent possible, the identifying of difficulties must be seen as challenges that require immediate attention to overcome, e.g. through significant targeted capacity building.

Moreover, it is important to not apply a set of expectations of developing countries that are beyond what is expected of industrialised countries, especially where infringements on sovereign rights and responsibilities may be perceived. *SNLTs* need to be seen in the context of targets voluntarily taken on in a multilateral negotiation process, as distinct from baselines of a CDM type. To this extent, *SNLTs* are not unlike the targets that will be taken on by industrialised

countries, albeit there are some key technical differences[18]. But in both cases, the 'beating' of a target has the result of creating tradable emission units – called 'credits' in the case of *SNLTs* and AAUs in the case of industrialised country targets. In either case, overly 'soft' targets have the potential to be a source of excessive supply to the carbon market and undermine its effectiveness for all countries.

Any differences in the treatment of prospective targets for industrialised countries and *SNLTs* for developing countries, therefore, need to be grounded in objective realisations of facts. A key issue here is the different capacities and capabilities relating to monitoring, reporting and verification (MRV) systems, due to the fact that industrialised countries have had nearly ten years to prepare for the Kyoto Protocol's first commitment period, whereas for developing countries, MRV has mostly just been focused at the project level when CDM activities were undertaken.

One issue that seems to need the serious and immediate attention of the international community is how the post-2012 negotiations are going to cope with the need for objective and accurate data and analysis on countries' national circumstances and proposals that is transparent and accessible to all key 'players' in the negotiations. By 'players' here, it is meant both governments and the non government stakeholders (ENGOs, RINGOs, BINGOs, IGOs etc) that play close attention to, and can significantly influence the outcome of, the negotiations. This issue applies equally to industrialised countries' proposals for targets as it does to any proposals by developing countries for *SNLTs*.

A neutral technical expert body is needed. However, no single institution currently exists that has the breadth of expertise – across energy, industrial processes, waste, forestry and agriculture – to address the full economy proposals of industrialised countries or likely proposals for specific sectors from developing countries. But pieces of the necessary expertise can be seen in organisations such as the IEA, FAO and UNEP, and in working groups of the IPCC, expert review teams in the UNFCCC and in the panels and working groups of the CDM Exec Board.

This need for a technical expert body is flagged here as a necessary early step of the international process, without further elaboration of how this might be achieved. But the same point as made above applies here – this step cannot be allowed to become a potentially insurmountable and self-defeating barrier. There are three key issues: (1) Is it agreed that a new body is needed, e.g. as distinct from a 'virtual organisation' of linked existing institutions; (2) How quickly can such a body be formed and be ready to work, and (3) How can it be constituted such that it is seen to be capable of providing truly expert, balanced and objective advice.

This body might either be based on already existing institutions within the UNFCCC or be an independent technical expert body established outside of the UNFCCC COP process per se but, as with the IPCC on climate science issues, a body that the UNFCCC COP process relies on for a specific technical purpose.

The outcomes of the work of this body should also be very open and transparent in the process – and delivered quickly and frequently. This can help ensure a 'level playing field' in terms of information being available to all parties to the negotiation. Beyond the basic 'equity' aspects of this, having such information in the open can help to avoid 'back room' political decisions being taken with respect to targets (i.e. of a 'hot air' or 'tropical hot air' nature) that, in time, will be seen

[18] In particular, *SNLTs* are expected to be defined in intensity terms meaning that credits are issued 'ex-post' following verified performance over a given period.

as having a destabilising effect on the carbon market and working against the best interests of the overall global mitigation effort.

3.2 NATIONAL LEVEL STEPS

3.2.1 Generating national interest and preparing information and data

A first step is raising awareness of the existence of the *SNLTs* policy tool. This can be done on an international level through information papers. But this also has to be done on a national level. For relevant countries[19] this has to be done at various levels of the government, and also within the industry in a given sector (or sectors) of a given country that might be suitable for this approach. Initiative has to be taken to inform the stakeholders by, for example, organizing workshops around the subject. This is necessary so that institutions can take ownership of the technical exercise that will come.

Once the basics of the approach have been understood, it will become clearer whether general interest exists and a first understanding of the capacities in a given country can be gained. It is important to keep in mind when approaching the national parties that a key aim of these initiatives is to secure the interest and the engagement of private and public financing. It also provides countries with a broader base for their climate change mitigation activities.

Within this process it should also be assessed which sectors in a given country might be relevant. A key consideration is likely to be sectors that have large and growing emissions, where there is a need for significant investment in low carbon technologies and where such decisions have significant long-term emission consequences. These investments might be either for modernising of existing or for new infrastructure and plant. As noted in section 2.2 and Figure 3, this determination may best result from a strategic 'scaling up' program analysis. It will also likely depend on the 'maturity' of the sector, which in turn depends on data availability, capacities, among other factors.

Once a sector is identified, a special effort has to be made to inform the stakeholders relevant on the existence of the approach. It will be helpful to identify one national focal point, most likely at government level but in some cases also a private institution that is capable of developing capacities to coordinate the further process in the country.

3.2.2 Testing the viability of sectoral baselines

After awareness has been raised and interest is secured from various sides of the private and public sector, the viability of establishing a crediting baseline in the given sector(s) needs to be tested.[20] A key issue is the determination of an appropriate metric for the baseline, which must not only be relevant to assessing reductions in emissions through proposed actions in the given sector, but also reflect the ability to measure, report and verify the necessary performance parameters.[21] The use of templates is likely to guide and simplify the testing process.[22] Such

[19] As will be made evident through this paper, *sector no-lose targets* are not considered relevant to all developing countries.
[20] Testing is already ongoing is several sectors, e.g. in initiatives by CCAP, WRI and Ecofys/GtripleC
[21] For example, a metric in the transport sector such as *CO_2 emissions per vehicle-kilometres travelled* may prove not to be practical in many large developing country cities, both for reasons of the unavailability of VKmT data and that because of heavy congestion, VKmT is not the most relevant indicator of emissions.
[22] Examples of such templates can be viewed and downloaded at www.sectoral.org .

templates give the country the possibility to tell its 'story' in a coordinated manner and should include quantitative as well as qualitative information.

Since they are used in an early, informal and non-binding stage, proposal templates do not yet have to be agreed upon by an international body such as the UNFCCC. It is useful though, if the efforts would be coordinated.

Within these templates, indicators should be defined that unify the process and enable a transparent comparison across countries. In order to develop such indicators, data has first to be gathered. Important characteristics of the data that needs to be gathered are the spatial and temporal scope as well as the quality. While an objective even of this test phase is to get and use data of the highest possible quality, it is likely that the quality of data may initially be limited. Concerning the scope of the data, it needs to be decided whether a country or region wide evaluation should be made, and what time span the data should cover.

Prior to moving into the information and data gathering phase, it is necessary to check how willing the industry is to cooperate and see whether there are any key issues that will become major barriers in the implementation of *SNLTs*. Issues with industry can arise, for example, if companies feel they will be forced to reveal too much data to their competitors if they share the data, or if this could lead to anti-trust concerns. Data aggregation by independent third parties is needed to get beyond such barriers.

The data collection will most likely be time-consuming and the amount of data needed might become extensive. While in some sectors there are a relatively small number of industrial operators (e.g. power plants) in other cases this can run to hundreds or thousands (e.g. cement in China). Thus, expertise and capacities within the national governments to deal with technical issues will be needed. Furthermore cooperation between the national government and the industry will be needed. Since the data requirements will have to be set at an early stage, it might become necessary to renegotiate the data requirements once more knowledge has been gained on the sectoral characteristics.

Once the necessary data has been gathered and the proposal template has been completed, it would then be ready for analysis by the technical expert body proposed in section 3.1 and, in turn, by the multilateral negotiation process. The expert body could, for example, compare templates from different countries, do a quality check on the integrity of the data as well as on the usefulness of the indicators chosen.

It would be expected that the review by this body would be made public, e.g. as is the case of in-country reviews made by the OECD of its member countries and indeed by the UNFCCC review teams. Depending on the views of the expert body, countries could review and update their proposals prior to presenting them into a multilateral negotiation process.

3.2.3 Preparing for domestic implementation

In parallel to the process that may be occurring at the international level, countries have to continue the process that was initiated through any work on sectoral proposal templates. Institutions may need to be created and capacities built up and extended. The relevant stakeholders, be it governmental or private institutions should be involved more heavily by the national focal point for given sectors. This should especially include institutions of the sectors that seem most promising. Similar to the proposal templates, a standardized process could be

created to facilitate this development, but one which in particular takes account of national circumstances.

Besides capacity building, the countries need to start thinking about the implications the implementation of *SNLTs* would have for their country. This includes starting to think of policies that could be implemented to achieve the sector no-lose target or go beyond that, or starting to figure out how the incentives provided through the credit generation can be passed on from the government to the private sector. It might be desirable to start implementing (pilot) policies, as policies often only become effective after some time. Section 5 provides a more detailed discussion of domestic implementation issues.

3.2.4 Need for an assistance package

All of these "national level" steps can involve significant new efforts in developing countries. A pair of very legitimate question that can be expected to be asked by developing countries are

1. How much time and effort will it take for countries to prepare for, negotiate and effectively implement this new policy tool?
2. In this regard, what financial resources and technical assistance will be needed and available?

For many developing countries the viability of them undertaking the efforts in 1 will very much depend on the availability of the help in 2. For a given developing country, the needed *SNLTs* assistance package can be expected to cover some or all of the following elements, depending on the country's national circumstances:

- Data and information gathering, including projections analysis of the economy and the sector(s) in question
- Economic analysis of the cost and benefits of adopting such a mechanism
- Developing the national level (or sub-national level as applicable) measurement, reporting, verification and compliance system for the sector(s) in question
- Developing the necessary legal framework, including enforcement mechanisms, for the implementation of the domestic program of policies and measures and links with the international carbon market
- Enhanced means of engagement with relevant domestic and international private sector players and, as applicable, public stakeholders

3.3 INTERNATIONAL CONSIDERATIONS AND STEPS

3.3.1 Agreeing the frame of the sector no-lose targets mechanism

Multilateral negotiations by their nature reflect the interests of all countries, both in broad groups and individually. Negotiations under the UNFCCC, in particular, also reflect a general 'consensus-based' process. Taking up a new mechanism such as *SNLTs* therefore requires a general consensus that this is useful to achieving an overall agreement.

Section 2 discussed in some detail one primary objective of a future agreement; that is, to scale up the investment in low carbon technologies and practices in developing countries. The key feature of *SNLTs* in this regard is that it moves beyond the institutional constraints that will exist

for any carbon market mechanism where additionality is a core requirement. Moreover, for such sectors and countries it shifts the focus of climate change mitigation to a sector level – and requires management across sectors, not just individual projects or activities.

The potential benefit of scaled up, carbon market financed investment for developing countries seems clear. A crucial question is whether industrialised countries feel that the increased scope for least cost mitigation, plus mitigation management at a sector level by developing countries, provides what they are expecting of such sectors in such developing countries in the post-2012 regime.

A key underlying issue here is about the international competitiveness of emission intensive sectors in industrialised countries – specifically 'carbon leakage'. Between industrialised countries, this concern mostly is displayed through an expectation that all industrialised countries will take fixed and binding economy-wide targets. The debate is then how stringent should be the reduction targets of individual countries. Of course, within industrialised countries there will be domestic policy debates about how such national targets are then distributed among specific sectors, especially those perceived to be internationally competitiveness-at-risk. But this is largely a domestic policy matter that need not be engaged in by the international community.

With respect to *SNLTs* for developing countries, the way the competitiveness issue is displayed is different. It becomes a question of whether industrialised countries, under pressure from their domestic industry constituencies, have specific technical requirements for such *SNLTs*. These, for example, may mean that there is an expectation that certain given sectors in certain given countries should be covered in such a regime, or that certain technical benchmarks should be applied in the determination of appropriate baselines.

It is clear that there is some traction in some industry sectors in some industrialised countries that such competitiveness concerns should be given serious consideration in any formulation of a new *SNLTs* mechanism (or, for that matter, in the formulation of any developing country commitment). Indeed there is a view in some quarters that global industry agreements in certain competitiveness-prone industries sectors (e.g. cement, iron and steel and aluminium) covering both industrialised and developing countries are preferable than having these sectors covered by *SNLTs* in developing countries. What is less clear is whether these competitiveness concerns have sufficient traction with enough industrialised country governments for this to impact the development of negotiation modalities for *SNLTs*.

In addition to competitiveness concerns, as heralded in section 2.6 and discussed more in section 6.3, there may be concerns about the scale of credits that may flow from some sectors if sectoral crediting were allowed. This issue is about the potential mismatch of demand and supply in the carbon market (i.e. potentially too little demand and too much supply).

If these competitiveness and potential (over) supply concerns become sufficiently important to major players in the negotiations, then the following type of decisions might be deemed necessary with respect to the development and negotiation of proposals for *SNLTs*:

- which sectors are suitable on a national and international level (and which are not), including the technical or other criteria by which these judgements might be made
- the demarcations of the sectors in order to provide for international comparability – while for some sectors boundaries are relatively easy to define (e.g. cement sector), this might

be more challenging for others (e.g. chemical production). Spill-over effects have to be accounted for.

- what data and information must be provided and the nature and uniformity of this data (e.g. for comparability assessments)

It may be desirable to centrally collect data that is comparable across countries. This data could inform countries that are proposing national sectoral baselines and other countries and institutions to judge the stringency of the proposed baselines. The data may be collected by the UNFCCC. It would be of key interest to the technical expert body proposed in section 3.1.

Irrespective of whether these issues become a necessary part of the process of negotiations for *SNLTs*, it can be expected that there will be requirements for a minimum level of sophistication and performance of MRV systems for any such sectors. This may have the effect of ruling out some sectors in some countries where the MRV systems are not sufficiently mature.

Attention to MRV issues is therefore a critical issue in the national level development and testing of the sector no-lose target mechanism. But it may also be a key issue for the international process elements discussed in this section, for example the work of the technical expert body. Work undertaken under the AP-6 and the current experience with MRV systems under the flexible mechanisms can be drawn upon.

Challenges that might be faced in this process could be the availability of data from industry for reasons such as competitiveness concerns, especially confidentiality, or institutional barriers within the industry. Furthermore, the timeframe within which this has to be achieved could be difficult to set, as the amount of data that needs to be gathered might differ tremendously from country to country, not only because of the size of a certain country's sector but also because of institutional and political barriers, that might be quiet different across countries.

A key point regarding the issues raised above is that those groups already working proactively on methodologies applicable to this mechanism (e.g. sectoral proposal templates) need to get some indications as soon as possible from the international community as to the likely required technical 'specifications' for the information and data necessary to support the negotiations. This will help such groups in their ongoing work testing the viability of this mechanism in given countries and sectors.

3.3.2 Piloting sector no-lose targets

Given the potential importance of this mechanism, it will be desirable to find some early means to pilot test it prior to the final details of the mechanism being set. Countries could volunteer to participate that have sectors mature enough for no-lose targets. Within this pilot phase, demand for the credits has to be generated (as the country's sector would no longer be eligible for CDM) and additional financing for setting up such an approach will be needed.

The World Bank's new *Carbon Partnership Facility* (CPF) provides an opportunity for such piloting. It is conceivable that pilot phase activities could be done for some sectors at either national or sub-national regional scale. A number of the proposed possible pilot initiatives identified by the World Bank for the CPF, in particular large scale renewable electricity generation, could be seen as amenable to a *SNLTs* mechanism.

3.3.3 Negotiating sector no-lose targets

At some point, the multilateral post-2012 negotiation process will be ready to consider proposals for *SNLTs* that are being put forward by some developing countries. Figure 8 in section 2.4 depicted the nature of what such proposals may look like. In particular a number of emissions intensity performance 'lines' are shown over a future period of time. To recap, this set of lines includes:

- a *reference line*, representing the projected emissions intensity including currently implemented national policies and measures relevant to emissions in this sector and existing known levels of external funding or financial support, including CDM projects in the sector
- the *sector crediting baseline* (the proposed sector no-lose target) which reflects the contribution to reduced emissions intensity from enhanced national policies and measures and foreseeable new external funding and financial support (e.g. from technology/funding support packages proposed to be included in the new agreement for SD-PAMs or other reasons, or from complementary initiatives such as the APP, new World Bank managed funds etc)
- an '*ambition' line*, which provides an indication of the possible improvements in emissions intensity (e.g. realisable technical potential) that may be achieved with the carbon financing (i.e. credits) from the *SNLTs* mechanism[23]

Coupled with the qualitative information behind these lines, the country's national story as it were, this information provides the basis for the negotiation and eventual acceptance of a sector no-lose target.

As noted above, the proposal and information contained therein should already have been through some form of objective technical assessment process by an independent technical expert body. The assessment, and any subsequent revisions to the proposal that the country may have made, would be public knowledge to the negotiating process. However, the negotiations themselves would follow whatever process is agreed to be taken by the Parties. Presumably this should be the same for the negotiation of both industrialised countries' targets and any developing countries' *SNLTs*. Ideally a high degree of transparency will prevail, but the nature of international multilateral negotiations is such that final agreements are often only achievable in a somewhat less than transparent setting.

<u>A Crucial Issue – Timing mismatch</u>

A significant issue for the negotiations that is relevant in particular to *SNLTs*, is that it cannot be expected that every developing country that may be interested to propose *SNLTs* will be ready to do so at the time that the international community expects the main details of the post-2012 multilateral climate change 'deal' to be agreed (e.g. in late 2009). The underlying issue here is the carbon market demand and supply issue discussed in section 2.6. In short, there are clear links between the targets that industrialised countries take on and *SNLTs*. These links are quite complex, politically and technically:

(i) If there is the will among industrialised countries to take on deep reduction targets, there will be a greater concern about the potential costs and a greater interest in the scale of

[23] A key value of this line is that it can give others in the negotiations a sense of the credits that may enter on the supply side of the market.

lower cost abatement opportunities that may enter into the overall emissions trading system from credits from the *SNLTs* mechanism. Moreover, the reason that this political will exists in some industrialised countries may be because some key sectors in some key countries are covered under *SNLTs*.

(ii) On the other hand, if the will of some key industrialised countries is less than is hoped by others, the overall ambition of industrialised countries may not be so great as to create a huge demand for credits from *SNLTs* to keep carbon prices at what are seen as reasonable levels. In this circumstance the 'mood' about *SNLTs* could be quite different, i.e. it will be affected by concerns that mechanisms that may 'flood' the market with large numbers of relatively low cost credits may not be good for the overall health of the carbon market, or the climate change mitigation challenge.

(iii) There is an obvious potential for a dynamic interplay between the circumstances of (i) and (ii). This challenge for the negotiations warrants significant diplomatic skills being brought to bear during (and before) the key negotiations of targets.

However, all this is somewhat moot if the details of potentially key developing countries' *SNLTs* are far from being clear at the time the 'hard' negotiations of industrialised countries' targets are happening.

All this suggests that a 'doorway mechanism' of some form needs to be part of the main agreement that leaves open the option of such *SNLTs* to be added to the agreement at a later time. Part of this mechanism would have to address what happens to industrialised country targets that have already been agreed.

A number of theoretical options exist for a mechanism to address this timing mismatch problem:

- Industrialised countries could agree on stringent emission reduction targets in 2009/10 with an explicit condition that a certain number of key developing countries adopt *SNLTs* in key sectors by the end of 2011. But this would not be satisfactory as it may imply that the agreement in 2009 will turn out to actually not be an agreement.
- Industrialised countries' targets could be automatically made more stringent as a function of the size of developing countries and sectors with *SNLTs*. This would provide an incentive for developing countries to assume such targets, as it automatically creates demand for such credits. But the political (un)feasibility of having such uncertainty for industrialised countries is likely to rule out such a 'ratcheting' option.
- The agreement could create a separate requirement (in essence a second target) for industrialised countries to purchase credits from *SNLTs*. If not enough credits from *SNLTs* are available, units from the primary carbon can also be used (AAUs, CERs, ERUs). This option is based on a CCAP "dual markets" proposal for REDD. The problem here is that the purchasing decision of industrialised countries in this second market has to be taken 'ex-post' at the end of the commitment period. Not knowing what the supply of *SNLT* credits are available to fulfil these second targets (hence how many primary market units may be needed) can cause great uncertainty on, and possible volatile shifts in the carbon price in, the primary carbon market.
- At the time that the industrialised countries agree their targets, a 'budget' could be established for the number of credits from developing country *SNLTs.* This can address concerns of possible over-supply of credits entering the system based on later agreements for *SNLTs*. But like any 'caps' or restrictions it raises questions about 'who gets served first' and can have the effect of disincentivising actions in the future that may

be highly desirable. Moreover there is no guarantee that this budget will be taken up, so this may raise concerns on the industrialised country side about the targets they've agreed to take on.

More work is needed on this timing mismatch issue. The best option, of course, is for an immediately implemented accelerated capacity building and diplomatic effort, such that details of potential *SNLTs* in some key sectors in some key countries can be well advanced at the time industrialised countries are agreeing their next targets. These could then be finalised in the period between when industrialised countries agree their targets and then the overall package of the 'deal' is ratified by domestic governments.

3.4 ASSESSING COMPLIANCE WITH *SECTOR NO-LOSE TARGETS* – AND ISSUING CREDITS

Once the *SNLTs* have been agreed upon for a specific country on an international level, the same tools can be used for assessing compliance as are currently used for industrialised country national emission targets. These include the national emission inventory reports that have to be submitted to the UNFCCC every year and that are supported by reporting guidelines.

For *SNLTs*, these could be limited to the sector of the no-lose target, and varied as needed to fit the circumstances. One key issue is the period of such inventory submissions, noting that credits are only to be issued ex-post based on assessed performance.

The national inventory reports would then be reviewed by an international team of experts. The review teams would also assess whether the emissions are below or above the sector crediting baseline and propose the number of credits to be issued. The compliance with the target and recommendation of the review team with respect to credits issuance would then be accepted by the COP. In the event of any dispute about this, the matter would be forwarded to the compliance committee for resolution.

3.5 CONCLUDING COMMENTS

Immediate term issues that are relevant to getting an international agreement for *SNLTs* have been described in this section. These show that a large amount of work is lying ahead and many challenges will have to be mastered. As can be seen a great number of preparatory steps are still necessary. The priority is to initiate the process as soon as possible. Even with an early start, the process for setting up *SNLTs* will need some time. Various steps will have to be taken by the countries interested in such approach and within international negotiations. International and national preparations will have to run in parallel and feedback between each other.

4. SUSTAINABLE DEVELOPMENT, DOMESTIC POLICIES AND MEASURES, AND SECTORS

Key Messages Of This Section

SD-PAMs in general

- SD-PAMs is a strategic approach involving a commitment by developing countries based on choosing a development path that results in lowered emissions, rather than an explicit climate target. SD-PAMs commitments by developing countries would be to *implement* sustainable development policies, which through associated MRV can be shown to have beneficial climate change outcomes.
- The implementation of SD PAMs in developing countries, including MRV systems, requires assistance through capacity building, technology and funding mechanisms (but not carbon financing) provided by industrialised countries – per Article 4.3 of the UNFCCC.
- Given such assistance, the SD-PAMs approach has the potential to mobilise the largest source of finance, that is, domestic investment. National policies, particularly those focused on development, by their sheer scale have large potential to shift investments. The challenge is to move both public and private investments into climate-friendly policies and technologies. It is in influencing these larger flows that external funding can play a leveraging role.
- Given that 'climate beneficial' outcomes of **SD PAMs** are not financed through the carbon market (carbon credits), such **benefits to the climate are absolute – and should be recognised and encouraged as such**.

Linkages between SD PAMS and *SNLTs*

- There are several similarities between *SNLTs* and SD-PAMs, as well as some differences. On the similarities side, both are voluntary and country-based in their nature and involve bottom-up pledges. Both *SNLTs* and SD-PAMs seek to recognise action already being taken by developing countries and to incentivise further action.
- SD-PAMs are in principle applicable across entire economies, in virtually any sector or across sectors. In practice, countries will choose SD-PAMs that support national priorities, within or across sectors.
- In practice, *SNLTs* are not seen as viable for all sectors, nor for a given sector in all developing countries. The space potentially occupied by *SNLTs* therefore would be narrower than SD-PAMs, but where it is applicable it can be expected to overlap with SD-PAMs.
- But this overlap between SD-PAMs and *SNLTs* can be seen as complementary, rather than conflicting. SD-PAMs could be thought of as being a (or the) primary contributor to the wedge between a sector *reference line* and a sector *crediting baseline* – i.e. the wedge showing as being funded by new external support but not the international carbon market (refer Figure 8)
- Ultimately, it is not the order of wedges that is fundamentally important, but that implemented together and supported respectively by public (SD-PAMs) and private (carbon finance) money, the overall emission reductions can be greater. However, both need to be discussed together in the multilateral negotiation process where developing countries are seeking the agreement of others to their proposals for SD-PAMs and *SNLTs*. Indeed, the understanding of how forthcoming the international community will be in terms of the external (public) support for the proposed SD-PAMs initiatives in a given sector is key to the setting of any SNLT (crediting baseline) in that same sector.

4.1 INTRODUCTION

While international policy frameworks that include mechanisms for international funding and financing can, as is implied, help frame potential outcomes at the country level, it is ultimately on-the-ground activities that reduce emissions and enhance sinks. Domestic policies and measures arguably have the greatest influence.

Section 2.2 and Figure 3 touched on domestic policies and measures in a strategic sense, i.e. its advocating that countries take a *program approach* to low carbon investment. But, to date, the most significant contribution in the post-2012 policy literature on domestic policies and measures for developing countries has been on the topic of sustainable development policies and measures (SD-PAMs). This addresses the question of how developing countries might implement domestic policy more effectively, both to promote their own sustainable development, but also with the co-benefit of reducing greenhouse gas emissions.

The purpose of this section is to present the concepts and detail of the SD-PAMs approach and explore what synergies and links there may be with domestic policy implementation in sectors for which countries have taken on a sector no-lose target.

This discussion on SD-PAMs takes as its starting givens that :

- The pace of climate negotiations needs to step up significantly to deal with the urgency of the challenge posed by the science and economics of climate change. To achieve the objective of the UN Climate Convention, deeper emission reductions will be required in all industrialised countries, but the growth of emissions in developing countries also needs to slow quickly.
- Meaningful participation by developing countries may take several forms. SD-PAMs is an approach for developing countries that starts from sustainable development – which is part of the UNFCCC objective – rather than climate targets. Not only does Article 2 of the Convention require stabilisation on concentrations to be achieved in a manner that does not prejudice sustainable development, but the right to promote sustainable development is a Convention principle as well (UNFCCC 1992).

4.2 WHAT ARE SD-PAMs?

SD-PAMs is a strategic approach involving a commitment based on choosing a development path that results in lowered emissions, rather than an explicit climate target, i.e. targets to reduce or limit GHG emissions. It comprises policies and measures that are firmly within the national sustainable development priorities of developing countries, which through inclusion in the multi-lateral climate framework seeks to recognize, promote and support means of meeting these policy priorities in a lower-carbon development path.

The SD-PAMs commitment would be to *implement* sustainable development policies.

The SD-PAMs approach starts from development objectives, and then identifies more sustainable pathways to achieve such objectives. In terms of the conception of a strategic program as outlined in section 2.2, therefore, the sectoral umbrella program (or implementation plan) would be defined *primarily* in terms of local development objectives. Reducing GHG emissions are a co-benefit of making development more sustainable (Munasinghe 2002; Sathaye et al. 2007). Indeed, the umbrella program or implementation plan may in many cases best be defined within domestic sectors. That is how many governments do business. Due

attention must also, however, be paid to the importance of policy alignment and coordination across sectors.

SD-PAMs could include a large range of national or sectoral policies with a direct impact on GHG emissions. Examples would include increasing electrification (if the fuel mix for electricity generation displaces more emissions-intensive sources), in which case the SD-PAM would apply specifically to electricity use in households. Improving energy efficiency would be a major SD-PAM (Winkler, Howells & Baumert 2007), but while it might be considered an intervention limited to the 'electricity' sector, it applies across economic sectors of industry, commerce and residential sectors. This points to the problem of unambiguous and broadly agreed definitions of sectors.

Examples of SD-PAMs

Rural electrification in India seeks to empower the 56% of households that remain without electricity supply. The development challenge is that 500 to 600 million people remain without access to electricity. Three paths were examined in a study (Dubash & Bradley 2005) – (1) a 'grid first' approach has little chance of meeting electrification targets; (2) a strategic approach of 'diesel first' raises concerns about the cost of oil imports, security of supply and local air pollution; and (3) 'Renewables first' provides benefits, contributing to rural electrification, but at significant incremental capital costs (Dubash & Bradley 2005). Given concerns raised about the grid and diesel technologies, there are important reasons for India to prefer renewable energy on domestic policy grounds. Renewables already play an important role in rural electrification (measured in % population with access) and continue to contribute without adding to dependence of imports. The diesel scenario, by contrast, adds some $21 billion per year to India's import bill (as a share of total, this could be the SD units reported). Favouring renewable energy sources brings significant CO2 emission savings: between 14 and 100 million tons of CO2 compared to using the grid (Dubash & Bradley 2005).

Not all examples are positive. There are also examples of policies that are pure climate policies. Carbon capture and storage is perhaps the clearest example. As an end-of-pipe technology directly seeking to store CO2 as a waste product, it has little benefit for local sustainable development (Mwakasonda & Winkler 2005). Equally, there are examples where policies may be good for local development, and even sustainable, but increasing emissions. Increased rates of electrification, absent any change in the fuel mix, would increase GHG emissions (Winkler et al. 2002c).

Other positive case studies include energy-efficient low-cost housing in South Africa is one example of a SD-PAM, with the potential to remove the housing backlog while reducing emissions compared to a coal-fired grid (Spalding-Fecher, Mqadi & Oganne 2003; Winkler et al. 2002d). Avoided emissions come together with substantial local sustainable development benefits – household energy savings (Rand / household / month), reduced indoor air pollution (another SD unit), improved health and increased levels of comfort. Experience at the project level has quantified some of these benefits – not only a level of thermal comfort at 21ºC (as the SD unit was defined in this case), but less active space heating that reduces energy bills by some R625 (ca. $100) per household per year (SSN 2004).

If implemented at larger scale – e.g. applied through policy to all housing, not just a single project - avoided emissions might range between 0.05 – 0.6 Mt CO2-eq if implemented at

policy (Winkler, Howells & Baumert 2005). The climate co-benefits are relatively small, since poor households use less energy than richer ones; the savings at most account for a reduction of 7% of residential CO2 emissions or 0.2% of national emissions (Winkler et al. 2002c).

Further examples of the use of case studies in China's energy sector (Kejun, Xiulan & Qiang 2006), including China's efforts to reduce air pollution in the process of motorisation (Wei-Shiuen & Schipper 2005). In the Brazilian case (La Rovere, Pereira & Simões 2006; Moreira, Nogueira & Parente 2005), the ethanol program produces approximately one third of Brazil's transport fuel, has saved $100 billion in foreign currency expenditure, has created over a million rural jobs and has climate co-benefits estimated at 574 million tons of CO2 over the lifetime of the program. These measures suggest that these may be meaningful SD units in Brazil. Without the biofuels program, Brazil's cumulative emissions of CO2 from 1975 to the present would have been 10% higher (Moreira et al. 2005).

The co-benefits of making development more sustainable – that is avoiding increased GHG emissions through a low-carbon development path – are well-recognised in the IPCC's Fourth Assessment Report (Sathaye et al. 2007). Climate policy alone will not solve the climate problem – changing development to a lower-carbon path is at least as important as explicit climate policy. Areas that have historically not been thought of as climate policy - macroeconomic policy, agricultural policy, multilateral development bank lending, insurance practices, electricity market reform, energy security and forest conservation - can significantly reduce emissions (IPCC 2007). The SD-PAMs approach seeks to capture the potential of co-benefits in a way that can be integrated into the architecture of the multi-lateral climate regime.

The SD-PAMs approach was originally developed as part of early considerations of new options for post-2012 (Winkler et al. 2002a). A variety of case studies have been developed to illustrate how the concept might be applied in a range of developing countries (Dubash & Bradley 2005; Moreira et al. 2005; Wei-Shiuen & Schipper 2005; Winkler et al. 2007; Winkler et al. 2002b). Methodological work has been undertaken to consider how the benefits of SD-PAMs might be quantified, including case study approaches but also
Through national energy modelling, analysis of sectoral data and inclusion of policies in global emission allocation models (Winkler, Höhne & Den Elzen in press 2008).

The approach was introduced into discussions as part of the Convention Dialogue on long-term cooperative action (RSA 2006). In the negotiations culminating in the Bali Action Plan, the approach was referred to by several delegations. SD-PAMs are one approach that would fit the description of "nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner" (UNFCCC 2007a).

The SD-PAMs commitment rests on the implementation of policy – domestic policy that meets local sustainable development objectives. How likely it might be that SD-PAMs are realised will depend in part on the design in the multilateral context, but perhaps in even greater part of the political, institutional and public support that the pledged policies enjoy domestically. The following section turns to an analysis of SD-PAMs by various architectural considerations.

4.3 ARCHITECTURAL CONSIDERATIONS FOR SD-PAMs

A number of architectural features of the SD-PAMs approach are worth highlighting:

Forum

SD-PAMs would be negotiated under the framework of the UNFCCC, but synergies exist with forums and agencies focused on sustainable development, such as the Commission on Sustainable Development and national agencies dedicated to sustainable development.

Eligibility

As a form of commitment SD-PAMs would only be applicable to developing countries, while policies and measures for industrialised countries are a means of implementing quantified emission reduction targets.

Objectives

The goals of SD-PAMs are framed in the first instance in terms of development, rather than climate. The approach starts by considering a country's own long-term development objectives, and then identifies policies and measures are identified that would make the development path more sustainable. In the context of the climate negotiations, SD-PAMs also include GHG objectives – as co-benefits of the more sustainable development path.

Scope

SD-PAMs are in principle applicable across entire economies, in virtually any sector or across sectors. Some SD-PAMs might be implemented within a specific sector, for example residential solar water heating would be implemented in a fairly well-defined sector, housing. Other SD-PAMs, for example efficiency measures or air quality standards, would cut across sectors.

National circumstances

SD-PAMs are designed to achieve national development objectives in a more sustainable manner. The approach starts by considering a country's own long-term development objectives. Next, policies and measures are identified that would make the development path more sustainable. By design, therefore, SD-PAMs are sensitive to national circumstances. Furthermore, no harmonised list of SD-PAMs would be imposed on any country, but rather each country would define how it can achieve its own development objectives more sustainably – and agree to report the GHG co-benefits internationally.

Flexibility

SD-PAMs are by design sensitive to national circumstances, such as the structure of the economy, natural resource endowments, domestic industrial strategies and other factors. Under SD-PAMs, there would simply be self-selection for the focus on action. (The potential down-side of this approach is that sustainable development is so broad as to lack the focus require to galvanise action in key sectors.)

Legal nature of commitment

SD-PAMs commitments would take the form of a voluntary pledge within the multilateral regime. Developing countries voluntarily identify the policies and measures they wish to pursue. The mitigation actions taken could be acknowledged and recorded in a register.

Institutional and public support

While the legal nature of international commitments needs clear definition, the effective implementation of policy in developing countries perhaps depends to a greater degree on

domestic support. The bottom-up definition of SD-PAMs – from each country's own development objectives – makes political, institutional and broader public support more likely than for targets set internationally. Through this design, domestic policies and programs are likely to have the support not only of national governments, but also of major domestic institutions, and are hence more likely to be implemented.

Accountability procedures

It would be desirable to measure progress on both local sustainable development and GHG benefits. In so far as they are supported by finance and enabled by technology, it would be reasonable for implementation of SD-PAMs to be reported. The meaningful contribution by developing countries to mitigation would be more fully acknowledged in reports that could either form part of national communications or a separate format. However, as a voluntary measure there would be no compliance system. Accountability is important domestically at least as much as internationally. Strong stakeholder engagement in the design, monitoring and review of SD-PAMs will contribute to more effective implementation of national policies.

Environmental effectiveness

The effectiveness depends on the scale of SD-PAMs pledged and, critically, on the extent to which they are implemented. Common conceptions that bottom-up approaches such as SD-PAMs are *by definition* less effective than top-down allocations are erroneous – in either instance, efficacy can only be assessed if the stringency of the target set is known, as well as its realisation – i.e. whether the goal has been achieved. In so far as SD-PAMs expands action beyond the limitations of projects to larger-scale policy-based action, it has the potential to enhance environmental effectiveness.

Timing and triggers

The approach would be available to all developing countries without an entire new climate regime. It would require 'only' COP decisions.

Finance

SD-PAMs can be financed from a variety of sources – climate and development funding; domestic and international sources. The approach taken in this paper is that SD-PAMs would not be linked to carbon markets, avoiding issues of additionality and baselines.[24] If SD-PAMs were linked to markets (as suggested in other analyses (Ellis, Baron & Buchner 2007)), they would be very similar to policy CDM.

Further discussion of architectural issues, and how SD-PAMs might be implemented under the Convention, have been outlined previously (Baumert & Winkler 2005; Bradley & Pershing 2005; Ellis et al. 2007). The focus of this paper, however, is on *SNLTs*. It now takes up the comparison of SD-PAMs with this variant of sectoral approaches for developing countries.

[24] If SD-PAMs were linked to markets (as suggested in other analyses (Ellis, Baron & Buchner 2007)), they would be very similar to policy CDM.

4.4 FUNDING DIFFERENT KINDS OF SD-PAMs

Several varieties of SD-PAMs are possible, as the range of variations identified by Ellis and Baron (2007) makes clear.[25] SD-PAMs as proposed in this paper would be funded from non-market sources only. Several reasons that would support taking this approach, include:

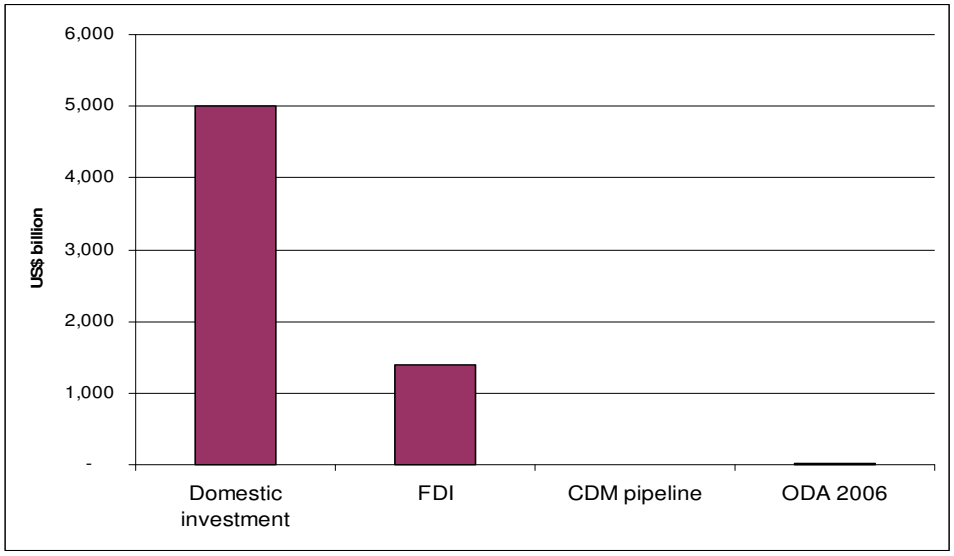
- SD-PAMs are focus on development first, with climate as a co-benefit. Funding streams that focus on (sustainable) development seem appropriate.
- Development activities often require up-front funding, rather than *ex post* incentives that may be delivered only years later by the carbon markets.
- Market-based funding immediately raises the issues encountered in the CDM, notably of additionality and baselines.
- Restricting SD-PAMs funding to non-carbon-market sources keeps the proposal distinct. The book containing the original SD-PAMs proposal also contained a chapter on sectoral CDM (Samaniego & Figueres 2002), the key difference being the explicit funding from CERs for the latter.
- Looking back to 1992, there is a long-standing commitment by Annex II Parties to fund the agreed full incremental costs of implementing measures and full costs of formulation and reporting (UNFCCC Art 4.3). This was not contingent on the sale of carbon credits.

Looking to the future, it is clear that no single source of funding will meet all needs. More specifically, the estimates of the future scale of the carbon markets indicate that this will meet at best half of the needs of developing countries. A UNFCCC Secretariat paper estimated that 46% of the $200 – 210 billion investment in mitigation in 2030 would be in developing countries (yielding 68% of the emission reductions). So roughly $90-100 billion would be needed in developing countries – but the size of the carbon market is estimated between $ 10-100 billion (UNFCCC 2007b: the 'I&FF' study). Hence the paper found that the carbon market "would have to be significantly expanded to address needs for additional investment and financial flows" (UNFCCC 2007b: para 6).

The carbon market on its own is unlikely to meet all needs, as outlined in section 2 of this paper. Figure 10 makes apparent that the large flows are domestic investment, with foreign direct investment a distant second. To show up to the scale, the revenues from CER sales from all projects in the CDM *pipeline* was estimated at $ 5 billion, which like ODA in 2006 is barely visible in this comparison.

[25] Ellis and Baron (2007) suggest three broad categories: SD-PAMs generate credit; SD-PAMs are encouraged by means other than credits; and SD-PAMs generate recognition only. Within this theoretical spectrum, this paper focuses only on the second option.

Figure 10: Relative scales of various investment flows



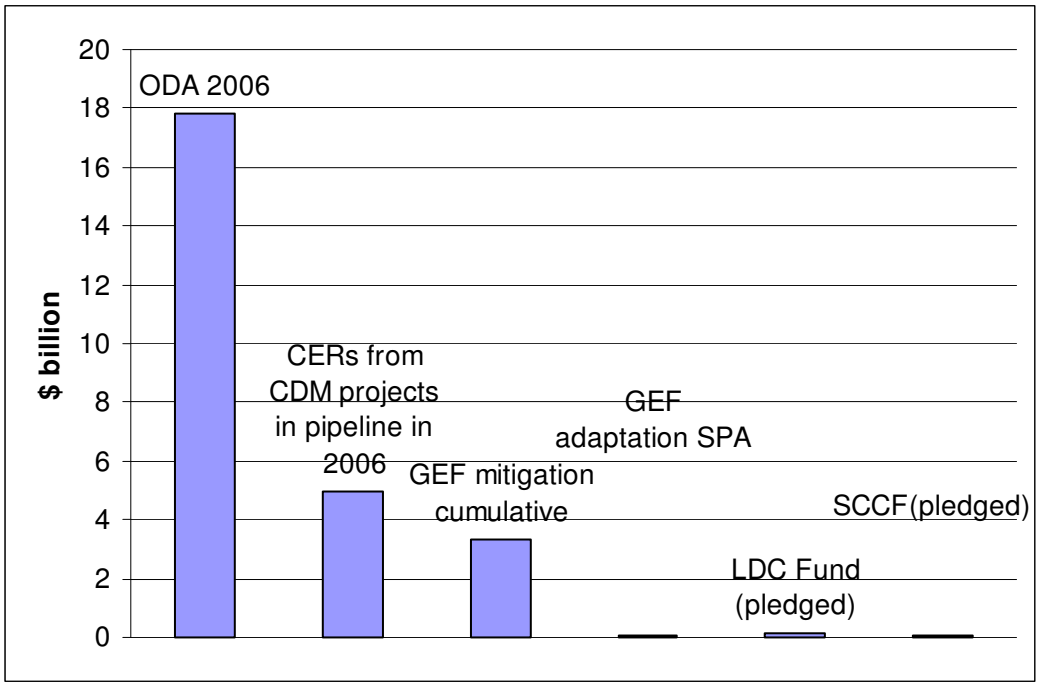
Source: Own analysis, based on data in UNFCCC (2007b)

Similarly, of course, the funding under the financial mechanism of the Convention would also have to increase by two orders of magnitude. 11 shows the two smaller bars from the previous graph (10), that is ODA[26] and[27] CERs from the CDM pipeline. Compared to the funds flowing through the Global Environment Facility, these now appear relatively large. Funding in for the adaptation pilot activities, and pledges for the LDC Fund and the Special Climate Change Fund are small in this context. The earlier analysis in section 2 can also be turned around – even large absolute amounts are small in relative terms.

[26] ODA funds less than 1 % of investment globally, but this rises to over 2 % in Africa and over 6 % in LDCs (UNFCCC 2007b: para 37)

[27] The revenue from CER sales was estimated at $ 5 billion, with total investment in the overall projects in the pipeline in 2006 at $ 25 billion.

Figure 11: Climate funds compared to CDM and ODA flows



The SD-PAMs approach has the potential to mobilise the largest source of finance, that is, domestic investment. National policies, particularly those focused on development, by their sheer scale have large potential to shift investments, beyond the scale of investment by developing countries already seen in project-based investment in unilateral CDM. The challenge is to move both public and private investments into climate-friendly policies and technologies. It is in influencing these larger flows that external funding can play a leveraging role. This type of funding is likely to be important **in particular** sectors in developing countries, notably those that depend on government investment and financial flows (UNFCCC 2007b: para 28).

As noted above, under the description of SD-PAMs in this paper, funding for SD-PAMs would not come from the carbon market. Several sources of public funding have been identified, from levies on international air travel, through funds to invest foreign exchange reserves, debt-for-efficiency swap to donated special drawing rights. It should also be remembered that there are markets other than carbon markets, and a Tobin tax for example is an economic instrument that could raise $15-20 billion (UNFCCC 2007b: para 28).

If the money supply could be increased, how might it be spent? The proposal for SD-PAMs is that funding would essentially go to governments, who would allocate it to specific policies.

Taking renewables as an example, governments that pledged to implement a Renewable Portfolio Standard might use the funding to fund x MW to implement this policy. If the option was for a feed-in tariff, the funding might be channeled to utility or municipal distributors to support the payment of higher tariffs for renewable electricity. For energy efficiency SD-PAMs, the funding might be dedicated to program costs, since they pay for themselves over time (with the possible exception of poor households, who might need grant funding for equipment). Again, it would be up to governments to channel the funding.

Money is one thing, spending it in a way that makes a difference is another. The next section looks at the importance of institutions in implementing domestic policies of the kind envisaged by SD-PAMs.

4.5 IMPLEMENTING DOMESTIC POLICY – THE IMPORTANCE OF INSTITUTIONAL CAPACITY

A South Africa case example

Institutional capacity at the national level will be critical to implementing SD-PAMs. This factor is at least as important in the realization of policies and measures in a developing country (if not more so), as the legally-binding nature of international commitments. An example from South Africa might help illustrate the point.[28]

Institutional arrangements clearly vary considerably across developing countries. In this section, we continue the case-study of South Africa. There is no central Ministry or department solely responsible for development in South Africa. While the Department of Environmental Affairs and Tourism would be the focal point for issues of sustainable development, many other departments deal with the issue in relation to their core function.

Even at national level, energy efficiency targets are to date defined by a voluntary agreement between government and business. The target is to reduce energy consumption by 12% below projected levels by 2015, with some sectors taking on a 15% target. Progress to date has been mixed. For industrial energy efficiency, key energy industries, such as the electric utility Eskom, the synfuel company Sasol, and other industry sectors (chemicals, mining), would need to be centrally involved in implementing any SD-PAMs.

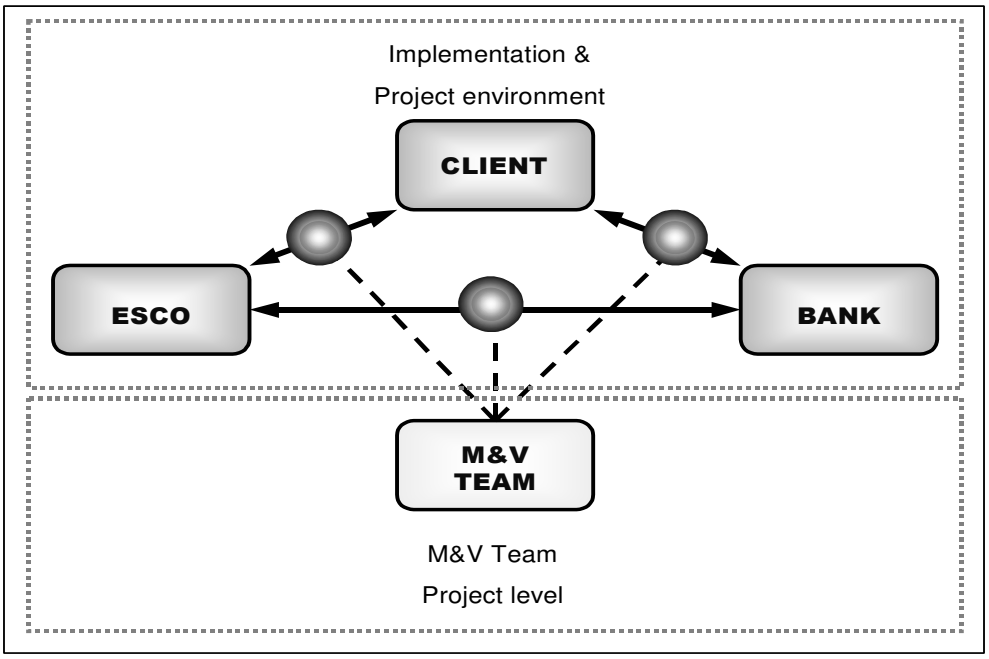
Public support and confidence by a broader set of national stakeholders – including NGOs and consumer organizations – for the target would further increase the likelihood of realizing the target. Public reporting of progress against targets is critical in this regard.

Figure 12 below shows that several institutions are involved in measuring and verifying energy savings. Eskom, the electricity utility, has a demand-side management program. The implementation of the program is outsourced to energy service companies (ESCOs), which assist clients in industry, commerce and the residential sector. The ESCOs carry out specific interventions for companies in industry (the client in Figure 12).

Four universities in South Africa are involved in measurement and verification (M&V) teams. These teams are employed by the utility to measure the savings against an energy baseline established prior to the intervention. After the intervention, the teams measure energy consumption either by a one-off use of instrumentation, or by long-term data recording. A conservative approach to energy saving is taken by the M&V teams, who only report energy savings that can be verified. Reports on the verified savings are submitted to the National Electricity Regulator (not shown in Figure 12) as well as the client.

[28] The example was previously presented in Winkler *et al.* (2007); the implications for climate architecture are further explored in this section.

Figure 12: Institutions involved in measuring and verifying energy efficiency savings in South Africa. *Source: (Grobler & den Heijer 2004)*



The confidence in SD-PAMs as an instrument can be increased if there is confidence that the targets set are achieved in practice. Taking the case-study of energy efficiency, how would the international community know that the reported savings have really occurred? Much of this depends on the institutional capacity in the country. In South Africa, the institutional infrastructure already exists to measure and verify the implementation of energy efficiency interventions in industry.

The international community might want to supplement this system, but does not need to start from scratch. If South Africa agreed to report an energy-efficiency pledge, the mechanisms to establish that this is "measurable, reportable and verifiable" would best be built on existing measurement and verification (M&V) systems. Supported by a range of stakeholders, the institutional capacity established around M&V provides assurance that policy intention is translated into effective action.

4.6 SD-PAMS AND 'SECTORAL APPROACHES'

To compare SD-PAMs to sectoral approaches, clarity is needed on the particular *kind* of sectoral approach being considered. A range of sectoral approaches are being talked about as a possible means of 'scaling up' action on mitigation, including sectoral CDM; benchmarks across trans-national sectors; technology transfer in specific sectors; the sector-based Triptych approach, and sectoral crediting mechanisms (Bradley et al. 2007; Den Elzen, Höhne & Moltmann 2008; Ellis & Baron 2005; Höhne et al. 2006; Samaniego & Figueres 2002; Schmidt et al. 2006; Ward 2006).

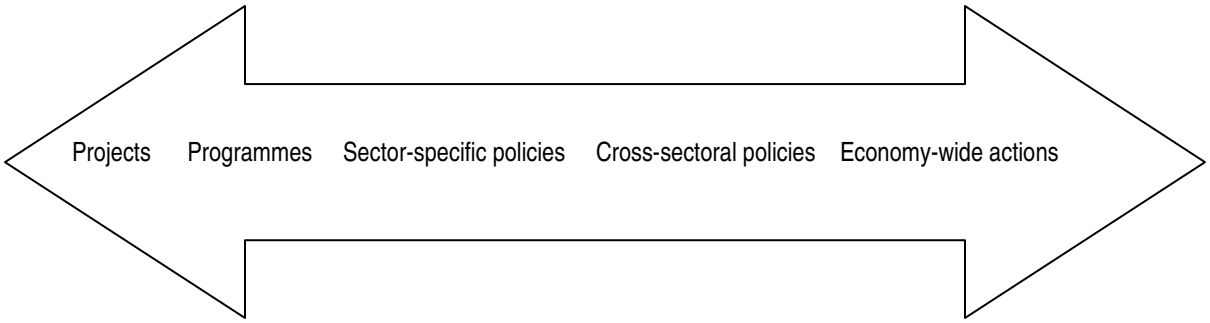
The focus of this paper is on *SNLTs* described as a particular policy 'tool'[29] applicable to developing countries only. This policy tool is considered as just one of the possible means for developing countries to take further action. Sectoral considerations might also inform the ways in which Annex I countries achieve national targets, but in those instances they would be policies and measures to reach an economy-wide emission reduction target.

SNLTs were elaborated more fully in section 1.2 and 2.3 above. There are several similarities between this particular variant of sectoral thinking, *SNLTs*, and SD-PAMs, as well as some differences.[30]

On the similarities side, both are voluntary and country-based in their nature and involve bottom-up pledges. Both *SNLTs* and SD-PAMs seek to recognise action already being taken by developing countries and to incentivise further action, beyond unilateral domestically supported actions. And as noted in section 2.4, it is expected that *SNLTs* will be selected by countries in sectors for which they seek scaled up investment according to their own sustainable development priorities, and where current carbon market policy tools, such as the various forms of CDM, are not considered adequate or appropriate to the task.

One could think of this as a continuum, with single projects at one end, and economy-wide measures at the other, as shown in Figure 13.[31]

Figure 13: Continuum of possibilities for incentivising action by developing countries



Some of the differences outlined here may be simply due to the architectural focus of this description. In reality, the approaches may be complementary and implemented in parallel. The differences revolve around the difference between targets (for GHGs) and PAMs to get there. But ultimately, even sectoral targets will require policies and measures to be implemented in the sector. And conversely, even cross-sectoral SD-PAMs will need to set goals and objectives, which have to be achieved in each sector covered.

SD-PAMs are in principle applicable across entire economies, in virtually any sector or across sectors. In practice, countries will choose SD-PAMs that support national priorities, within or

[29] The use of the term policy 'tool' (or instrument) to describe the *SNLTs* concept is to try and clarify that it is just one policy tool of many in the toolkit to help achieve scaling up. The general term 'approach' has led to confusion in the literature (approach to what?) and sounds more strategic and encompassing than is intended. So this is deliberately avoided in this paper's discussion of the *SNLTs* concept.

[30] The comparison made here draw on insights provided by Shaun Vorster.

[31] Figure 13 is comparable to Figure 4 in section 2.4, but the latter is focused only on 'compliance carbon' policy tools, while Figure 13 considers a broader range of tools, not necessarily aimed at compliance.

across sectors. Some SD-PAMs might be implemented within a specific sector, for example residential solar water heating would be implemented in a fairly well-defined sector, housing, and renewable generation may apply in electricity supply. Other SD-PAMs, for example efficiency measures such as mandatory efficiency standards or air quality standards, would cut across sectors.

As noted, in practice, *SNLTs* are not seen as viable for all sectors, nor for a given sector in all developing countries. The space potentially occupied by therefore would be narrower than SD-PAMs, but where it is applicable it can be expected to overlap with SD-PAMs.

But this overlap between SD-PAMs and *SNLTs* can be seen as complementary, rather than conflicting. Referring back to Figure 7 in section 2.4, in that framing, SD-PAMs could be thought of as being a (or the) primary contributor to the wedge between the sector *reference line* and the sector *crediting baseline* – i.e. the wedge showing as being funded by new external support but not the international carbon market. SD-PAMs that pay for themselves, such as energy efficiency, could be developing countries' contribution to the atmosphere. The wedge beyond the crediting baseline is where the carbon market becomes the key source of funding.

It is not the order of wedges that is fundamentally important, but that implemented together and supported respectively by public (SD-PAMs) and private (carbon finance) money, the overall emission reductions can be greater. However, both need to be discussed together in the multilateral negotiation process where developing countries are seeking the agreement of others to their proposals for SD-PAMs and *SNLTs*. Indeed, the understanding of how forthcoming the international community will be in terms of the external (public) support for the proposed SD-PAMs initiatives in a given sector is key to the setting of any SNLT (crediting baseline) in that same sector.

Both *SNLTs* and SD-PAMs are compatible with the Bali Action Plan (UNFCCC 2007a). Sustainable development is part of core balance between sub-paragraphs 1b(i) and 1b(ii), in that mitigation actions by developing countries are qualified as being "in the context of sustainable development". While SD-PAMs have to date primarily been investigated in relation to mitigation, the plan includes consideration of "means to incentivize the implementation of adaptation actions on the basis of sustainable development policies" (1e(iv), the closest the Bali Action Plan comes to saying SD-PAMs). The approach has great potential to contribute to the critical balance between mitigation and adaptation.

Paragraph 1b(iv) is the place where sectoral approaches are included, specifically "cooperative sectoral approaches and sector-specific actions, in order to enhance implementation of Article 4, paragraph 1(c), of the Convention". Sectoral approaches are mentioned after REDD and before "various approaches, including opportunities for using markets" and so is clearly included as one of the approaches available to Parties. In the Bali Action Plan, all these fall under the rubric of "enhanced national/international action on mitigation of climate change", that is, not only action by developing countries, as with the *SNLTs* variant considered in this paper.

Beyond these high level similarities and differences, some further points of detail comparing and contrasting SD-PAMs and *SNLTs* are:

Flexibility v focus

While SD-PAMs are applicable to all sectors and activities at all scales, *SNLTs* can be expected to focus on specific sectors, or sub-sectors, e.g. electricity generation as distinct from all energy.

Both *SNLTs* and SD-PAMs support learning-by-doing, albeit for *SNLTs* with a greater sense of urgency added by the opportunity of substantial crediting. Despite the narrower scope in focusing on specific sectors for *SNLTs*, the point is that key sectors can cover substantial parts of a country's emissions. Energy supply and use in South Africa, for example, accounts for four-fifths of emissions.

Environmental effectiveness

The environmental effectiveness of *SNLTs* is incentivised by the ability to sell into the carbon market, but similar to SD-PAMs then depends on the implementation of domestic measures to reduce emissions below the crediting baseline. Both *SNLTs* and SD-PAMs are compatible with a "multi-stage" approach (to future global climate change mitigation). They could be seen as transitional 'mechanisms', which are defined around voluntary contributions, which could be converted to verifiable actions, which in time could become mandatory if linked to appropriate incentive structures.

Costs and Financial Flows

While the large emission reduction potential of sectoral approaches using best available technology have been analysed (Höhne et al. 2006), there is little information on costs. Given that sectoral mechanisms like *SNLTs* have not been implemented to date, there are no estimates of the potential financial flows. As with SD-PAMs, costing of particular interventions can, however, at least be modelled.

MR&V

Both STDC and SD-PAMs are approaches in which avoided or reduced emissions are clearly measurable and reportable, using a common metric of tons of carbon dioxide. *SNLTs* with its crediting baseline would integrally include verification of performance beyond the baseline. SD-PAMs, not being funded by the market, would not have verification through such market required MR&V procedures. An independent review mechanism would be needed (perhaps after some years of learning-by-doing) to quantify the contribution to the atmosphere of a basket of SD-PAMs (Winkler et al. in press 2008).

4.7 CONCLUDING COMMENTS

SD-PAMs and *SNLTs* have much in common, but are nevertheless distinct proposals. SD-PAMs comprises policies and measures that are firmly within the national sustainable development priorities of developing countries, which through inclusion in the multi-lateral climate framework seeks to recognize, promote and support means of meeting these policy priorities in a lower-carbon development path. *SNLTs* are focused on domestic measures in a sector that reduce emissions, with no penalty for not meeting a baseline, but the incentive of crediting for exceeding the benchmark.

Some of the differences relate to national circumstances. SD-PAMs by design start from national development objectives, whereas *SNLTs* would tend to involve some pre-definition of key sectors. But perhaps the key difference lies in the funding source, with *SNLTs* clearly linking into carbon markets through crediting baselines. SD-PAMs (in the variety considered here) draws only on non-market funding, using this to influence and leverage the larger flows of domestic investment.

Both SD-PAMs and *SNLTs* are specific policy tools within an overall program approach to low carbon investment in developing countries. In both, the implementation of measures, be they at national or sectoral level, are likely to be critical to their effectiveness. Both approaches involve complexity, with data-intensity, definitional issues and institutional management some of the key issues for *SNLTs*, and definitions of sustainable development and funding arrangements critical for SD-PAMs. Locating more specific climate actions – be they projects, programs or individual policies – within an overarching context of national policy objectives appears to be the best means of structuring a strategic program.

5. DOMESTIC IMPLEMENTATION AND THE CARBON MARKET

Key Messages Of This Section

- While domestic activities, or domestic policies and measures that may be employed by countries to incentivise these activities, are mostly unrelated to targets that countries may have under an international policy framework, any mechanisms associated with the international framework can have a profound influence (e.g. the EU ETS can be seen as stemming from international emissions trading provisions of the Kyoto Protocol.
- A key issue for developing countries with *SNLTs* is how can the interest of project developers and carbon financiers whose activities thus far under the CDM have focused at the project level – including, importantly, the issuance of carbon credits – be maintained when crediting occurs at a sector level and, in the first instance, is directed to governments.
- To achieve sectoral emission reductions, national governments could implement domestic policies and measures with direct links for entities to the international carbon market, e.g. schemes that allocate credits to emission reduction actions by entities in the relevant sector; or establishing internal emissions trading schemes like the EU ETS;
- Governments could also implement new and additional domestic policies, or enhance enforcement of existing measures, that do not rely on carbon finance and emissions trading. Carbon taxes, enhanced law enforcement, intensity or efficiency standards, and subsidies (either adding or removing subsidies as the case may be for a particular sector) are examples of these types of policies and measures. Governments can then sell the received credits directly on international carbon markets.
- To overcome the potential problem of the disengagement of currently active carbon market players (project developers and carbon financiers) because of concerns about having to negotiate with national governments to get credits, a *nesting approach* could be employed whereby an international institutional process (akin to the current CDM) existed and credited individual on-the-ground activities. The total of any credits issued under this process would then be deducted from the amount the country was later issued for the overall sector performance.
- If a concern arises that there may be a demand-supply imbalance that would harm the carbon market (i.e. too little demand and too much supply from sectoral crediting in developing countries), a variant of the nested approach may be to have funds provided to governments for beating their sector targets, not carbon credits.
- Significant institutional issues of a capacity, legal framework and 'public compared with private' nature can arise with all domestic implementation models. (These are assessed in some detail.)
- Given these institutional issues, there are significant capacity building challenges that need to be taken up with some urgency if *SNLTs* are going to play a significant role in the next multilateral framework.

5.1 INTRODUCTION

Like fixed and binding targets for industrialised countries, *SNLTs* for developing countries can be seen as primarily just an element of the international policy framework. In practice, as policy tools, such forms of targets have little to do with domestic activities or the domestic policies and measures that may be employed by countries to incentivise these activities.

This section considers in greater detail the question of what type of domestic policies and measures can most effectively connect with the incentive of international carbon market financing applied at a sector level. A key issue is how can the interest of project developers and carbon financiers whose activities thus far under the CDM have focused at the project level – including, importantly, the issuance of carbon credits – be maintained when crediting occurs at a sector level and, in the first instance, is directed to governments.

This section also explores key compliance and legal issues at an international and in-country level surrounding the implementation of *SNLTs*.

In thinking about the nature of the domestic policies and measures that national governments may undertake in sectors for which they have taken on a sector no-lose target, this paper assumes the following about the general design of the policy option itself:

- sector baselines (targets) negotiated at the same time as industrialised country targets;
- periodic sector wide monitoring and accounting of emission reductions against this baseline;
- periodic awarding of emission reduction credits (or other incentives) to national governments if actual sector emissions are below the negotiated baseline;
- the system may possibly incorporate a separate crediting mechanism for programs and project activities promoted by sub-national actors within the covered sector.

5.2 POLICY MEASURES UNDER *SECTOR NO-LOSE TARGETS*

Overview

To achieve sectoral emission reductions, national governments are likely to implement a set of domestic policies and measures. Governments may decide to design schemes that allocate credits to entities operating in the relevant sector – similar to, e.g. the New Zealand Projects to Reduce Emissions (PRE) scheme, or JI or through the establishment of internal emissions trading like the EU ETS. (See section 5.3)

Provided that there is an international market for credits, governments could also decide to raise funds to commercialize the received credits directly on international carbon markets and implement domestic policies that do not rely on carbon finance and emissions trading. Carbon taxes, enhanced law enforcement, intensity or efficiency standards, and subsidies (either adding or removing subsidies as the case may be for a particular sector) are examples of these types of policies and measures. If such policies are already in place they may be considered part of the host country's baseline, such that implementation should not generate any additional environmental benefits. New and additional policy measures, or enhanced enforcement of existing measures, would however generate additional emission reductions, i.e. serve to help the country beat its sector baseline.

Institutional Capacity Requirements

Institutional capacity within national governments is needed to develop, implement, and enforce the chosen policies and monitor the sector's emissions. Initial institutional capacity is also needed to quantify the costs and quantity of the emission reductions that can be achieved by a certain policy intervention. Governments will have to ensure that sufficient enforcement capacity is built within government agencies; knowledge and expertise is being made available; and that robust reporting and data collection systems are in place.

Legal Framework

The government may finance the implementation of emission reduction policies through the state budget, the advance sale of future carbon credits, or other internationally available financing sources. Other ways of generating some up-front finance such as the sale of call options or the issuance of government bonds could also be explored, though this has not been seen to date in the current carbon market. Forward contracts may be coupled with advance payments for credits that could be used to help with some of the costs associated with developing and implementing these policies. The forward sale or securitization of carbon credits would create a government liability that has to be backed by the state budget. Alternatively, the government could choose to commercialize carbon credits through spot contracts or an auction after the credits are generated.

Governments will have to assess the legal conditions for the sale of carbon credits carefully. Carbon credits allocated to governments will form part of the body of state assets (some countries consider treating allocated international carbon credits also like natural resources). If countries decide to sell those credits, institutional and other legal requirements for the sale of such assets need to be met. In almost all cases the sale has to be organized according to the country's procurement laws and be based on a formal law. The sale of carbon credits to finance policy interventions can be compared with the sale of AAUs under so-called Green Investment Schemes. The establishment of such systems is burdened by a high number of implementation challenges, among which legal challenges have constituted substantial barriers.

Implications for the Public Sector and Private Sector

Where the implementation of policy aimed at reducing emissions includes incentive schemes based on carbon taxes, enhanced law enforcement, intensity or efficiency standards, or direct or indirect subsidies, private sector entities would not be rewarded carbon credits for any achievement of emission reductions. While under the no-lose target approach the government is not liable for under performance, it would be liable if it used forward sales of carbon credits as a means to mobilize financing. It would be difficult to pass such liability on to private entities.

5.3 PROJECT BASED CREDITING UNDER NATIONAL SECTORAL ACCOUNTING AND CREDITING

Overview

Project (or activity) based crediting under national sectoral accounting and crediting describes a possible legal and policy framework for designing a project based carbon finance mechanism under an international mechanism that relies on *SNLTs*. Under this framework national governments would develop and implement policies that would allow individual projects within a sector to gain carbon credits if they reduce their emissions.

Depending on the design of the mechanism, credits could be issued by the government (similar to First Track JI) or an international body (similar to the Joint Implementation Supervisory Committee Track of JI or the CDM Executive Board). Governments could also establish domestic emissions trading or offset schemes which rely on the allocation of credits to polluting entities (or to entities that reduce emissions).

There are a number of features common to any project based approach under *SNLTs* irrespective of the specific details of the particular approach taken. These include:

- National monitoring and accounting of emissions for the particular sector
- Project level monitoring and accounting of emissions
- Distribution of credits to individual projects or entities
- Transfer of ownership of credits to subnational actors
- Sale of credits by subnational actors
- Host country liability for credits allocated to project activities or legal entities

Specific variations may occur in a number of areas such as:

- The scheme may or may not involve the domestic trade of offsets
- Scheme can rely on the allocating of international credits and can or cannot be linked to international carbon markets
- Allocation of credits or approval of individual projects to receive credits for agreed environmental performance

If a scheme relies on the appraisal of individual projects, issues include:

- How the government selects a project (e.g. whether or not the government runs a bidding or tender process or whether it follows a JI-like bottom up approach)
- How a government approves a project (e.g. additionality, co-benefits, preferred geographic locations or technologies etc)
- The criteria it uses to determine the number of emission reductions the project has generated (e.g. pre-set emission factors, project specific baselines, allocation of more or less credits per tonne of CO_2e reduced or sequestered etc)
- The criteria used to determine how many credits the project will be allocated (e.g. project performance, sector performance, a combination of both etc.)

In addition the host government may decide to keep a portion of the credits for itself to cover the costs of operating the scheme and/or for other purposes. The relevant international sectoral agreements will further have to establish whether credits are being issued on the international or the national level and to what extent the government assumes liability for environmental performance.

A project based scheme can be complemented by an internal trading mechanism. Entities that invest in polluting activities could be obliged to offset their emissions by procuring offset credits from other projects. An internal market similar to the domestic REC markets could be established. Countries could also establish a trading scheme which allocates domestic credits to polluting installations and require a matching of emissions with credits. These credits would be

different from the international credits allocated to the government but would be created by the legislation of the respective country (similar to the EU allowances under the EU ETS). Since such schemes would not necessarily include a trading of credits on the international level – although links to the international markets could be established – it may be treated as a policy measure under 5.2 above. The scheme may also be incorporated with other policies and measures discussed in 5.2 such as carbon taxes and subsidies.

Institutional Capacity Requirements

The government would be responsible for designing and implementing the project based policy framework, assessing and approving individual projects, and overseeing sector-wide as well as project specific monitoring of emissions, and distribution and tracking of issued credits. National activities may be complemented by an international fall-back mechanism that resembles the JI Second Track framework.

The development of a national crediting mechanism requires substantive institutional capacity as well as a robust accounting framework. It has to be noted that until today only a few Annex I countries have established First Track JI procedures. New Zealand is a notable exception in having pioneered project based crediting outside of the JI framework (see NZ PRE box below).

New Zealand Projects to Reduce Emissions (PRE) Scheme

The New Zealand PRE scheme held two contestable bid rounds in 2003 and 2004. The incentive provided was a contract with the government by which AAUs (or ERUs if requested) would be provided based on the performance of the projects over the first Kyoto compliance period, 2008-2012. Project proponents were able to forward sell these units to help finance their projects. Projects needed to reduce emissions in the New Zealand inventory for which AAUs would otherwise need to have been retired against. The additionality design features of PRE focused on the desire to secure best outcomes for the government's net Kyoto position. The nature of the 'contest' was that bidders could request up to (but not more than) one AAU for each tonne of emissions reduced. But they were encouraged to only request what they needed to secure the financing value needed for the projects to proceed. The contest was then that bids were selected from the lowest ratio of AAUs/tonne reduced upwards, until the number of units offered in the bid round was achieved. Initially selected bids were then also tested against project financial and risk criteria by an expert panel to test the validity and quality of the bids.

Over the two bid rounds about 10 million units were prospectively 'allocated' through contracts. At the time of these PRE rounds there was no market in New Zealand for these credits, so successful projects mostly looked to European government and entities as likely buyers of the AAUs or ERUs. More recently, New Zealand has designed a domestic emissions trading cap and trade scheme (NZ ETS) and this has gained favour over the projects-based PRE scheme as the preferred domestic policy instrument. Some of the PRE allocated units may now be purchased by those with obligations under the NZ ETS.

The EU ETS may also be considered as an instrument rewarding domestic emission reductions with the allocation of carbon credits. In its complexity a system like EU ETS however may not, or not yet, be an adequate or appropriate instrument to incentivise sectoral emission reductions in developing countries. Unlike the baseline and credit approach of *SNLTs*, the allowances issued under the EU ETS are backed by AAUs. Even simpler trading mechanisms such as First Track JI transactions promoted by Eastern European host countries have seen a very slow start. To circumvent the challenges related to the defining of national validation and verification

procedures, it is likely that the majority of JI transactions will rely on the Second Track 2 international services of the JI Supervisory Committee, its criteria and procedures.

Legal Framework

The main elements of the legal framework are:

- Establishing a procurement mechanism
- Designing a project selection framework
- Putting in place of an accounting, reporting and monitoring framework; and
- Establishing a mechanism that allocates credits to the project.

The mechanisms through which governments would allocate carbon credits to private entities could take the form of a permit, a license or a bilateral contract. It would establish the right of the project proponent to receive credits and may be structured as a specialized type of concession agreement, authorization or license to operate the project and receive credits if certain conditions are met. If the government relies on a mechanisms that resembles JI and is established by international or national law, the contract with the project proponent could be reduced to a letter of approval (such as under JI).

A central problem of this scheme is that the government cannot transfer international credits to private entities and projects before it has received these credits. This is a fundamental difference to JI which is embedded in a cap-and-trade system while sectoral targets are closer to a baseline-and-credit system. In order to mobilize upfront finance, a country can securitize the stream of future credits and issue “green” bonds in prospect of the future receipt of credits. In this system the robustness of the system and value of bonds would depend on the credit rating of the country and the trust of bond recipients’ that the country will indeed receive credits of compensate for the failure of not being able to back the bonds with credits.

Implications for the Public Sector and Private Sector

This approach is a means to complement the policy measures discussed under 5.2 above. It uses the carbon market as a means to facilitate the financing of emission reducing activities. It allows private and public project entities to participate directly in the carbon market. However, this type of crediting contains a number of risks that may hinder private sector engagement.

The main risk associated with this approach centres around the project sponsor being able to control and foresee the number of credits it will receive. Uncertainty around this can come in two forms: 1) uncertainty regarding the number of credits the government may receive and it will be able to distribute to projects, 2) uncertainty regarding enforceability of the host country’s commitment to eventually transfer credits which may be a greater or lesser risk in some developing countries. Some, but not complete, risk mitigation may be provided by an international verification mechanism.

The first uncertainty – regarding the number of credits available – is a function of any ex-post sectoral crediting under a no-lose target. In First Track JI or Green Investment Schemes a host country knows in advance how many AAUs it will have over a commitment period once it has calculated and verified its emissions and the allocation of AAUs has taken place. The country can establish its AAU sales and purchase strategy based on national emission estimates. If the country sells some credits, fails to (re)purchase the units it needs to comply with its

commitments, and ends up missing its target, 1.3 times this shortfall is deducted from the assigned amount of the following commitment period.[32]

This is not the case in ex-post crediting where the number of available credits is only known at the end of the commitment period. If the country did not meet the target, the "no-lose" consequence is simply that credits are not issued. This is the case even if an individual project, or even a number of projects, in fact reduced their emissions during the relevant commitment period but the sector as a whole did not. The reason why the sector as a whole did not reduce its emissions may be due to any number of factors unrelated to the successful project (and therefore not due to leakage within a sector), such as a failure of other projects participating in the system to reduce their emissions or an overall growth in the sector.

The consequence for this sector-wide failure may land on the shoulders of the government, or it may be passed onto the individual projects. The government may shoulder this liability if under the agreements with individual projects it is required to compensate projects that actually reduced emissions against a project specific baseline. However, the financial resources and political will of a developing country government to do this may be limited – particularly if it was planning on funding the particular policy (or other government policies or programs) with revenue it expected from the sale of carbon credits.

The other alternative – that of passing this failure onto projects may come in the form of simply not delivering credits to successful projects, and/or requiring projects that failed to pay some sort of damages that it uses to recover its own losses and compensate successful projects. Needless to say, there are a number of options to structure this, but all of them require legal relations between government and project entities that would need to be robust and enforceable in local courts.

This relates to the second risk identified above regarding enforceability of contracts with governments. This risk will vary depending on the country in question and goes beyond enforceability in the event of non-performance of the sector as a whole to include risk of enforceability even if the sector performs and credits are issued. A change in government, changes in the value of the credits on the carbon market (either an increase or decrease), unexpected re-allocation of funding priorities, or general budget shortfalls may all put pressures on governments to re-negotiate or simply not honour an arrangement made years ago under a different government.

Some of these risks may be mitigated through establishing legal remedies in the law that establishes the crediting mechanism. Other risk mitigation means include political risk guarantees or other guarantees from institutions such as the World Bank. Rather than initiating these types of guarantees on a project by project basis, the World Bank (or similar financial institutions) could play a useful role in offering country wide guarantee facilities that individual projects could take advantage of. These institutions could also link this with loan or other technical assistance packages to support sector wide emission reductions.

Other risk mitigation options for government risks exist, such as using escrow accounts to hold funds or credits prior to distribution as agreed, or regular insurance products. The insurance sector is only just starting to offer insurance products related to failure to generate carbon

[32] See Article 18, Kyoto Protocol and the CMP decision implementing this article titled "Procedures and mechanisms relating to compliance under the Kyoto Protocol", Part XV paragraph 5(a)

credits, but this type of insurance product could be expected to grow as the carbon market as a whole grows.

Finally, the issuance of credits could be approved on the international level (following the JI Second Track or JISC model) which increases the likelihood that a government respects the agreement embodied in its approval of an emissions reduction project.

5.4 THE "NESTED" APPROACH

Overview

As discussed above, a sectoral agreement exclusively built on sectoral accounting would require the definition of a sectoral reference emission level and a nation-wide monitoring system for that sector. Credits would be issued *ex-post* for emission reductions achieved below the reference emission level, which means that, in principle, the cost of the additional efforts required to change historic emissions patterns would have to be covered up-front by developing country governments (albeit as noted there are some means for forward values to be secured). Moreover, under such a scheme countries would require the capacity and willingness to adopt and enforce emission reduction policies, as well as to accurately account for their emissions and be accountable for subsequent carbon losses.

Consequently, a sectoral mechanism such as *SNLTs* is based on the assumption that countries are able to fund and successfully implement effective policy, legal and institutional reforms nationwide, and that they are in the position to formulate and enforce appropriate social and economic safeguards – something that may be a challenge for many developing countries. Reliance on government performance and a government's promise to allocate future carbon credits (if the model described in section 5.3 is chosen) may also make the participation of private funds difficult. The private sector has expressed reluctance to make investments directly into developing country governments or into projects where project performance is linked to government performance to reduce emissions from any particular sector.

With the aim of integrating investment incentives into a system of sectoral accounting, the discussion in this section draws on the underlying rational of the mechanism that has been proposed as a "nested approach" in the context of reducing emissions from tropical deforestation and forest degradation.[33] It looks at whether and how this approach could be applied to sectoral targets. A "nested" approach would combine a nation-wide sectoral accounting mechanism with a sub-national crediting system as follows:

1. A sector-wide scheme based on the following principles:
    - A defined emission reduction level, which rewards lowering sectoral emission levels
    - The creation of fungible carbon credits that are issued by an international body that reward the reduction of emissions under a reference scenario (or another reward system)

[33] The "nested approach" was first presented by the Tropical Agricultural Research and Higher Education Center (CATIE) and The German Emissions Trading Association (BVEK) in a submission to the UNFCCC in February, 2007 and was later proposed in a joint submission by Paraguay on behalf of Honduras, Mexico, Panama and Peru, and supported by Ecuador and Chile. At the 13th session of the Conference of the Parties, held in Bali in December 2007, Parties recognized the value of this proposal by adopting its main concept as part of the indicative modalities for the demonstration (pilot) activities launched by the Conference and by including subnational approaches in the REDD programme of work of the Subsidiary Body for Scientific and Technological Advice (SBSTA).

- Countries may allocate these credits to private entities and authorize them to trade the issued credits
- A mechanism of reserve credits, ensuring compliance with the agreed targets

2. A project based mechanism based on the following principles:
   - The authorization by host governments of private or public entities to implement emission reduction activities at the project level
   - Credits for these project activities would be issued directly to the public or private project entities through an international and independent mechanism, regardless of the achievement of national emission targets
   - Mechanisms addressing leakage would have to be defined to ensure long term climate benefits
   - The creation of fungible carbon credits on the project level which can be used to comply with GHG targets

The advantage pointed to by proponents of the nested approach is that it allows countries to gather data and put in place the conditions for assuming sectoral (no lose) targets and for being able to ensure an accurate sector-wide accounting without compromising the opportunity to host project activities. It allows the gradual transition from project activities that are comparable to the CDM to, eventually, binding sectoral targets or caps. While the government is encouraged to implement policies and reduce the emissions from the relevant sectors by policy measures, private entities would be encouraged to invest in emission reducing activities. Provided that the project activities reduce emissions against a project specific (or sector specific) baseline (or benchmark) the investor would be awarded for its efforts by the receipt of tradable credits. Sector wide baselines could cut some of the high transaction costs associated with project specific baselines currently found in the CDM.

The credits would be issued by an international body to the project proponent directly. When accounting for sector wide emission reductions, governments would have to deduct the credits that have been issued directly to project proponents. The government would receive the negotiated credits or other rewards for the remaining portion of emission reduction. In case the government measures did not reduce the emissions sufficiently to be able to net-off the credits allocated to private entities, the country liability would either be carried over to the next accounting period or the shortfall would be compensated by an international insurance mechanism that involves the establishment of a certain “buffer” deducted from all project activities that successfully reduced their emissions (similar to the existing share of proceeds).

Institutional Capacity Requirements

Governments would need to show that they are putting in place systems that ensure accurate sectoral accounting. They would also be mandated to ensure that the emissions of the sector as a whole go down and that the project crediting mechanism would be supported by relevant policy measures. They would however not be charged with administrating the project level mechanism which would be defined and overseen on the international level, similar to the CDM. Governments would however be asked to approve project level activities.

Legal Framework

The nested approach combines elements described under the sections 5.2 and 5.3 respectively. It relies on the government taking measures to encourage sectoral emission reductions. In order to raise up-front financing governments can negotiate forward sales or issue bonds backed by the future stream of credits. Governments would further authorize project level activities. Since the credits would be issued independently from the government's ability to stimulate sector-wide emission reductions, the government would not have to enact a legal framework that defines the eligibility of projects to receive carbon credits. It would however have to adopt a project approval framework similar to the CDM project approval procedures. Any insurance mechanism that ensures the environmental integrity of the system as a whole would best be established on the international level. A government would however have to put in place an accounting system which ensures that emission reductions are not counted twice under the project based and the sector-wide accounting.

Participants in the project level mechanism would have to demonstrate that the project activity indeed reduces emissions below the relevant reference level (or benchmark). The emission reductions achieved by a project activity would have to be verified by an independent entity. Based on the verification report, credits would be issued to the project by an international body. The rules and procedures of the project mechanism would be set on the international level.

Implications for the Public Sector and Private Sector

The underlying rational of the nested approach is to devise a framework aimed at achieving meaningful reductions in GHG emissions in developing countries that allows for an immediate and broad participation by developing countries whilst facilitating the integration of private investments in such efforts. It relies on a national, sectoral track and in which it embeds (or "nests") a project track.

It recognizes that the simulation of private investment into the relevant sectors is an essential component of success to achieve overall emission reductions. While governments should participate in the efforts to reduce emissions and take a more active role than under the CDM, private capital based on the future promise of receiving carbon credits would only be deployed if investors are confident that they receive carbon credits provided that the project performance results in emission reductions.

The nested approach therefore delinks the rewarding of credits on the project level from the rewarding of credits (or other incentives) on the national (sectoral) level. The two tracks are brought together when a country has to deduct credits issued to projects from its overall reduction achievements.

5.5 OTHER ALTERNATIVES: TAPPING INTO ADDITIONAL FUNDING SOURCES

Based on the success of the CDM, carbon markets are viewed by many as the best way of mobilizing private investment for investments that result in emission reductions. However, there are a number of challenges associated with integrating *SNLTs* into the carbon market that could damage the integrity, efficiency and efficacy of the international carbon market. The above discussion in this section has set out problems associated with implementing sectoral crediting that cast doubts on whether it would attract meaningful amounts of private sector finance, in some developing countries at least. It also describes with the "nested approach" a way to overcome some of the described hurdles. The following section sets out another approach to sectoral crediting that may overcome many of these hurdles.

One of the main challenges of sectoral mechanisms is to manage the amount of carbon credits that enter into the market to ensure that certain price levels are being maintained and to avoid a collapse of the market. It may be worth in this context to review the necessity to reward certain achievements with carbon credits. While the CDM has brought evidence that the issuance of carbon credits is an effective means to stimulate investments, the proof that the same applies for governments is still yet to be established. That governments do not necessarily feel comfortable with valuing and trading emission rights can be evidenced by the various attempts to establish AAU-backed Green Investment Schemes to stimulate investment into climate friendly investments in economies of Eastern Europe. Valuating carbon credits, engaging in international trade and distributing the proceeds among private entities requires the establishment of a number of laws and legal requirements that have, thus far, delayed the trade of greater amounts of AAUs. Carbon credits may therefore not be the most adequate instrument to reward a government for emission reductions.

Emission reductions generated under *SNLTs* of developing countries do not need to be converted into fungible credits that are sold on the carbon market. The main benefit to developing country governments of these credits is the money they earn when they are sold. Since the value of the credits on international markets is likely to fluctuate, governments would not be able to predict revenues associated with certain emission reductions. As governments are not investing into policies and measures to speculate in carbon markets, the volatility of carbon credits may be a serious problem for governments.

Rather than being tied to the carbon market, sectoral reductions generated under no-lose targets due to domestic policies and measures could be matched by commitments by the international community to reward these reductions with cash or other benefits. These no-lose commitments can be negotiated and tied to funding commitments that would be drawn upon if the reductions are generated and carried over to subsequent commitment periods if they are not. The “price” per emission reduction would be established (negotiated) upfront for all relevant sectors. The price would be the same for each sector (regardless of the country) but could differ between sectors depending on abatement costs and sustainable development benefits.

Industrialized countries could pool their commitments into sector specific funds used to pay successful developing country governments directly. Alternatively, no-lose commitments could come in the form of converting loans made through the World Bank or other regional development banks in the chosen sectors into grants. Other commitments are also possible and could be negotiated bilaterally between governments.

If the sectoral emission reductions purchased (or compensated) by industrialized countries are not treated as offsets by the “buying” country, this type of approach will have the added environmental benefit of generating additional emission reductions.

The funding needed to compensate developing country emission reduction achievements could come from various sources. It could be pledged by industrialized countries, similar to the GEF replenishment. It is however unlikely that such fund raising exercise would result in amounts sufficient to reward successful countries. More money is needed. In addition to voluntary contributions by industrialized nations, the mechanism could be fed by institutionalized mechanisms through a number of options including, *inter alia*:

- a levy on Assigned Amounts first traded in the carbon market, similar to the fees imposed on CERs, and/or

- fees on carbon-intensive commodities and services in industrialized countries, and/or
- a levy on international transport emissions; and/or
- revenues from auctioning of credits in emission trading systems.[34]

Private sector involvement under this sort of *SNLTs* could occur at the project level, where project level emission reductions are deducted from any sectoral reductions (see nested approach above). To avoid problems associated with project level crediting uncertainty under sectoral accounting, project level emission reductions still need to be credited even if sector wide reductions are not achieved. This sectoral failure would be taken into account when negotiating the next round of targets. It could also be mitigated by the international insurance mechanism proposed above.

This approach combines traditional public sector funding incentives while at the same time shielding the carbon market from potential shocks and providing opportunities for private sector investment in developing countries.

[34] The authors of the nested approach propose a separate fund for capacity building and contemplate a similar funding mechanisms.

6. KEY INSIGHTS AND CONCLUSIONS

Key Messages Of This Section

Great need; good prospect (but no silver bullet); cater for diversity; significant challenges; solution options exist; time is of the essence. – These phrases can perhaps best sum up the breadth and substance of the discussion in this paper.

Great need

- Scaling up of the investments in zero and low carbon technologies and practices, including and in particular in developing countries, needs to be seen as an orders of magnitude issue – and an urgent one. Huge investments (trillions!) in long lived infrastructure are expected to be made in developing countries in the next two decades.

Good prospect (but no silver bullet)

- By moving beyond the additionality-based constraints of CDM-type policy instruments, *sector no-lose targets* are a good prospective *scaling up* carbon finance instrument in some sectors in some developing countries. While this sounds somewhat equivocal, a key point is that these "some sectors and some countries" can account for a very significant portion of projected global emissions growth – or put another way, of projected abatement potential.
- *SNLTs* are just one tool in the toolkit. A strategic program approach to how to employ the whole toolkit can also provide substantial gains, including for policy instruments that exist today. Moreover, the toolkit should not just be seen in a climate change context, but in the broader context of sustainable development.

Cater for diversity

- The process of preparing and negotiating *SNLTs* and the MRV requirements associated with their implementation means that, in the near term anyway, only a subset of developing countries are likely to be interested, e.g. the large(r) rapidly industrialising countries and middle income countries. But the electricity generation sector may be one that many developing countries might feasibly consider. And the process should welcome any developing country that wishes to put forward a *SNLTs* proposal.

Significant challenges – and time is of the essence

- There are many challenges. They can generally be divided into two classes: high level (e.g. issues around environmental integrity and uncertainty about the correct matching of demand and supply) and implementation detail level (both in negotiating this new form of compliance carbon mechanism and then having it work in practice).
- The environmental integrity and demand-supply issues are not issues that occur just on the developing country side. Indeed, how industrialised countries are prepared to act in the next phase of multilateral climate change action (in particular the 'deepness' of their targets) goes to the core of these issues. The developing country side is mostly around uncertainty with respect to whether the process of agreeing *SNLTs* (i.e. crediting baselines) and then subsequent MR&V of performance can be sufficiently robust. There is also the key issue of the potential number of credits that may be generated by *SNLTs* – and how this compares with the likely demand created by the 'deepness' of the industrialised countries targets.

- The implementation detail is particularly an issue of current capacity – and the capacity building needed. A critical issue here is timing. A huge effort is needed in a very short time if negotiations of *SNLTs* for "some key sectors in some key countries" can realistically be expected to happen in the time period when industrialised countries' commitments are expected to be agreed and then ratified by national governments.

Solution options exist

- If there's the will, and proactive leadership by world leaders – in industrialised and developing countries, and in governments and business.

6.1 GREAT NEED

Section 2 provided this context. Scaling up of the investments in zero and low carbon technologies and practices, including and in particular in developing countries, needs to be seen as an orders of magnitude issue – and an urgent one. Neither public finance sources nor private finance through carbon markets can, on their own, provide a necessary response to this need. Moreover it is hard to predict how these splits may occur in the future (when urgent action may be on the agenda of the world's leaders, public and private sector) based on their split in the past (when it hasn't been). Certainly, it would not be correct to take a *"carbon finance is the answer"* perspective.

What does seem clear however is that developing countries, indeed all countries, need to take a strategic program approach to these issues. This doesn't mean a 'cookie cutter' approach. Each country will have its own sustainable development priorities. Climate security, energy security and development imperatives need to be advanced simultaneously – and means found to have this happen in concurrent and synergistic ways.

6.2 GOOD PROSPECT (BUT NO SILVER BULLET)

The key attraction of *SNLTs*, one of a number of compliance carbon market-based policy tools, is its potential to achieve (more) scale because it doesn't have the institutionalized constraints of other additionality-focused mechanisms. It may well prove to be the best carbon finance mechanism in some sectors and in some developing countries. But differences in national circumstances may, in practice, rule it out at this time in many developing countries, and even where it may work well in a given sector in one or some countries, it may not be applicable in that same sector in others.

This reality aside, it need only work well in some sectors in some developing countries for it to have a major global influence on investments in low carbon technology. For example, emissions (now and projected in coming decades under 'normal' business) in the electricity generation sector in a relatively small number of major developing country economies accounts for a very substantial portion of global emissions and emissions growth. Moreover, even in smaller developing countries, many of the priority investments for their sustainable development can be expected in the electricity generation sector. The point here is not that this is the only sector where the *SNLTs* mechanism may prove valuable (because it isn't); it is just that it doesn't have to work in every sector and in every developing country to be valuable.

An associated point, drawn out in particular in the section 4 discussion on SD-PAMs, is that carbon financing mechanisms are not the only way to mobilise the needed investment in low

carbon futures in developing countries. Moreover, a focus on climate change and carbon is not necessarily the appropriate main focus. Instead, substantial investments of a low carbon nature can occur under strategic programmes with a priority focus on sustainable development. In this case national sources of investment leveraged by international public finance may result in the scale needed.

6.3 CATER FOR DIVERSITY

What developing countries are possible candidates for taking on *SNLTs*? In principle, the *SNLTs* mechanism is open to all countries. In practice, as signalled by the often used phrase in this paper "some key sectors in some key countries", the process of preparing and negotiating SNLTs and the MRV requirements associated with their implementation means that, in the near term anyway, only a subset of developing countries are likely to be interested, e.g. the large(r) rapidly industrialising countries and middle income countries. For other smaller less developed countries, 'regular' and programmatic CDM and SD-PAMs are other policy instruments that help scale up financial and other support for mitigation activities.

This said, for many developing countries, the electricity generation sector is one where the process and MRV requirements associated with *SNLTs* are likely to be manageable with adequate support. Moreover, this sector is often one where major capital investments are planned even in smaller less developed countries and mobilising investment through the *SNLTs* mechanism may be the 'first best' option.

In summary, the process should welcome any developing country that wishes to put forward a *SNLTs* proposal.

6.4 SIGNIFICANT CHALLENGES

There are many issues. Those set out in this paper can generally be divided into two classes: high level (e.g. issues around environmental integrity and uncertainty about the correct matching of demand and supply) and implementation detail level (both in negotiating this new form of compliance carbon mechanism and then having it work in practice).

<u>High level issues</u>

Challenges of Scaling Up: Environmental Integrity

The ultimate objective of concluding sectoral agreements with developing countries is to reduce global GHG emissions. The efficiency of a mechanism to mobilize funding has therefore to be measured against its environmental effectiveness. Only if a mechanism results in real emission reductions is it worth considering, and only if it relies on a feasible implementation mechanism will it trigger activities that result in emission reductions.

Environmental credibility is a function of a robust accounting framework. As discussed above, such accounting can be guaranteed through a cap-and-trade approach by accounting for all emissions of a sector and creating shortage by allocating less allowance than corresponding to the full amount of such sector's emissions. As discussed in the context of JI, host countries are ultimately liable for the achievement of emission reductions in such capped environment.

The current CDM on the other hand is based on project based crediting that is supported by rigorous checks and balances to ensure the correct number of credits are issued for eligible

projects. These checks and balances include tests to make sure emission reductions are additional, and that any emission reductions are correctly monitored and verified. Environmental integrity of credits is seen as one of the key requirements of the CDM being able to be used to offset a portion of industrialized counties emissions.

It is important that sectoral agreements meet equivalent or higher standards, in particular where emission reductions are rewarded by payments or the allocation of carbon credits. If sectoral agreements rely on a full accounting and host country liability, environmental integrity depends on the accuracy of available data. Where sectoral approaches are based on a baseline-and-credit system, as in the case of *SNLTs*, the establishment of the crediting baseline is crucial in determining a system's credibility.

Negotiated baselines create significant environmental risk that baselines will be negotiated so that a sector's actual emissions may in fact be below its negotiated no-lose target. This may occur through making overly generous projections of growth and corresponding emissions within a sector. Soft no-lose targets have the potential to produce significant numbers of credits without environmental integrity that are not associated with any real emission reductions. To be clear, this problem is not just true of *SNLTs* for developing countries. The same problem can occur with soft fixed and binding targets for industrialised countries. Managing both these risks will be a key challenge of the negotiations.

Baseline based no-lose targets do not reduce the need for the other quality control assurances in the CDM associated with strict emission monitoring and third party verification. These are still critical to ensure emission reductions are not over estimated by a country. However, expanding the rigor required under the CDM to cover an entire sector can be very difficult, and if standards are relaxed significantly to make it easier, any corresponding increase in uncertainty will cast serious doubts over the environmental integrity of sector based credits and the appropriateness of them as offsets for industrialized nations.

Challenges of Scaling Up: Uncertainty over Demand

As for any market, the carbon market is based on the notion of scarcity. Incentives to innovate, seek low cost emission reduction options and to invest in relevant technology is dependent on an environment where the circulating number of allowances and credits are below the actual level of emissions. The more allowances are allocated and credits issued, the more the price per credit drops until it reaches zero in the tipping moment that there are more allowances than emissions.

Cap-and-trade systems involve a stable number of allowances that allow governments and private sector to optimize their operations taking into account the cost of generating emission reductions. Where cap-and-trade systems are linked to offsets generated outside of the system, such offsetting opportunities act as price valve by allowing covered entities to access additional low cost abatement opportunities.

But industrialised countries that adopt cap-and-trade policies may want to keep carbon prices relatively high domestically to stimulate domestic reductions. The linking to credits generated in a non-capped environment therefore can entail significant risk, especially where the number of credits that eventually may be issued is uncertain. The supply of too many credits that can be achieved at costs significantly lower than those within the industrialized countries cap-and-trade system (so called "flooding") may make impossible the achievement of the system's primary goal of reducing emissions within its caped environment.

To address this risk, caps can be placed on the number of imported credits to avoid a circumstance where a large supply of international credits would push the price of credits down significantly, thereby thwarting the objective of the policy to stimulate domestic reductions. For example, in order to protect the EU ETS from the flooding of CDM credits, the market regulator has capped the number of CERs that is authorized to be brought into the system.

Irrespective of whether or not there is a cap on the use of international offset credits under a cap-and-trade system, an oversupply of such credits also hurts sectors included in a relevant agreement. The more emission reductions are achieved, the lower the value of a particular credit. The system thus creates the perverse incentive to limit emission reductions to a small amount in order to keep prices high enough to make carbon credits a viable financing instrument.

Conclusions

For the reasons summarized above, the issuance of carbon credits for sectoral achievement of emission reductions beyond an established baseline can be seen as a risky and potentially inadequate and insufficient policy instrument. Any final design of a financing mechanism such as *SNLTs* will have to be built on a careful modelling of the emission reductions that can be achieved, credits that should be issued, and market links that have to be established.

The crucial question is whether industrialised country commitments can create sufficient demand for carbon credits to (i) ensure domestic reductions in industrialised countries; and (ii) reward sectoral achievements in developing countries; while (iii) simultaneously maintaining a sufficiently high carbon price. If this is unlikely, or proving to not occur in practice, the issuance of carbon credits should be limited.

It is worth investigating in this context whether government performance indeed needs to be rewarded with the issuance of carbon credits. Other finance mechanisms discussed in 5.5 above may be more adequate to reward and stimulate government action. Since the carbon market is unlikely to mobilize the funding needed to stimulate action in all participating countries and sectors, other financing mechanism should be looked at to complement the emerging mechanisms.

The carbon market has proven to be a successful way to involve private entities into treaty compliance. Provided the system is sound, it can stimulate private investment and carbon credits are a viable instrument to serve as credit enhancement or motivate equity investments. The carbon market should therefore form part of the policy mix that rewards sectoral emission reductions achieved by developing countries. As already stated above, government contributions should help to create market conditions and the infrastructure for trades and GHG accounting. The identified remaining financing gap (e.g. to reward the achievement of emission reductions by governments) could be closed by other international financial instrument that need to be discussed in further detail.

<u>Implementation detail issues</u>

Section 3 sets out the immediate term issues associated with getting international agreement to this new form of carbon finance mechanism, *SNLTs* for developing countries. The striking point that comes out from this discussion is the volume and complex nature of the issues to be dealt with – and all within a very short timeframe. Three key issues stand out in the discussions in section 3:

1. A very large capacity building effort is needed, in particular in the countries and sectors that seem to offer the greatest opportunity for this mechanism to make a material difference to global emission reductions. This capacity building effort needs first to attract the interest of key government departments and sector stakeholders, and then engage them in the technical preparatory work for them to develop proposals for *SNLTs*.
2. It is unlikely that, without some new form of technical assistance, that the UNFCCC negotiating process can cope with the complex technical detail that is likely to be contained in any such proposals. Moreover, this is not just an issue of *SNLTs* for developing countries. Proposals for targets by industrialised countries may be equally complex, and while economy wide may include substantial detail on sector-relevant national circumstances. The idea is put forward in section 3 that a new independent technical expert body may need to be constituted to assist the negotiating process, and this should occur as early in the ongoing negotiations as possible.
3. It is also unlikely that every developing country that may be interested to propose *SNLTs* will be ready to do so at the time that the international community expects the main details of the post-2012 multilateral climate change 'deal' to be agreed (e.g. in late 2009). This suggests that a "doorway mechanism" needs to be part of the main agreement that leaves open the option of such targets to be added to the agreement at a later time. Of the theoretical options considered, the idea of having a 'budget' for *SNLT* credits seems the one that most warrants further work.

   The best option, of course, is to minimise the problem in the first place by having an immediately implemented accelerated capacity building and diplomatic effort, such that details of potential *SNLTs* in some key sectors in some key countries can be well advanced at the time industrialised countries are agreeing their next targets. These could then be finalised in the period between when industrialised countries agree their targets and then the overall package of the 'deal' is ratified by domestic governments.

The suggestion is made in section 3 that there should be some form of pilot activity to test *SNLTs*. The new World Bank *Carbon Partnership Facility* is noted in this regard, including that a number of the pilot activities proposed by the World Bank for the PCF may lend themselves well to a test of *SNLTs*, e.g. large scale renewable electricity programs.

Section 5 touches on implementation issues following an agreement, i.e. of a domestic policies and measures nature. The key challenging issue it takes up is how to reduce risk to acceptable levels to stimulate private sector investment and maintain a connection between those on-the-ground activities seeking the incentive of carbon finance when crediting may occur at a sectoral level. A corresponding challenge is whether governments will be seen as reliable partners by the private sector carbon finance providers (credit buyers) when crediting occurs at a sector level. Both of these are critical challenges; indeed they are potential 'deal breakers' to the concept of *SNLTs*.

A key point made in section 5 is that there are few existing successful case examples of how industrialised countries have engaged in project scale activities within sectors in their countries covered by their economy wide caps. A New Zealand example is one exception, but even this policy program has recently been superseded by more of a 'top down' domestic cap and trade emission trading scheme. It is also unclear how readily the New Zealand model may be applied to developing countries.

6.5 SOLUTION OPTIONS EXIST...TO SOME KEY CHALLENGES AT LEAST

Some possible solutions to challenges outlined are already contained in the discussion above in 6.3, e.g. the independent technical expert body to support negotiations and a number of options to address the timing problem where *SNLTs* for developing countries might be agreed following the main deal where industrialised countries targets are set.

On the 'challenge' matters from section 5 raised immediately above, section 5 provides significant discussion under three generally alternative themes:

i. Domestic policies and measures that governments in developing countries may implement to incentivise project-level activities and programs within sectors covered by *SNLTs* – These could pass on the carbon finance incentive, or some other form of financial incentive.

ii. A "nested approach" which provides project level activities occurring within sectors covered by national sectoral crediting with direct access to carbon credits for the project that are issued by an international body. To avoid double counting, such issued credits would be subtracted from subsequent awards of credits to the country's government for beating its sectoral baseline.

iii. A scheme whereby the reward for countries beating sectoral baselines would not be carbon credits but instead some predetermined level of funding. A nested approach can be incorporated into this scheme to address both the problems of the need to maintain project-level crediting and concerns about oversupply of credits into carbon markets from national level sectoral crediting.

Without elaborating further on section 5's discussion of these 'solution options', it is worth noting that not all challenges identified can necessarily be expected to occur in all situations for key developing countries. The point, rather, is that where such problem situations may arise, there are a number of options that might be applicable in given countries to address these problems.

6.6 TIME IS OF THE ESSENCE

The international community has an expectation for negotiations on the post-2012 multilateral climate regime to be concluded in 2009 so that there will not be a gap when the Kyoto Protocol's first commitment period concludes in 2012. The detailed analysis of policy issues in this paper shows that if the new mechanism of *SNLTs* for developing countries is going to be part of this agreement, and potentially be quite key to help conclude this agreement, there is a substantial amount of effort needed on multiple work fronts. For this mechanism to be sufficiently well framed and developed so it can play a role in the next climate change regime, this effort needs to be initiated by the Parties in the very near term (even if just informally in the first instance).

REFERENCES

General

Ward, M, Garibaldi, J et al (2008) *Emerging program based and sectoral approaches for investment in climate change mitigation activities in developing countries – and their interface with the World Bank's new Carbon Partnership Facility,* World Bank Carbon Finance Unit, March 2008

Sectoral

Baron R, et al (2007) *Sectoral approaches to greenhouse gas mitigation: Exploring issues for heavy industry*. OECD/IEA Paper

Baron and Ellis (2006) *Sectoral crediting mechanisms for greenhouse gas mitigation: institutional and operational issues*. OECD/IEA Paper, COM/ENV/EPOC/IEA/SLT(2006)4

Bodansky (2007) *International sectoral agreements in a post-2012 climate framework*, Pew Center Working Paper, May 2007

Bosi and Ellis (2005) *Exploring options for 'sectoral crediting mechanisms'*, OECD/IEA Paper, COM/ENV/EPOC/IEA/SLT(2005)1

Bradley, R et al (2008) *Slicing the Pie: Sector-based approaches to international climate agreements* World Resources Institute, December 2007

Cosby, Drexhage, Murphy (2007) *Market Mechanisms for Sustainable Development: How do they fit in the various post-2012 climate efforts?* Draft, IISD, May 11, 2007

Ellis and Baron (2005) *Sectoral Crediting Mechanisms: An initial assessment of electricity and aluminium*, OECD/IEA Paper, COM/ENV/EPOC/IEA/SLT(2005)8

Höhne, N, Moltmann, S, Lahme, E, Worrell, E & Graus, W (2006). *CO_2 emission reduction potential under a sectoral approach post 2012.* For the Netherlands Environmental Assessment Agency (MNP), No. DM70210. Cologne, Ecofys.

Schmidt, Helme, Lee and Houdashelt (2006) *Sector-based approaches to the post-2012 climate change policy architecture*, Center for Clean Air Policy (CCAP), International Future Actions Dialogue, August 2006

Sterk, W & Wittneben, B (2005). *Addressing opportunities and challenges of a sectoral approach to the Clean Development Mechanism*. JIKO Policy Paper 1/2005 pp. 1-15.

Ward (2006) *Climate Policy Solutions: A sectoral approach*, GtripleC, March 2006

SD PAMs

Baumert, K & Winkler, H 2005. SD-PAMs and international climate agreements. Chapter 2. R Bradley, K Baumert and J Pershing (Eds). *Growing in the greenhouse: Protecting the climate by putting development first*. Washington DC, World Resources Institute: 15-23.

Bradley, R, Baumert, K A, Childs, B, Herzog, T & Pershing, J 2007. Slicing the pie: Sector-based approaches to international climate agreements: Issues and options. Washington, World Resources Institute.

Bradley, R & Pershing, J 2005. Introduction to sustainable development policies and measures. Chapter 1. R Bradley, K Baumert and J Pershing (Eds). *Growing in the greenhouse: Protecting the climate by putting development first*. Washington DC, World Resources Institute: 1-14.

Den Elzen, M, Höhne, N & Moltmann, S 2008. The Triptych approach revisited: A staged sectoral approach for climate mitigation. *Climate Policy* 36 (3): 1107-1124.

Dubash, N & Bradley, R 2005. Pathways to rural electrification in India: Are national goals also an international opportunity? R Bradley, K Baumert and J Pershing (Eds). *Growing in the greenhouse: Protecting the climate by putting development first*. Washington DC, World Resources Institute.

Ellis, J & Baron, R 2005. Sectoral crediting mechanisms: An initial assessment of electricity and aluminium. COM/ENV/EPOC/IEA/SLT(2005)8. Paris, International Energy Agency & Organisation for Economic Co-operation and Development.

Ellis, J, Baron, R & Buchner, B 2007. SD-PAMs: What, where, when and how. Report for the Annex I Expert Group on the UNFCCC (draft for review).

Grobler, L & den Heijer, W 2004. The measurement and verification guideline for Energy Service Companies. Potchefstroom, Measurement & Verification Team, North-West University.

Höhne, N, Moltmann, S, Lahme, E, Worrell, E & Graus, W 2006. CO_2 emission reduction potential under a sectoral approach post 2012. For the Netherlands Environmental Assessment Agency (MNP), No. DM70210. Cologne, Ecofys.

IPCC 2007. Climate Change 2007: Mitigation of Climate Change. Summary for policy makers. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva.

Kejun, J, Xiulan, H & Qiang, L 2006. China's energy sector. K Halsnaes and A Garg (Eds). *Sustainable development, energy and climate change: Methodological issues and case studies from Brazil, China, India, South Africa, Bangladesh and Senegal. ISBN 87-550-3452-6*. Roskilde, UNEP Risø Centre: 21-26.

La Rovere, E L, Pereira, A S & Simões, A F 2006. Brazil country studies. K Halsnaes and A Garg (Eds). *Sustainable development, energy and climate change: Methodological issues and case studies from Brazil, China, India, South Africa, Bangladesh and Senegal. ISBN 87-550-3452-6*. Roskilde, UNEP Risø Centre: 15-20.

Moreira, J R, Nogueira, L A H & Parente, V 2005. Biofuels for transport, development and climate change: Lessons from Brazil. R Bradley, K Baumert and J Pershing (Eds). *Growing in the greenhouse: Protecting the climate by putting development first*. Washington DC, World Resources Institute.

Munasinghe, M 2002. The sustainomics trans-disciplinary meta-framework for making development more sustainable: Application to energy issues. *International Journal for Sustainable Development* 5 (1/2): 135-182.

Mwakasonda, S & Winkler, H 2005. Carbon capture and storage in South Africa. Chapter 6 in. R Bradley, K Baumert and J Pershing (Eds). *Growing in the greenhouse: Protecting the climate by putting development first*. Washington DC, World Resources Institute: 94-109.

RSA 2006. Dialogue working paper 18: Submission from South Africa: Sustainable Development Policies and Measures. Pretoria, Department of Environmental Affairs & Tourism.

Samaniego, J & Figueres, C 2002. Evolving to a sector-based Clean Development Mechanism. K Baumert, O Blanchard, S Llosa and J F Perkaus (Eds). *Building on the Kyoto Protocol: Options for protecting the climate*. Washington DC, World Resources Institute: 89-108.

Sathaye, J, Najam, A, Cocklin, C, Heller, T, Lecocq, F, Llanes-Regueiro, J, Pan, J, Petschel-Held, G, Rayner, S, Robinson, J, Schaeffer, R, Sokona, Y, Swart, R & Winkler, H 2007. Sustainable development and mitigation. Chapter 12. B Metz, O D Davidson, P Bosch, R Dave and L M Meyer (Eds). *Climate Change 2007: Mitigation, Contribution of Working Group III to the IPCC Fourth Assessment Report*, Cambridge University Press.

Schmidt, J, Helme, N, Lee, J & Houdashelt, M 2006. Sector-based approach to the post-2012 climate change policy architecture. Washington DC, Center for Clean Air Policy.

Spalding-Fecher, R, Mqadi, L & Oganne, G 2003. Carbon financing for energy efficient low-cost housing. *Journal of Energy in Southern Africa* 14 (4): 128-134.

SSN (SouthSouthNorth) 2004. Project design document for the Kuyasa project. Submitted to the Executive Board of the Clean Development Mechanism. http://cdm.unfccc.int. Cape Town, SouthSouthNorth Project. www.southsouthnorth.org.

UNFCCC (United Nations Framework Convention on Climate Change) 2007a. Bali Action Plan. Decision 1/CP.13. Bali, Indonesia.

UNFCCC (United Nations Framework Convention on Climate Change) 2007b. Investment and financial flows to address climate change. Bonn.

Ward, M 2006. Climate policy solutions: A sectoral approach. Wellington, Global Climate Change Consultancy.

Wei-Shiuen, N & Schipper, L 2005. China motorization trends: Policy options in a world of transport challenges. R Bradley, K Baumert and J Pershing (Eds). *Growing in the greenhouse: Protecting the climate by putting development first*. Washington DC, World Resources Institute.

Winkler, H, Höhne, N & Den Elzen, M in press 2008. Methods for quantifying the benefits of sustainable development policies and measures (SD-PAMs). *Climate Policy* 8.

Winkler, H, Howells, M & Baumert, K 2005. Sustainable development policies and measures: Institutional issues and electrical efficiency in South Africa. Washington DC, Center for Clean Air Policy. http://www.ccap.org/international/oct05.htm.

Winkler, H, Howells, M & Baumert, K 2007. Sustainable development policies and measures: institutional issues and electrical efficiency in South Africa. *Climate Policy* 7 (3): 212–229.

Winkler, H, Spalding-Fecher, R, Mwakasonda, S & Davidson, O 2002a. Sustainable development policies and measures: starting from development to tackle climate change. K Baumert, O Blanchard, S Llosa and J F Perkaus (Eds). *Building on the Kyoto Protocol: Options for protecting the climate*. Washington DC, World Resources Institute: 61-87.

Winkler, H, Spalding-Fecher, R, Mwakasonda, S & Davidson, O 2002b. Sustainable development policies and measures: starting from development to tackle climate change. Cape Town, Energy & Development Research Centre, University of Cape Town. April.

Winkler, H, Spalding-Fecher, R, Mwakasonda, S & Davidson, O 2002c. Sustainable development policies and measures: Tackling climate change from a development perspective. O Davidson and D Sparks (Eds). *Developing energy solutions for climate change: South African research at EDRC*. Cape Town, Energy & Development Research Centre, University of Cape Town: 176-198.

Winkler, H, Spalding-Fecher, R, Tyani, L & Matibe, K 2002d. Cost-benefit analysis of energy efficiency in urban low-cost housing. *Development Southern Africa* 19 (5): 593-614. December.