

SCALING UP INVESTMENT IN CLIMATE CHANGE MITIGATION ACTIVITIES

INTERFACE WITH THE WORLD BANK'S CARBON PARTNERSHIP FACILITY

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EXECUTIVE SUMMARY

The case for scaling up mitigation efforts is urgent and has been made repeatedly in the last few years – whether denominated in gigatonnes of needed reductions in greenhouse gas emissions per year or tens of ‘gigadollars’ of needed annual investments in zero and low carbon technologies and systems. The central question the international community now faces is *how – and how fast*.

Answering this question, carbon market policy instruments are expected to play a key role. But, current instruments, and the overarching programs under which they are implemented internationally, need to evolve significantly in order to achieve the needed magnitude of *scaling up* mitigation.

Renowned experts and institutions – Socolow and Pacala on *stabilization wedges*, the IEA on *accelerated technology scenarios*, the IPCC on emission reduction potentials in the energy sector, McKinsey on abatement cost curves and the UNFCCC on investment and financial flows – have collectively provided a clear and consistent picture on a number of key points:

- We already know the commercially available 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.
- Other key technologies, in particular carbon capture and storage, need to be commercially proven at scale in the next one to two decades, in order to transform the world’s energy systems to cut global greenhouse gas emissions at least in half by 2050.
- The additional needed investment and financial flows in low carbon technologies (e.g. in 2030 to reduce global emissions to today’s levels by then) are large by today’s measure, but only a small fraction of total global investment (less than 2% in 2030).
- Many low carbon technologies and systems need to be deployed in the coming decades in developing countries. The reason is the rapid expansion of energy systems infrastructure due to:
 - population and economic growth;
 - population shift from rural to urban areas;
 - the fact that developing countries are increasingly manufacturing the energy intensive goods consumed by the industrialised world;
 - the need – a critical point – for improved energy services to alleviate poverty.
- There is a large potential for low cost abatement on the energy ‘demand side’ in both developed and developing countries, i.e. improved energy efficiencies in buildings, transport and industry.

This is the context in which the challenges for the evolution of carbon market instruments must be framed .

A number of avenues are being explored for enhanced carbon market instruments applicable in developing countries, i.e. going beyond the present project-by-project based Clean Development Mechanism (CDM). One way is *programmatic CDM*. While still in its early days of implementation, this is available under rules that already apply today. Other options on the

horizon for possible application post-2012 are *sectoral CDM* and *sector no-lose targets* for developing countries. There is also a rapidly growing *voluntary carbon market*, driven by changing consumer preferences and an increasing corporate responsibility.

All of these policy instruments have particular attributes that make them more or less applicable for aggregation of specific activities in given sectors and sub-sectors. Lessons could also potentially be learned from the Joint Implementation (JI) and Green Investment Scheme (GIS) mechanisms in developed countries, especially challenges that can arise when moving from an international regulatory approach to more direct engagement with national governments.

All of these instruments can help *scaling up*. However, one should not see carbon finance in the sense of “*carbon finance is the answer....what is the question?*” A much more strategic approach is needed to achieve the aggregation of activities that *scaling up* requires. Determining the appropriate role for carbon finance instruments derives from the following questions:

- What activities do we want to build up so that significant *scaling up* occurs?
- Who are the ‘natural’ key coordinating actors?
- What is the role of new financing, as compared with other possible interventions?
- Where the provision of new financing is key, what are the available sources and, among these, what is the potential role for *carbon* financing, i.e. where ‘carbon assets’ are being generated and acquired?
- Where carbon finance is key, what mechanisms are needed? Is moving from project-by-project CDM to CDM *programmes of activity* likely to achieve the scale-up needed and possible? Or is a *sectoral CDM* or *sector no-lose targets* approach preferred?
- Is it possible that financing through the non-compliance voluntary carbon market may be the easier and/or quicker route to follow? Might there also be other forms of carbon finance mechanisms that may have greater low carbon investment *scaling up* potential?

When carbon financing can play an important role in *scaling up* a particular type of low carbon activity, it is however not enough to just choose what seems to be the most applicable form of a carbon finance policy instrument and assume it will then all just happen. Scaling up therefore requires taking a *strategic program approach* that provides the right enabling environment. This means purposefully engaging all the right players and, where necessary, implementing required complementary policies and measures.

Importantly, taking a *strategic program approach* means that a significant degree of *scaling up* can happen immediately with the carbon finance policy instruments that already exist (e.g. by aligning the implementation of ‘regular’ and programmatic CDM within strategic programs). It is not necessary to wait for new and enhanced instruments that may come into play post-2012. Moreover, lessons learned now about how such a *strategic program approach* can enhance action will mean that any new carbon finance policy instruments can have more optimal outcomes from the outset.

In order to make scaling up happening in practice, a substantial capacity building *readiness* effort is necessary. This includes both technical efforts (e.g. the fundamentally needed measurement, reporting and verification systems) and institutional capacity building (e.g. the

governance systems that can link all the domestic and international actors whose cooperation is needed to maximise outcomes). Early initiatives and case studies of new carbon finance policy instruments can be particularly helpful for international ‘learning by doing’.

Applied to developing countries, the scaling up effort – more investment in low carbon technologies and practices supported through carbon finance – describes most of all the supply side of the market. But carbon markets, as markets by nature, involve supply and demand. So what about the demand side? If a proper balance is not achieved, the price of carbon could rapidly diminish – and along with that the interest of the capital markets that have successfully been engaged over the last five years. There are two key demand side factors: the nature and scale of targets developed countries will take on in the post-2012 climate agreement, and the magnitude of the carry-over of emission credits from existing agreements and projects in the CDM (both implemented and in the pipeline).

The World Bank’s new *Carbon Partnership Facility* (CPF) can play a very important *scaling up* role, in particular through targeted engagement of buyer and seller ‘partners’. Its implementation modalities can encourage and facilitate countries to take a *strategic program approach* to investments in low carbon technologies and practices. It can also help ‘pull forward’ and test new carbon finance policy and program instruments, just as the original *Prototype Carbon Fund* was very instrumental in getting the CDM off the ground. By focusing on enhancing the business-as-usual level of activity for current/emerging policy instruments (like programmatic CDM) and on future instruments (such as *sector no-lose targets*), the CPF can maximise its value-adding role and minimise any overlap with what the current private sector carbon finance players are able to achieve.

Given the scale and pace of the modernization of many rapidly industrialising developing countries, and hence their infrastructure investment needs, these should be primary candidates for the technology investment opportunities reflected, for example, in the Socolow and Pacala “wedges”. But a detailed understanding of how this might come to fruition is probably beyond the capacity of most developing countries. The CPF can play a very proactive role in supporting countries own deliberations on what taking a *strategic program approach* to aggregate activity and investment in given sectors means in practice.

Such deliberations should involve the participation of all possible providers of technology and financing (‘traditional’ and carbon) – and the policy practitioners whose ideas can help put in place the domestic and international policy environments required to support the needed magnitude of *scaling up*. In this regard, the term *partnership* goes well beyond just matchmaking activities between buyers and sellers of compliance or voluntary CO₂ emission reductions.

1 INTRODUCTION

Whether denominated in gigatonnes¹ of needed reductions in greenhouse gas emissions per year or tens of ‘gigadollars’ of needed annual investments in zero and low carbon technologies and systems, the case for *scaling up* mitigation efforts has been made repeatedly in the last few years². This case does not need further elaboration here. The purpose of this paper is to delve into the *how*, in particular the questions of whether and in which way emerging policy ideas in both the compliance and voluntary market ‘universes’ can lead to the needed order(s) of magnitude through *scaling up* of carbon finance investment³.

The World Bank is now beginning to actively engage partners it contemplates in its new Carbon Partnership Facility. As these discussions ‘get down to business’, it will be helpful to have a better understanding of the types of *scaling up* (or aggregation) opportunities and the steps that need to be taken to get proper policy frameworks in place (internationally and domestically) to ensure carbon finance plays an effective role.

The authors team bring a range of skill sets and experience to this task; from detailed post-2012 policy research in the UNFCCC community, to clean energy investment frameworks discussed in the G8 Gleneagles process, to international carbon finance. Sections of the paper reflect this diversity. The final section seeks to bring all this together and provide coherent and consistent “main messages”.

This paper is organised as follows:

- Section 2 provides detail on what ‘*scaling up*’ means in practice. It draws from literature looking at this question from a range of perspectives: technology deployment; abatement potential in terms of sectors, costs and geographic location; and investment and financial flows.
- Section 3 looks at the policy and investment situation for *scaling up* activities that exists today, i.e. in advance of any new policy instruments being considered in a post-2012 context. It notes that *scaling up* will best occur through purposeful **programs** of *vertical* and *horizontal* aggregations of activities. *Vertical* aggregations represent a multiplicity of similar actions in a given sector, or sub-sector. *Horizontal* aggregations represent a multiplicity of actions coordinated by a given main actor across a range of sectors, or sub-sectors. There are different natural aggregators that suit these activities. And depending on what *scaling up* activity is being sought, there will be different best means to achieve this, including various forms of finance and investment. Three different streams within an overall strategic *program approach* are set out, and the role of CDM project financing and the evolving CDM Programme of Activities within these program streams is discussed – along with other forms of finance and investment, including the voluntary carbon market.

¹ giga is 10⁹, or billion

² e.g. in *Stern, N 2006, Cosbey, A et al. 2005, OECD/IEA 2007*

³ For reference, in 2007 emission reductions and sink enhancements are estimated at 832 MtCO₂e in the Kyoto CDM and JI compliance market and 42 MtCO₂e in the OTC voluntary carbon market. Sources: *World Bank 2008* and *Hamilton, K et al 2008*.

- Section 4 describes new ‘enhanced carbon finance’ ideas for *scaling up* that are emerging in the formal UNFCCC and associated post-2012 policy discussions. It summarises the key relevant debates and literature, as well as the characteristics of, and differences between, both the key new proposed *scaling up* policy instruments and current policy instruments.
- Section 5 focuses on the question of carbon finance and *scaling up*. Drawing from the discussion on the current role of carbon finance (among a broader portfolio of finance and investment options that can support *scaling up* programs) and the new ideas and post-2012 debate in the international community, it provides a ‘real world’ assessment of how the current carbon finance sector (public and private) might be able to operate with these new ideas. In doing this, it identifies key issues and challenges.
- Section 6 pulls together overall insights and conclusions. In particular, it takes forward the discussion about a strategic *program approach* by considering how the new post-2012 policy instrument ideas might enhance the role of carbon finance in *scaling up* investments. On the new World Bank Carbon Partnership Facility (CPF) specifically, it discusses the place and engagement role of the CPF in the overall picture of carbon financing programs of *vertical* and *horizontal* aggregated activities.

2 ELABORATING THE SCALING UP CHALLENGE

It is now well accepted that addressing climate change equates to a significant restructuring of the world’s energy and technology infrastructure. Various studies over the last few years have led to a much better understanding of what this “*scaling up*” would actually mean in terms of climate friendly investments .

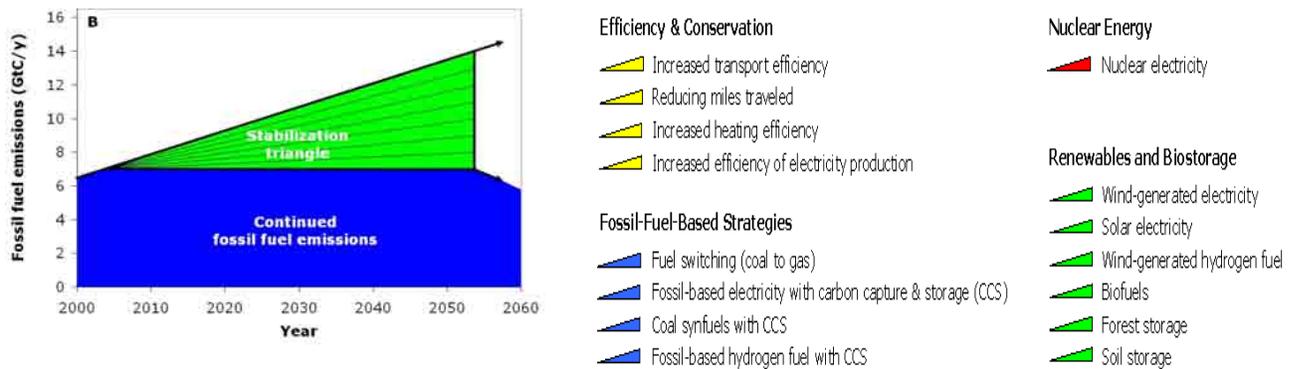
The Stern Review, for example, noted⁴:

...Achieving these deep cuts in emissions will have a cost. The Review estimates the annual costs of stabilisation at 500-550ppm CO₂e to be around 1% of GDP by 2050 – a level that is significant but manageable.... Global GDP is currently around \$35 trillion, so if the full 1% were applied to the current period, it would imply around \$350 billion in costs. Global GDP is likely to be around \$100 trillion by 2050, so this would mean annual costs in the order of \$1 trillion by then.

In some sectors – particularly electricity generation, where new technologies can struggle to gain a foothold – policies to support the market for early-stage technologies will be critical. *The Review argues that the scale of existing deployment incentives worldwide should increase by two to five times, from the current level of around \$34 billion per annum.* Such measures will be a powerful motivation for innovation across the private sector to bring forward the range of technologies needed.

To emphasize the need for early action, the two Princeton University researchers Robert Socolow and Stephen Pacala created the concept of stabilization wedges (see Figure 1). The “stabilization triangle” that results from aggregating these wedges in a required emission reduction pathway provides a way of visualizing the mitigation required in the coming half century to avoid doubling the pre-industrial CO₂ concentration. Socolow and Pacala argued that, from a technological point of view, implementing just seven of these wedges would be enough to avoid the worst consequences of climate change. They described fifteen such options to do so, with each wedge representing an aggregation of specific activities capable of potentially reducing one gigaton of carbon (or 3.67 gigatonnes CO₂) per year by the year 2054.

Figure 1. Stabilization Wedges



Source: Socolow and Pacala 2004

⁴ Source: Stern, N 2006

Table 1 on the Socolow and Pacala wedges provides a good understanding of the magnitude of the *scaling up* challenge. It helps to emphasize the point about the necessity to find ways to successfully engage all the ‘natural aggregators’ of the activities implicit in the columns labelled “Description” and “1 wedge could come from” columns.

Table 1. Detail of fifteen wedges

 = Electricity Production,  = Heating and Direct Fuel Use,  = Transportation,  = Biostorage

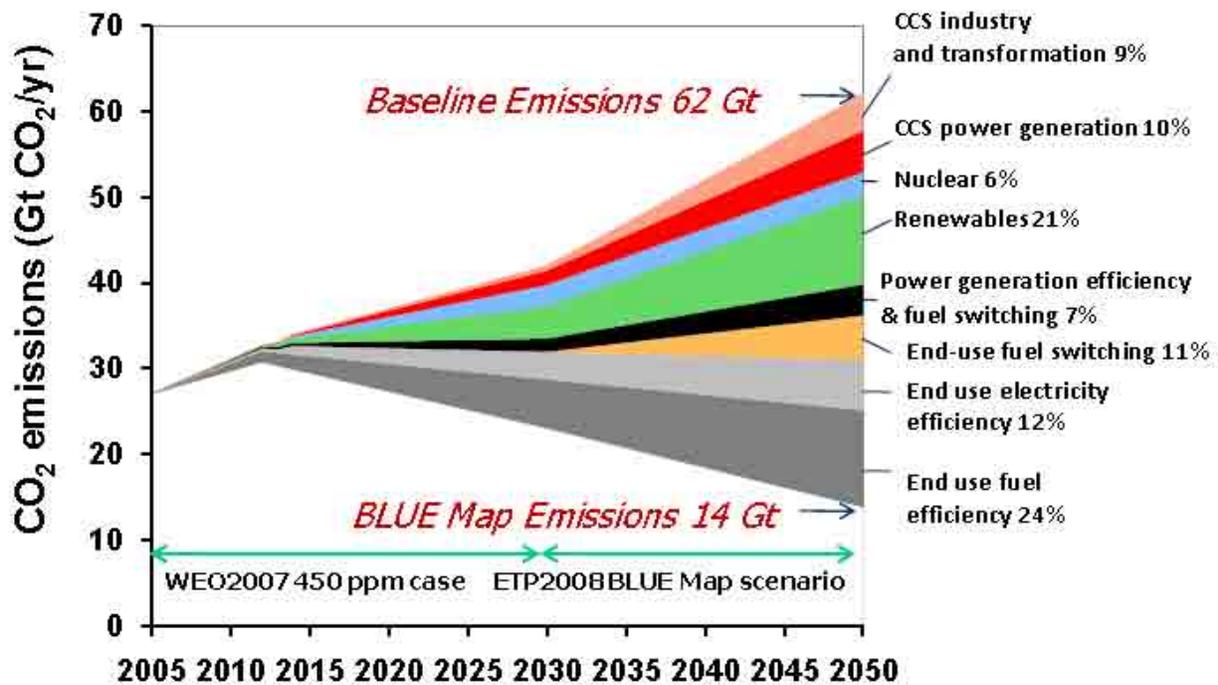
Strategy	Sector	Description	1 wedge could come from...	Cost	Challenges
1. Efficiency – Transport		Increase automobile fuel efficiency (2 billion cars projected in 2050)	... doubling the efficiency of the all world's cars from 30 to 60 mpg	\$	Car size & power
2. Conservation – Transport		Reduce miles traveled by passenger and/or freight vehicles	... cutting miles traveled by all passenger vehicles in half	\$	Increased public transport, urban design
3. Efficiency – Buildings	 	Increase insulation, furnace and lighting efficiency	... using best available technology in all new and existing buildings	\$	House size, consumer demand for appliances
4. Efficiency – Electricity		Increase efficiency of power generation	... raising plant efficiency from 40% to 60%	\$	Increased plant costs
5. CCS Electricity		CO ₂ from fossil fuel power plants captured, then stored underground (700 large coal plants or 1400 natural gas plants)	... injecting a volume of CO ₂ every year equal to the volume of oil extracted	\$\$	Possibility of CO ₂ leakage
6. CCS Hydrogen	 	Hydrogen fuel from fossil sources with CCS displaces hydrocarbon fuels	... producing hydrogen at 10 times the current rate	\$\$\$	New infrastructure needed, hydrogen safety issues
7. CCS Synfuels	 	Capture and store CO ₂ emitted during synfuels production from coal	... using CCS at 180 large synfuels plants	\$\$	Emissions still only break even with gasoline
8. Fuel Switching – Electricity		Replacing coal-burning electric plants with natural gas plants (1400 1 GW coal plants)	... using an amount of natural gas equal to that used for all purposes today	\$	Natural gas availability
9. Nuclear Electricity		Displace coal-burning electric plants with nuclear plants (2x current capacity)	... ~3 times the effort France put into expanding nuclear power in the 1980's, sustained for 50 years	\$\$	Weapons proliferation, nuclear waste, local opposition
10. Wind Electricity		Wind displaces coal-based electricity (30x current capacity)	... using area equal to ~3% of U.S. land area for wind farms	\$\$	Not In My Back Yard (NIMBY)
11. Solar Electricity		Solar PV displaces coal-based electricity (700x current capacity)	... using the equivalent of a 100 x 200 km PV array	\$\$\$	PV cell materials
12. Wind Hydrogen	 	Produce hydrogen with wind electricity	... powering half the world's cars predicted for 2050 with hydrogen	\$\$	NIMBY, Hydrogen infrastructure, safety
13. Biofuels	 	Biomass fuels from plantations replace petroleum fuels	... scaling up world ethanol production by a factor of 30	\$\$	Biodiversity, competing land use
14. Forest Storage		Carbon stored in new forests	... halting deforestation in 50 years	\$	Biodiversity, competing land use
15. Soil Storage		Farming techniques increase carbon retention or storage in soils	... using conservation tillage on all the world's agricultural soils	\$	Reversed if land is deep-plowed later

Source: Socolow and Pacala 2004

Table 1 is drawn from detail on the “Wedges Game”. The colour coding represents four different categories: Efficiency and Conservation (yellow), Fossil Fuel-based Strategies (blue), Nuclear Energy (red) and Renewables and Biostorage (green).

Further technology-based sectoral differentiation is provided by the IEA. This work is an outcome of the Gleneagles Plan of Action, following a request of the G8 to the IEA for it to explore technology scenarios for a lower carbon future. Figure 2 is taken from the new *Energy Technology Perspectives (ETP) 2008* study.

Figure 2: Cutting Energy related CO₂ emissions – The 450ppm case



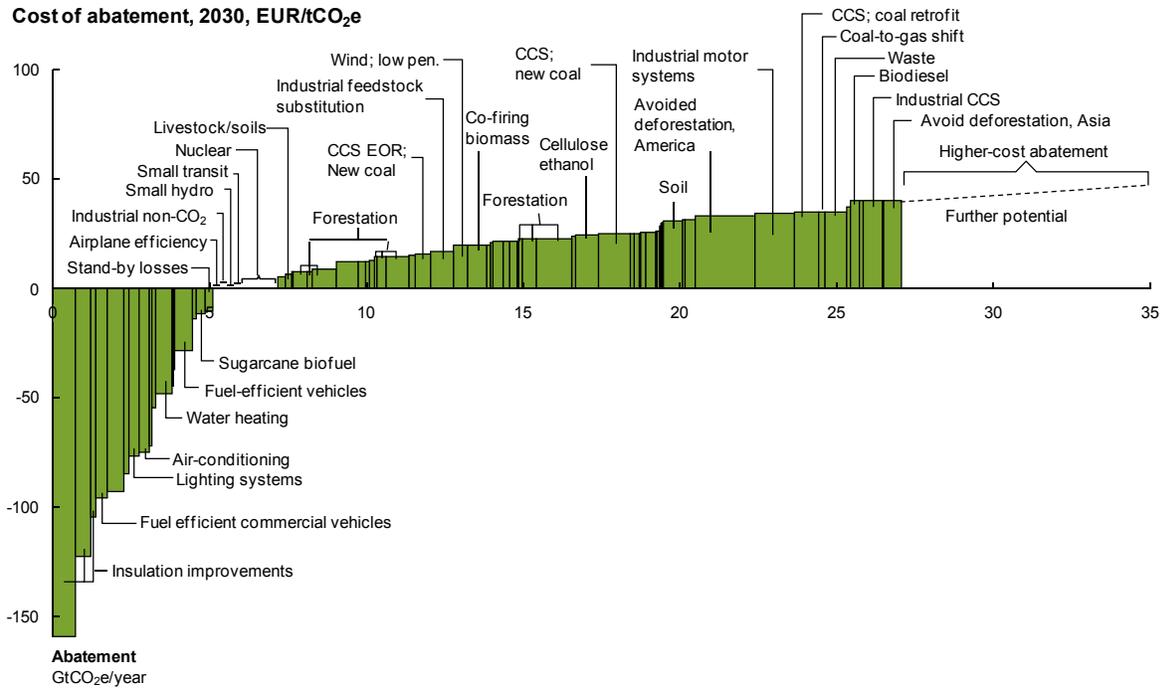
Source IEA 2008

The IEA ETP (2008) data are key to the topic of this paper since they provide an understanding of where the big mitigation potentials exist, especially in power generation, industry and transport – with a major contribution from energy efficiency on the end-use side.

The McKinsey cost curves shown in Figure 3 tell a similar sectoral story and make clear that a very significant portion of the mitigation potential lies in the negative or low cost zone⁵.

⁵ Caution should be taken however. The so-called ‘negative cost’ options are typically assessed on a life-cycle basis and face well-documented barriers to their take-up in practice. Moreover, the cost of delivering some of these options is significant and often not accounted in these studies.

Figure 3: Global cost curve for ghg abatement measures beyond “business as usual”, GtCO₂e
McKinsey Global Cost Curve for Greenhouse Gas Abatement



Source: McKinsey Climate Change Special Initiative

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In 2007 the UNFCCC commissioned a study on *Investment and Financial Flows to address Climate Change (UNFCCC 2007)*. Its key findings:

- 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 billion⁶
- 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
- Investments in new physical assets are projected to triple between 2000 and 2030. There is a huge opportunity to direct I&FF in new facilities that are more climate friendly and resilient.
- It is important to focus on the role of private sector investments as they constitute the largest share of I&FF (86%).
- Particular attention must be given to *developing countries*. 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*.

⁶ Broken down as: reduced investment of about 67 billion in energy supply due to additional investment in efficiency and biofuel; 36 billion in industry; 51 billion in buildings, 88 billion in transport, 1 billion in waste; about 35 billion in agriculture; forestry about 21 billion; and technology R&D and deployment about 35-45 billion

- With appropriate policies and/or incentives a substantial part of the additional I&FF needed could be currently covered by already available sources. However, mechanisms such as the carbon markets need to be improved, as well as the financial instruments of the UNFCCC, ODA and national policies. In some cases *new and additional resources* will be needed to mobilize the necessary I&FF to address climate change.
- The *carbon market*, which is already playing an important role in shifting private investment flows, needs to be significantly expanded to address the needs for additional I&FF.
- *National policies* can assist in shifting I&FF made by private and public investors into more climate-friendly alternatives. They can optimize the use of available funds by spreading risks 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.

Key insights

Key points to be taken from these studies relevant to the topic of this paper are that:

1. Regarding technology, there is reason for optimism. The crux of the matter is technology deployment at the scale needed and within the required time frame. As Socolow and Pacala argue, most of the necessary wedge technologies are already deployed somewhere in the world at commercial scale. No fundamental breakthroughs are needed (although IP and patent issues remain and need to be addressed). Radically new ‘silver bullet’ technologies – like nuclear fusion – might eventually solve the energy problem, but are far away from being available.

However, no wedge is easy to accomplish, because huge scale-up is required, and scale-up introduces environmental and social problems not present at limited scale. Also, wedges that work for one country may not be the best solution for another. It is therefore required to combine flexibility in the implementation and stringency in the objectives.

Moreover, the challenge may be greater than set out by Socolow and Pacala’s ‘stabilisation triangle’ work. They recommend reducing global energy-related emissions to current levels by 2050 (not by 2030 as the UNFCCC I&FF work)⁷. But this will not be sufficient to meet the lowest of the stabilisation scenarios set out in the IPCC Fourth Assessment Report. Global emission reductions of more than 50% are needed by 2050. Twice as many or bigger wedges than ‘just seven one gigatonne’ carbon wedges are required. This is demonstrated in the “Blue Map” scenario of the IEA ETP 2008 work.

2. There is also reason for investment optimism. In particular, 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.

On the surface, this would seem a small investment to make in order to help ensure

⁷ The UNFCCC I&FF *mitigation scenario* consists of (1) the energy-related CO₂ emissions of the IEA WEO 2006 ‘Beyond the Alternative Policy Scenario’, the most aggressive of the IEA scenarios which returns global energy-related CO₂ emissions to current levels by 2030; (2) the US EPA baseline non-CO₂ emissions projections minus the reductions possible at a cost of less than US\$ 30 per tonne CO₂eq; (3) potential CO₂ sinks increases due to agriculture and forestry practices; and (4) industrial process CO₂ emissions from WBCSD (2002).

securing a more stable global climate system in the upcoming century. But increases 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 (e.g., financing institutions will have to do more 'off balance sheet' project financing, which is very rare in most developing countries).

3. A very substantial portion of the mitigation potential lies in energy efficiency measures in buildings, industry and the transport sector. This is typically characterised by a very large number of small actions and so has some key policy implications.
4. Finally, a huge potential for mitigation exists in developing countries, the focus of this paper.

3 CURRENT SETTINGS FOR SCALING UP

CURRENT CARBON FINANCE AND INVESTMENT POLICY ENVIRONMENT

‘Compliance carbon’⁸

Carbon finance in developing countries is dominated by the Clean Development Mechanism (CDM) under the UNFCCC Kyoto Protocol⁹. In the first stage of its evolution the CDM has been characterised by project-by-project investments in many sectors by a large number of actors in many developing countries. In its update report on 1 October 2008, UNEP Risoe Center on Energy, Climate and Sustainable Development stated that the *CDM Pipeline* contained 3,967 CDM projects, 1170 were registered and a further 232 were in the registration process¹⁰.

In some cases, the underlying project finance for the CDM projects has been packaged with carbon finance. But in most cases, carbon finance is a separate element of the overall investment needed for the projects to proceed. However, applying the current requirement of additionality (that the project would not have proceeded – or not proceeded in the same way – without the CDM), carbon finance would need to be a critical element of overall project financing.

The project-by-project approach to the CDM which characterised the first five years of its development has been seen by many as a fundamental constraint to the potential of carbon finance-based investment in developing countries. But, there has also been a strong view that the environmental integrity of the CDM should not be compromised by weakening the core additionality principle. Furthermore, with respect to the potential for scale with the CDM, the primary objective of the CDM was originally to assist Annex I countries to reach their emission reduction targets at lower costs, while at the same time assist developing countries in achieving sustainable development. Generally speaking¹¹, the CDM is therefore constrained at this time to mitigation options that cost less than the options existing in Annex I countries – which, however, are estimated to be significant – that they can take up to meet their first Kyoto period commitments.

Towards *scaling up*

Some critical steps relating to the CDM regarding *scaling up* of low carbon investments in (and by) developing countries have been:

⁸ 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 (see section 3.2.2).

⁹ This paper assumes that readers are well familiar with the basic construct of the CDM, in particular the concept of ‘additionality’, and the institutional processes centred around the CDM Executive Board to help ensure the integrity of the CDM and that projects are real, verifiable and additional.

¹⁰ For a regular update of these statistics see <http://www.cdmpipeline.org/>

¹¹ In practice, the situation is more complex than this generalisation, given the stratifying of the overall compliance carbon market into subsets such as the EU ETS. The result is a higher value for carbon in the key markets creating demand, hence more potential in the CDM. But ultimately, the scale of the CDM is constrained by the current demand in Annex I countries.

- At its 22nd meeting in November 2005, the CDM Executive Board (EB) ruled that policies and measures can be taken into account to establish baseline scenarios, without creating perverse incentives which might affect host parties contributions to the ultimate objective to the convention.¹² If countries implemented policies and measures (P&Ms) that give comparative advantage to low carbon technologies, the EB determined that the baseline scenario would not need to take them into account if the policy was adopted after the adoption of the CDM modalities and procedures in November 2001 (i.e. the baseline would only refer to the hypothetical situation without the P&Ms in place).

This ruling seemed to ensure that the introduction of P&Ms by developing countries would not adversely affect emission reduction quantification. It also should make sure that CDM and policies and measures could work together to decarbonizes economic sectors, rather than having developing countries to choose between one and the other.

However, subsequently, this ruling has been seen by some as not being as clear as it seems, and the underlying issue not fully resolved. The key point here, though, is that forms of financing other than the CDM are available to developing countries to help them implement programs involving low carbon investment.

- The UNFCCC COP11 in Montreal in December 2005 clarified that policies and standards alone could not count as CDM activity.¹³ This was presumably due to difficulties in (i) ensuring policies would be implemented, and (ii) tracing the resulting emissions to the policy – in cases where such a policy was in fact implemented.

However, if a policy is implemented as a program with directly verifiable reductions, the program itself then could be implemented as a CDM project activity. As a result, this decision (a) effectively eliminated any discussion around policy-based CDM and (b) took the policy/program difference as a keystone of the programmatic approach.

In parallel, bundled approaches (where several CDM projects were implemented together) were also approved.¹⁴ A small literature has also evolved on the difference between programmatic and bundled approaches, emphasizing the supposed flexibility of programmatic CDM based approaches vs. bundled ones.¹⁵

¹² See UNFCCC EB 22 Annex 3 “Additional clarifications regarding the treatment of National/Sectoral policies and circumstances” November 2005.

¹³ See the rather tortuous language of the compromise reached then “...a local/regional national policy or standard cannot be considered a CDM project activity, but project activities under a program of activities can be registered as a single CDM project activity... provided that CDM methodological requirements are met.” See COP/MOP1, Decision 7/CMP.1, paragraph 20.

¹⁴ In the bundled approach sites are identified ex-ante, each single activity is generally represented by a CDM participant (who in turn is the one achieving the reductions) and the composition of project activities is known at the beginning and does not change through time (see COP/MOP1, Decision 7, paragraph 21).

¹⁵ Hinostroza, M et al (2007), following insights developed by Figueres in various presentations, have argued that a PoA differs from a stand alone CDM in that (a) it comprises multiple actions in many sites to reduce emissions, (b) coordinated by a managing entity, (c) via unlimited CDM project activities (CPAs) (d) with GHG reduction activities not occurring all at the same time, but - as the EB stated - through an up to 28 year period, and (e) with the resulting achieved emissions identified - through statistically sound sampling or other mechanism - only at the end of the crediting period.

Implementing CDM Programme of Activities or Programmatic CDM

Since the initial decisions on programmatic CDM, the EB has produced several guidance documents.

While still evolving, as it stands now, a Programme of Activity (PoA) is:

*“a voluntary coordinated action by a private and public entity which coordinates and implements any policy/measure or stated goal (i.e. incentive schemes and voluntary programs), which leads to GHG removals by sinks that are additional to any that would occur in the absence of the PoA, via an unlimited number of CDM program activities (CPAs)”.*¹⁶

In order to establish additionality, a PoA has to demonstrate that the proposed voluntary measure would not have taken place otherwise, the proposed regulation would not have been enforced or the PoA would lead to a greater level of enforcement.¹⁷ Individual CPAs' additionality can be demonstrated through the EB additionality tool or any other recognized methodology.

The evolution of discussions at the EB has mostly focused on the capacity of programs to directly generate CERs. There has not been any focus on the potential of policy and measures (P&Ms) to create conditions where CDM projects could be deployed to generate CERs.

In fact, P&Ms could still create an enabling environment for low carbon development and/or standalone CDM without in fact being programmatic CDM. It is crucial to avoid the perverse incentive of countries having to choose between deploying policies and/or having CDM activities. It is important to note that the issue of perverse incentive addressed by the EB22 decision of November 2005 has unfortunately been difficult to implement in practice.

Two recent studies (*Hinojosa, M 2007* and *Figueres and Philips 2007*) have looked at the potential for programmatic CDM (pCDM) to help address a concern that the CDM has, thus far, played only a very limited role in energy efficiency. This concern is made more serious by various studies that indicate that a very significant portion of low cost mitigation potential lies in energy efficiency activities, including in developing countries. Both of these studies find that, while pCDM shows some promise to improve the situation for energy efficiency activities in the CDM, significant constraints remain.

Other commentators have raised different concerns about pCDM. A primary issue raised is that the rules for PoAs place higher liability risks on the Designated Operational Entities (DOEs). These are likely to be reflected in the price of independent validation services or as more commonly seen, result in the lack of interest by DOEs to undertake validation of PoAs.

While the CDM PoA approach undoubtedly offers advantages over project-based CDM, it still has some significant constraints. In particular, the emphasis on the traceability of the emissions directly derived from programs, and the resulting focus on single methodologies, has significantly limited the amount of reduction action. For example, it can suit *horizontal* aggregations outlined later in section 3.2.1, with various technologies as long as a single methodology is applied. Likewise, it does not suit *vertical* aggregations where more than one CDM methodology is involved, e.g. a program for industrial boilers involving energy efficiency

¹⁶ Annex 38, EB32.

¹⁷ Annex 38, EB32.

improvements and fuel switching, or even where energy efficiency improvements involve a number of quite different types of technology.

Further evolution of POA is therefore needed, especially for types of aggregating activity – as well as on procedures to register them – that may not lend themselves to other new *scaling up* mechanisms (e.g. *sectoral CDM* and *sector no-lose targets*) discussed in section 4.

Voluntary carbon markets

While the main focus of this paper is on carbon markets created through the compliance mechanisms of the Kyoto Protocol and future multilateral climate change agreements, the potential for scaling up low carbon investments through the voluntary carbon market should not be overlooked. The voluntary carbon market differs from the compliance market first and foremost by what creates market demand. In the voluntary carbon ‘space’ demand is created by voluntary actions – by organisations, businesses and individuals.

The best (and rapidly growing) examples are initiatives associated with *carbon neutrality*. These can occur at the individual level; e.g. someone offsetting the emissions of an airline trip either through the airline or on an offsets website. Or it may be a firm or organisation undertaking a full formal carbon neutrality program where it (Step 1) calculates the carbon emissions *footprint* within the boundary of its operations, (Step 2) introduces policies and measures to reduce its footprint and (Step 3) purchases *offsets* for the residual emissions footprint.

Another key driver is *corporate social responsibility* (CSR) reporting. All of these voluntary market drivers contribute to create a demand for carbon offsets that can be served by a supply of projects and activities occurring in the voluntary market ‘space’¹⁸. This demand (and supply) is growing rapidly. It is estimated that in 2007 the voluntary market saw ‘over the counter’ (OTC) trades of about 42 million tonnes CO₂ with a value of about US\$258 million¹⁹.

Another point of difference between compliance and voluntary carbon markets is that, whereas ‘compliance carbon’ demand originates in developed countries, the demand in the voluntary market can also come from firms operating in developing countries. This is because what is ultimately driving many decisions for businesses to ‘go carbon neutral’ is emerging consumer preference.

While the “green” consumers live mostly in industrialized countries, any company in the supply chains to satisfy those end consumers can be affected. This includes also companies in developing countries. So, for example, there is as much market opportunity for a winegrower in, say, Chile or South Africa to put a carbon neutral bottle of wine on the shelves of a Sainsbury’s store in London (at a premium price) as there is for a winegrower in, say, New Zealand or Australia. Wine is just one example. There is a drive for the carbon footprint labelling of many (or all) products in major retail chains in countries like the UK, so this is becoming a new retail reality (and opportunity) for supply chain producers worldwide.

Moreover, major industries headquartered in developing countries may see good reason to take voluntary initiatives in advance of the time when their countries (and they) may take on more formal emission reduction commitments.

¹⁸ It is also possible for those seeking voluntary offsets to acquire and retire, or cancel, Kyoto compliance units, so this can, for example, create additional demand for CERs, and hence CDM projects.

¹⁹ Hamilton, K et al, *State of the Voluntary Carbon Market 2008*, Ecosystem Marketplace (2008)

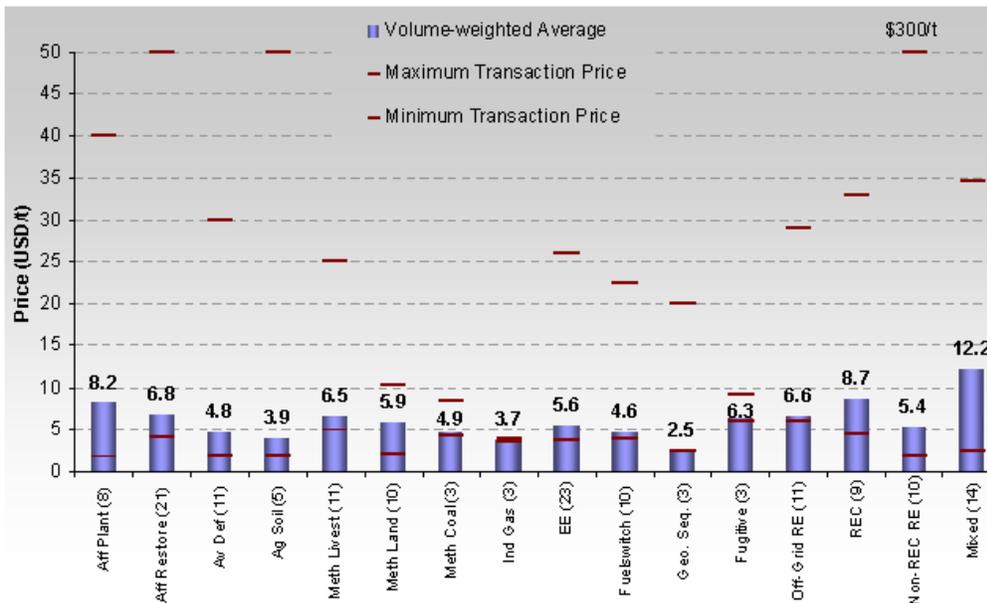
All the signs are that volumes in the voluntary market are rapidly increasing, commensurate with the growing corporate carbon neutrality movement and the bottom-up engagement of publics worldwide to play their part to help battle “the climate crisis”²⁰.

However, this rapid growth has been seen to outstrip the establishment of proper credibility ‘building blocks’ that exist in compliance carbon markets – i.e. emission measurement calculators; project approval standards and methodologies; accredited independent validators and verifiers, and organisations to accredit and audit them; and unit registries.

In response to concerns emerging in the media about “carbon cowboys”, there has been significant progress in 2007 and 2008 by a number of organisations that have released proposed voluntary carbon market standards. It is still too early to say whether these standards will converge on one particular international voluntary standard. But it is already clear that these standards require offsets to be *real, verifiable and additional*, therefore are working to a large extent from the base of existing CDM methodologies.

Another key difference between the voluntary and compliance carbon markets is that buyers of voluntary carbon – particularly those for whom CSR is the primary driver – will often value co-benefits of the underlying activities (e.g. biodiversity and social benefits, including contributions to sustainable development in general). It’s not just about carbon. The result is that buyers will often be more interested in specific projects and project types and want to understand the co-benefits of any ‘carbon’ they are buying. This explains the wide range of prices for VERs reported for 2007 (Figure 4).

Figure 4. OTC prices paid for VERs in 2007



Source: Hamilton, K 2008

The key point, then, is that there are unique features of the voluntary carbon market. So this should not be overlooked as a possible key contributor within a financing portfolio approach for

²⁰ e.g. as stimulated by the ongoing Gore and Clinton initiatives, with individuals and cities respectively

low carbon programs in developing countries. Nevertheless, the basics of carbon financing are still valid – namely the development of baselines beyond which credits apply and that offset credits should not be created for activities that were going to occur anyway.

SCALING UP NOW – A STRATEGIC THINKING FRAMEWORK

The Socolow and Pacala wedges and IEA technology-focused approaches are useful because they purposefully oversimplify a complex problem. They stress the need of deploying broadly-defined but well-known technologies on a huge scale and outline the main roadmaps to achieving this. However, this simplicity comes at a ‘cost’. What is missing are the details of policies and programs needed to scale up the deployment of these technologies. Such outline needs to include:

- crucial governance/policy considerations for implementing the required reductions
- specific best technology/policy combinations required to achieve the reductions
- associated social dimensions (The viability of technology implementation requires accompanying human practice and social acceptance of both the large scale introduction of technologies – e.g. the lifestyle and amenity value changes they will imply – and of lower carbon lifestyles that will be required to achieve a low carbon economy).

Vertical and Horizontal aggregations

It is useful to consider issues from the ‘on the ground’ perspective of what are the types of actions and investments that are the most desirable to see scaled up and 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.

The concept of *vertical* and *horizontal* aggregations can be helpful, especially at a program level encompassing sectors and/or regions. **This paper’s use of the term *program*, as in *strategic program approach* below, involves thinking in broader terms about the aggregation of sets of interventions or enabling actions by a relevant actor.** A *strategic program* can form the overarching policy framework and a *program approach* can be seen as the purposeful implementation of sets of measures by public or private agents within a sector or region. These programs could be devised to substantially increase the capacity to overcome barriers and aggregate projects by means of financial, policy and/or project implementation structures. The objective is increasing the scale of low carbon projects (including CDM) and response activities – and consequently, increasing the potential for large scale GHG reductions in the same sectors or regions.

Vertical aggregations represent a number 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. They also could be energy utilities, industry associations 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. Here, local or regional governmental programs may be envisioned that involve many different types of activities, for example across the building and transport sector.

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.

A Strategic Program Approach to Scaling Up

A strategic *program approach* to *scaling up* low carbon investment must ask the following key questions:

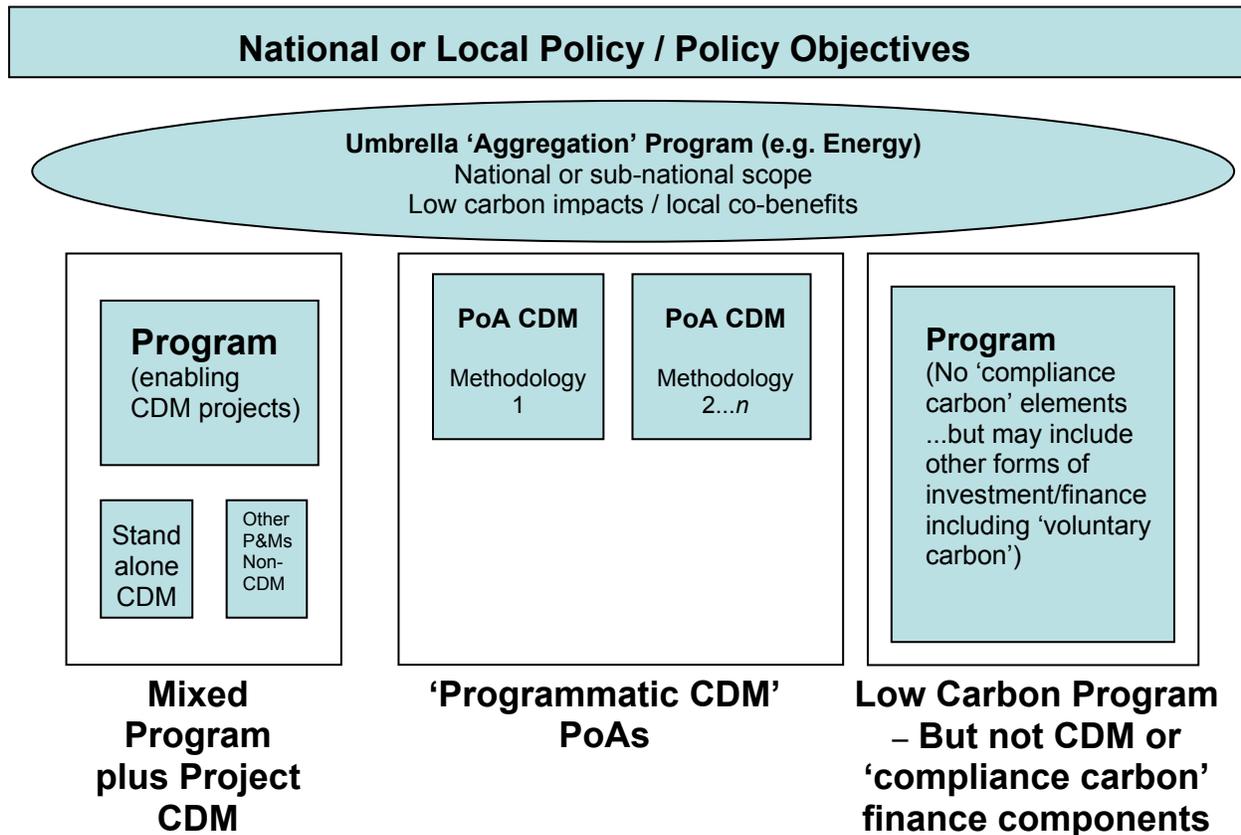
- Who are the ‘natural’ key coordinating actors for the sought aggregations of activity? Are they policy makers or policy ‘takers’?
- To what extent is the provision of financing likely to ‘unlock’ the investment needed for the desired aggregation of activity – or are there other key barriers to be overcome or other complementary policy and measure (P&M) 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 carbon finance 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 programmes of activity likely to achieve the scaling-up possible? Is a *sectoral CDM* or *sector no-lose targets* approach preferred? Or is there an option to blend or differentiate mechanisms, depending on the host country situations? And is it possible that financing through the non-compliance voluntary carbon market may be the easier and/or quicker road 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 set? What institutional process approves these baselines, monitors performance and issues credits for performance beyond these baselines?

This aggregation can have a subnational, national or regional scope. It can be led by public or private parties (private companies, financial institutions, industry leaders, trade associations or public sector agencies). It can be advanced through solely private, solely public or mixed character arrangements – e.g. through public-private partnerships or public trusts.

Importantly, it would not be expected that all of these measures could form a single POA under the CDM, or all directly result in project based CDM activities; or all be totally accounted for in terms of CER generation. But the measures could be expected to share a common low carbon objective for those activities within their scope.

The following depiction in Figure 5 sets out the policy environment that can currently exist for investment in low carbon activities – if a program approach is taken.

Figure 5. A strategic *program approach*



Source. Garibaldi, J: Program Based Approaches to Low carbon Development, mimeo, and Presentation at the forum Sustainable Cities in Latin America and The Caribbean, Santiago, Chile, November 2007.

As this depiction shows, there are currently three distinct program streams that can work together. A strategic *program approach* would combine these three streams within domestic national or local level policies under umbrella sector-wide (or region wide) aggregation schemes. Over time, other compliance carbon policy instruments (such as the new sector-based ideas discussed in section 4) can add to this picture. This point is further discussed in section 6.

Stream I: National (or local) Program and CDM,

In this first ‘mixed’ version, a program and standalone project CDM activities operate together, i.e. it uses the current CDM with accompanying enabling policies and measures to increase the number, scope and scale emission reduction activities, including CDM activities. The program creates conditions – for example, through providing tax rebates, preferential tariffs or other financial incentives/subsidies – which encourage the deployment of GHG mitigation activities including those that may also be eligible under the CDM. Only the standalone CDM project activities can create CERs; the program is neither created for nor influenced by the CDM. The existing CDM global portfolio already has examples in Asia (*inter alia* India, Indonesia and Nepal), Latin America (Colombia, Chile, Mexico, Peru) and in South Africa.

Stream 2: Programmatic CDM

The distinction between the Programme of Activities (PoA CDM) and its CDM project activities (CPAs) categories is relevant here. In all cases, the PoA creates conditions and organizes action; CPAs deploy project activity. In this case, however, the PoA guidance from the CDM, as discussed earlier are directly applied: Both PoA and CPAs must be proved additional, each PoA must be based on a CDM methodology and furthermore the policy objectives must be partially achieved for the program and project to be additional. Here, in theory, the program activity allows for the easy replication of CDM project activities and CER generation – with no double counting. But note that this second program stream is more than just pCDM. It combines current pCDM with policies and measures that will result in aggregated pCDM activity.

Stream 3: Low Carbon Programs alone (that contribute to a low carbon environment, have measurable and verifiable emission reduction outcomes but do not produce any CERs)

Finally, it is always possible for any Program to create conditions for low carbon development, even if there is no CDM activity at all (although there may be voluntary carbon market activity). This program stream will most likely need to be deployed to facilitate the enabling finance and investment environment, but could also be deployed due to domestic sustainable development policy reasons, or – in an ideal world – because of global low carbon concerns.

It is also important to note that these three streams need not operate as alternatives, but can be combined for a broader impact on the GHG emissions in the sector or region.

Currently, most of the CDM activities fall outside of all these three streams – as most of the current pipeline is specifically single project based activities that don't fall under any form of strategic thinking. However, a sizable portion of the current CDM project pipeline could be considered to fall within stream 1, considering the number of projects with supporting measures to facilitate their operation or with some support of the national government.

Stream 2 is currently the least developed due to limitations, described earlier. Nevertheless, pCDM could help expand the scale by combining implementation mechanisms and financial instruments under a program (more or less as currently happening under stream 1 but not on the basis of single project CDM). The development of GHG quantification methodologies for the aggregation of large number of small projects could increase the contribution of this stream.

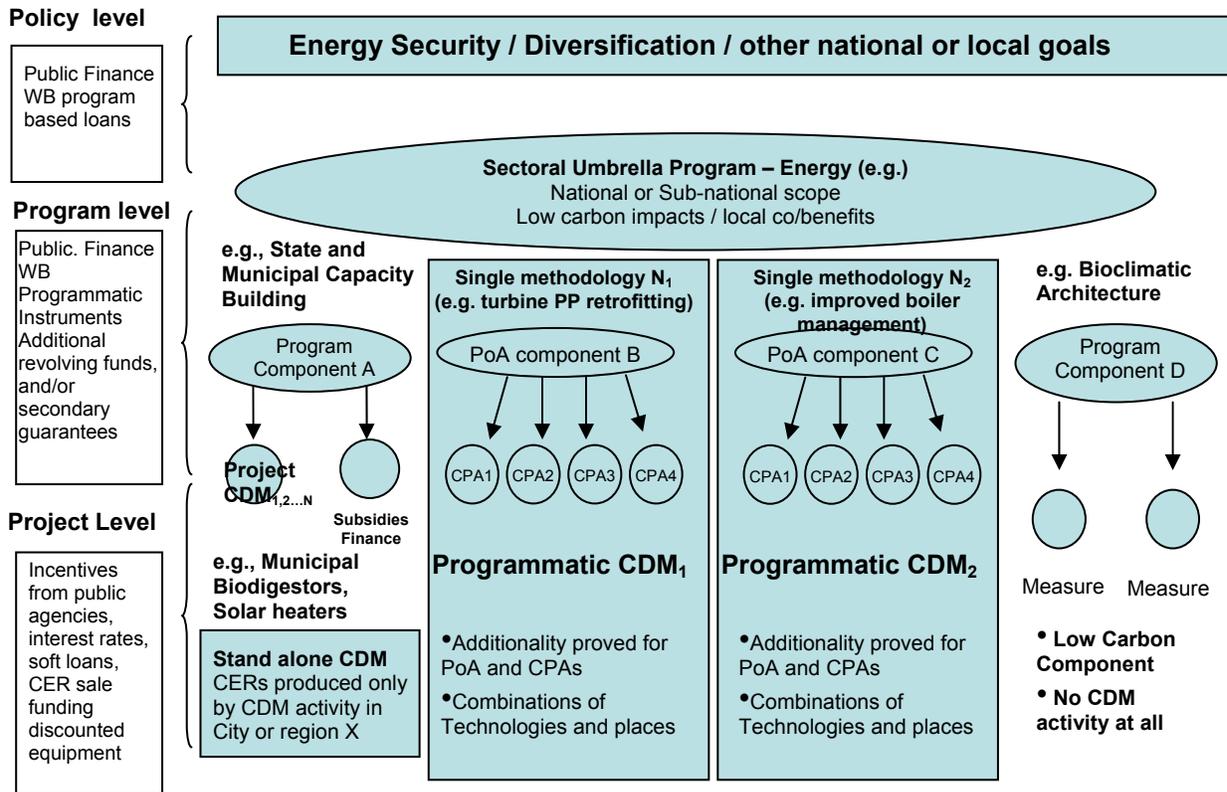
Finally, stream 3 refers to support activities not currently directly generating CERs, but nevertheless creating a low carbon program environment that:

- (i) helps make possible the other two streams through general enabling activities;
- (ii) facilitates and attracts other forms of financing and investments that are currently not supported through streams 1 or 2; and
- (iii) creates the basis for enhanced carbon financing that may in the future occur under existing streams 1 and 2 or through future carbon finance mechanisms – e.g. through the development of new baselines and methodologies.

The depiction below in Figure 6 provides a detailed example of how such a *program approach* could work in a specific sector, using the energy sector as an example. While this depiction

takes a policy set as the context, the entity aggregating activities could be public, private or both (through a public/private partnership).

Figure 6. A detailed example of taking a *strategic program approach*



Source. Garibaldi, J, Program Based Approaches to Low Carbon Development, Mimeo.

In the case shown above, the program based approach would help deploy national or local development goals (as outlined in the top policy objectives box), supported by a suite of financial instruments (some of which are suggested in the set of boxes to the left), defining them at the policy, program, and project level. Finally, each of the three options is aggregated under an umbrella activity (included in the main oval) which can be coordinated by a public or private agent (although, due to its policy character, it will imply at least some level of public sector participation).

Under this overarching framework, examples of the three options outlined earlier are presented. The first “mixed program” option “Program A” includes municipal level activity (including in this case the deployment of municipal biodigestors as single CDM projects). The second option, “Program B and C” involves various PoA activities around e.g. plant and turbine retrofitting and/or improved boilers or other thermal activities. The third option “Program D” includes programs that can create conditions which indirectly facilitate CDM projects – but have no direct carbon finance component .

Financial and investment arrangements and instruments

A crucial characteristic of such a strategic *program approach* would be to increase conditions for the supply of emission reductions through alliances between public and private agencies,

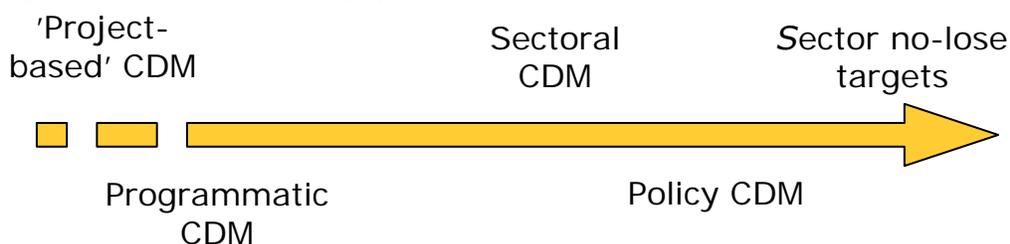
potentially supported by domestic agencies, national and multilateral development banks' instruments. Crucially, rather than aggregating projects through the use of the CDM, it would instead be through multilateral or domestic policy instruments. As program based approaches and development finance both depend to various degrees on government policies, this would ease their effective planning, coordination and implementation.

4 POST-2012 DISCUSSIONS ON CARBON FINANCE TOOLS FOR SCALING UP GHG MITIGATION

A number of options for enhancing carbon finance are currently being discussed by the international community. This section looks at ideas for specific policy instruments (or *tools*) that might be used as part of an overarching quantitative international climate change policy framework. These tools are therefore of a 'compliance carbon' nature. Indeed, these tools deal with different ways of establishing crediting baselines at progressively greater scales of activity.

Discussions on *scaling up* from project-based CDM have a variety of policy tools on the table. Figure 7 illustrates schematically the *scaling up* continuum of the various policy tool options proposed as elements of a future climate regime.

Figure 7. Options for *scaling up* from project-based CDM



Moving up from project-based CDM, *programmatic CDM* is already part of the current policy setting for pre-2012 and allows many projects to become constituent parts of one large CDM project, called POA. As noted in section 3, these still face some key constraints.

Sectoral CDM (or as some say, *taking a sectoral approach to CDM*) is not one single clear concept. The term is used for significantly different ideas that, however, would apply to a specific sector (or subsector) in a country:

- (i) **Multi-project baselines:** This version would grant credits to private entities which emit less than a sectoral emission baseline (or standardised benchmark) defined for the sector in a given country. For example, all electricity generation plants might automatically earn credits if their emissions are below x tonnes CO₂ per MWh. This, however, has been seen by some as contrary to the logic of the project-by-project assessment of additionality under the CDM, as credits would automatically be given to all those private actors already producing more efficiently than the baseline. Setting such baselines in a conservative manner is one way to address this concern, i.e. such that aggregated over all activities, the credited reductions won't be greater than the actual reductions expected to occur by comparison with a likely business as usual scenario. Another way to address this concerns could be that crediting only applies to new plants being built and existing plants being substantially upgraded.
- (ii) **Baseline for entire sector:** This version deviates from the traditional CDM thinking of having emissions credits provide incentives directly at the emission-reducing installation/plant/end-use level. Instead, it involves 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 the CDM – at least in the first stage – to the government level. The government would be responsible for implementing

policies and measures to reduce emissions in the sector and would receive credits if the ex-post overall emissions of the sector are below the baseline. It would be up to the government to decide whether – and if so how – the credits (or a share thereof) would be given to the good performers in the sector. Note that any such baseline would still be subject to international oversight and need to be approved by the CDM process (currently the Executive Board) because CDM credits add to the emissions cap of developed countries and so affect all countries (and all entities involved in the carbon market).

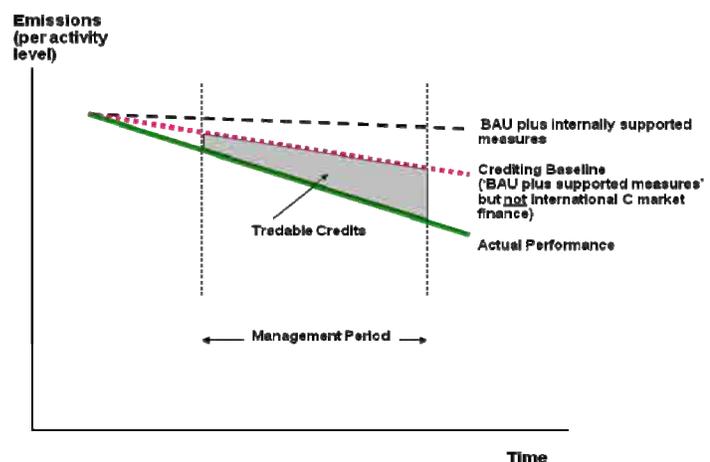
Policy CDM would award credits to any activity that falls under a government policy (which may include several measures and possibly over a number of sectors) the impact of which in terms of emission reductions can be measured against a baseline and can be attributable to the policy. This continues to face difficulties in quantification and measurement of emission reductions actually attributable to policies. Hence, the risk of generating excessive credits, thus causing worse environmental outcomes (than not having this mechanism), may be perceived as high. It may be possible to make this concept more environmentally robust through clear definition of the baseline targeted by the policy, identification of measures/actions to be undertaken under the policy and perhaps even a clarification of how the CDM credits would help implement the policy – which would be subject to monitoring and verification.

Sector no-lose targets 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 (see Figure 8). Developing countries could voluntarily propose a sector crediting baseline (e.g., national emission intensity of the specific sector) which would be negotiated at the international level. Reductions below the baseline would generate credits issued to the government. But no penalties would occur if the target is not met for the whole sector. Such a sectoral mechanism would demand greater monitoring and reporting for the covered sector(s) than is currently seen in developing countries. Third party verification (e.g. as is required now for developed countries' inventories and national systems) is also likely to be required for such sectors to enhance credibility.

The main difference between *sectoral CDM* and *sector no-lose targets (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 *SNLT* would be negotiated. Proponents of the *SNLT* mechanism suggest 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.

This difference in the treatment of *additionality* between *SNLTs* (where it is not applicable) and any form of CDM is what distinguishes the *SNLT* 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 lack of predictability of the institutional decision-making processes of the CDM, particularly associated with the determination of

Figure 8. Simple depiction of a sectoral baseline



additionality. This will be avoided in the case where *SNLTs* are negotiated as Annex I country targets are set.

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 the case 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 cost-effectively) and where a measured change is representative of reduced tonnes of emissions to the atmosphere (or enhanced sequestration). This becomes increasingly challenging as one moves away from project scale CDM projects towards a sector level, especially, for example, where there are a large number of dispersed sources of emissions.

Given that *SNLTs* apply to developing countries, the baselines would likely be determined in relative terms, not absolute. This is necessary in order to explicitly recognise the well-accepted and legitimate need to allow economic outputs to grow in some means other than by having inflated absolute targets. Intensity baselines also then require the parameter that is the denominator in the metric (e.g., output) to be measurable – and measured, reported and verified. This, again, places constraints on which sectors (or subsectors) might be applicable for *SNLTs*.

Some examples of possible sectors and baseline metrics are:

- Electricity generation: tonnes CO₂e 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 CO₂e 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 CO₂e 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. Here, a *SNLTs* approach is much more complex and perhaps not feasible – although some sub-sectors may be able to be defined, including perhaps regions or sub sectors that are less than national in scale. (Note also that the same issues would apply for *sectoral CDM* of the second version²¹.)

It can be seen that these carbon finance policy tools vary substantially in their characteristics. One key element is to whom the carbon finance incentive is provided (at least initially) and to whom credits are issued. Under the current CDM and pCDM, the carbon finance incentive is given to the entity undertaking and/or coordinating the CDM or pCDM activity. Credits are issued directly to the entities involved in the project activities. But under some of the options credits could be issued to national governments – who may in turn decide whether, and if so how, the

²¹ The issues raised here about *SNLTs* are taken up in detail in a separate full paper on *SNLTs* (Ward, M et al 2008)

credits, or their value, would be transmitted to entities. The geographic scope of activities tends to increase when going up the scale towards *SNLTs*. Approval of baseline methods could lie with the CDM Executive Board (EB) or directly with countries' governments through the COP. Furthermore, additionality is an issue under all variants of the CDM, while it is not for *SNLTs* – at least once the baseline is agreed.

The scaling-up step of granting credits to governments instead of directly to entities undertaking the GHG mitigation activities 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 private actors or relevant public entities. 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 – from regulatory measures such as setting standards to market approaches such as a domestic projects-based incentive scheme or a cap-and-trade system.

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

But all this introduces considerable uncertainty to the public and especially 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 segments of the carbon markets and go elsewhere. This concern is taken up specifically in later sections.

There is also the issue of host government capacity and international oversight. At one end of the spectrum, the current CDM can function with relatively limited host country capacity²². It relies on the international oversight provided by the CDM Executive Board for the approval of projects and third Party CDM Designated Operational Entities (DOEs) to validate and verify the proposed CDM projects and their emission reductions. At the other end of the spectrum, *SNLTs* would demand significantly more engagement and capacity from host governments in terms of ensuring the environmental integrity of the *SNLT* and related data collection, monitoring, reporting and verification activities.

That this issue of carbon market engagement is one deserving very close attention is a lesson which can perhaps be drawn from looking at developments thus far with JI (in particular Track 1 JI²³) and the idea of Green Investment Schemes (GIS). In both cases, these involve domestic (host) governments to a much greater degree than the CDM. The potential extra contractual and transaction cost uncertainties of dealing with national governments is suggested as being a key reason for relatively limited market activity in JI and GIS thus far. For example, compared with

²² The only requirement is the establishment of a CDM Designated National Authority to confirm that proposed CDM projects are voluntary and assist the host country in meeting its sustainable development priorities –as defined by the host government.

²³ Under Track 1 JI the host (seller) and buyer governments can agree that a project is additional and that the baseline is reasonable. ERUs are issued and provided by the host government. No process like the Executive Board managed CDM process is required. While, in theory, this sounds as if it might be preferred by the private sector carbon market, thus far, this has not proven to be the case. The uncertainty of dealing with national governments is seen to be a key concern.

the 1170 CDM projects registered (at 1 October 2008), there are only 17 Track 1 JI projects.²⁴ This situation is expected to change, however, with increased political will and capacity in host countries.

Horses for courses

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 the case 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 in the most developed of the developing countries, only some sectors may be candidates for what some view as the *scaling up* tool with the broadest scaling up potential, *SNLTs*.

The reasons behind this ‘horses for courses’ point are made clearer in Table 3. This summarizes the different characteristics of the different carbon finance tools for scaling-up beyond the classic project-based CDM. (Note that this table refers to existing and future policy tools, and does not consider the *strategic program approach* outlined in Section 3 about how these might optimally be implemented.) 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.

From the table 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 the more advanced developing 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 forms 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.

²⁴ One limiting factor for JI projects has also been that many projects that may have been seen as possible in EITs that have subsequently joined the EU are now captured under the EU ETS, and reductions are incentivised through ‘freed up’ EUAs that can be on-traded.

Table 3: General Characteristics of scaling-up ‘compliance carbon’ policy tools

Option	Classic CDM	Programmatic CDM (PoA)	Sectoral CDM (two variants)		Policy CDM	Sector no-lose targets
			Multi-project baseline	Baseline for entire sector		
Applicability / Suitability	Stand alone, low carbon investment project	Wide deployment of specific individual technologies	Relatively large site and homogenous commodity sectors		Easily regulated and monitored sectors / activities	Relatively large site and homogenous commodity sectors
Examples of typical application	Landfill site, windfarm,	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 (but some easier than others)	Difficult to determine	How to set baseline to avoid awarding credits for non-additional reductions?	Difficult to determine	Very difficult to determine	No longer an issue once SNLT is set through negotiation
Contribute to overall global reductions	Zero sum at best (‘first round’ effect ²⁵)	Zero sum at best (‘first round’ effect)	Zero sum at best (‘first round’ effect)	Zero sum at best (‘first round’ effect)	Zero sum at best (‘first round’ effect)	Potentially positive
Required government capacity	Low	Low (if government is not the coordinating agent)	Low	High, since credits are issued to governments, which have to pass on the incentive + MRV obligations	Higher, since credits are issued to governments, which have to pass on the incentive + MRV obligations	Highest (?), since credits are issued to governments, which have to pass on the incentive + MRV obligations
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 possible	Relatively simple	At national level with greenhouse gas inventories	May be difficult to set boundaries	At national level with greenhouse gas inventories

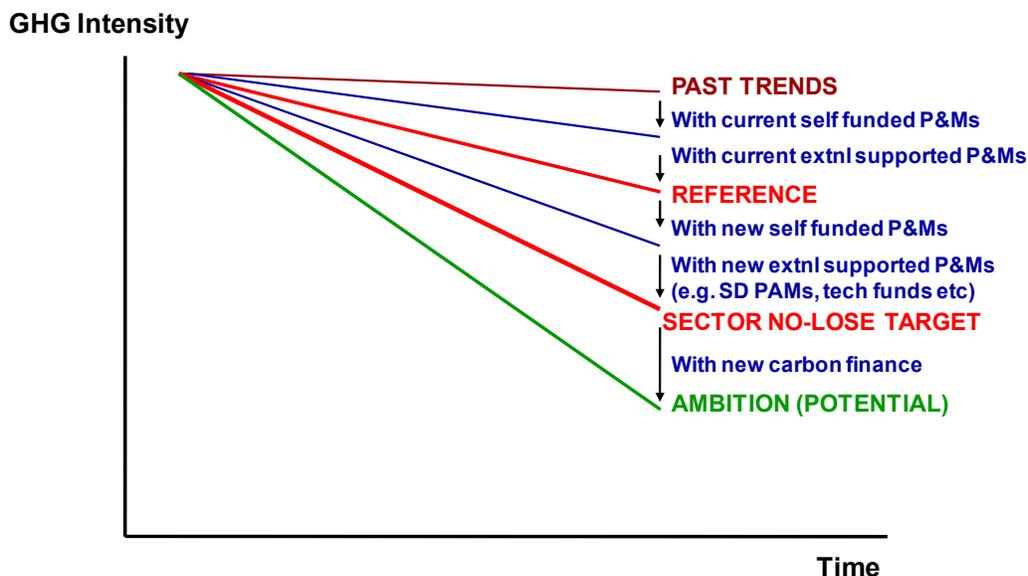
Colour coding: Reddish cells indicate limitations or problematic issues. Greenish cells indicate more positive scoring. Creamish shaded cells are “depends”.

²⁵ ‘First round effect’: CDM credits allow emissions elsewhere as they add to the developed country cap. But CDM projects have a limited crediting period and can have the subsequent effect of changing regular practice in developing countries (so could lead to even more reductions, especially if the baseline is conservative).

Proposals for *SNLTs* suggest that the sector crediting baseline would need to be set below business as usual levels. This means that only a part of the emission reductions achieved beyond business as usual would be awarded in the form of carbon credits. Such a national contribution by the host country is considered because of the non-binding nature of the target.

The national contribution by the host developing country is one means to achieve additional emission reductions beyond Annex I targets at the global level. This does not mean to say that external funding or technological support other than carbon financing may not 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 a crediting baseline beyond which carbon finance would apply, it will be necessary to understand which external support is already available for low carbon investment in the sectors in question and which additional support may be made available in the future. This is depicted in Figure 9, a more elaborated version of Figure 8.

Figure 9: Development of *sector no-lose targets*



Source: Ward, M et al (2008)

Figure 9 also provides a sense of the negotiation process that may be involved with *SNLTs*. Importantly, for both developing and developed countries it provides for a comprehensive assessment that recognises (so values) the measures that developing countries are taking, or are planning to take, (including through self funding) to mitigate climate change.

In thinking about their *scaling up* priorities, developing countries will need to decide which sectors or technologies are most effectively addressed by, say, a proposed and negotiated *SNLT* (e.g. for electricity generation) and which sectors might be more effectively dealt with by e.g. programmatic CDM or other funding mechanisms (e.g. energy emissions from buildings or private transport). 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 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 following questions:

- 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?

Financing will be needed to support developing countries in the technical and analytical work of this phase, e.g. filling-out sector proposal templates²⁶, studies on cost curves and data collection. It will also be necessary to build the institutional capacity needed to kick-start and maintain the processes. The involvement of key stakeholders, including 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. Where possible, building on the current efforts for the preparation of non-Annex I national communications and national inventories should help ensure that efforts do not duplicate existing in-country work.

In order to gain sufficient experience to be able to implement such scaled-up policy tools, an initial phase might be implemented in which countries 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.

²⁶ See www.sectoral.org for a description of “proposal templates” developed for a number of sectors. These templates provide a means to structure the development and presentation of information, so are a capacity building and negotiation facilitation tool.

5 SCALING UP OF CARBON FINANCE

Global mitigation efforts will require massive redeployment of private capital towards investment in low- and no-carbon technologies in developing countries. But while emissions trading is being tested at scale in the EU and core market design principles are increasingly well understood, the *scaling up* of baseline-and-credit approaches to carbon finance has only been examined on a theoretical basis, with limited practical experience. This section seeks to apply a private sector lens to some of the issues discussed in previous chapters. It also raises crucial new issues, in particular regarding the demand side of the carbon market.

COMPETING OBJECTIVES

Despite its huge achievements, project-based CDM has limitations, as noted in previous sections. The success of the next wave of rule making (as regards *scaling up*) will be determined by the ability of policy makers to reconcile competing needs at the heart of carbon finance.

Scale, traceability and additionality

Carbon market mechanisms need to strike a balance between investor friendliness and environmental rigour without compromising the overall environmental integrity. A more efficient regulatory system will increase the scale of investment. Every regulatory hurdle reduces the amount of investment in emission reductions by increasing transaction costs. But if the rules are not sufficiently demanding, they risk that non-additional activities ('anyway tonnes') and overestimation of emission reductions ('non-existent tonnes') will slip through the net. The key issue for policy makers is what level of streamlining is acceptable in order to enable scale?

Inherent in the current CDM project-by-project approach is the need for baseline and additionality to be established for each individual project; this places a high transaction cost on project participants, especially when decisions continue to be difficult to anticipate and predict. It is both expensive and technically difficult to develop and implement methodologies on a project basis, and proposed methodologies face a high risk of rejection.

While the process of determining additionality is considered to be complex and unpredictable by the private sector, it is not in the interest of investors to remove additionality, as the assessment of environmental integrity, from CDM-based mechanisms. Rather, the decision making criteria should be more simple, transparent and predictable. Some consideration of additionality is necessary to maintain the market value of emission reductions. The factors affecting the acceptability and the potential reasons for rejection of projects need to be clearly communicated to help market players to better integrate the information in the development of their projects.

An evolution towards *SNLTs*, for those countries and sectors where this may be feasible, shifts the environmental integrity issue away from underlying activities to (1) the initial targets setting process; and (2) sector level emissions performance monitoring and verification at the national scale. There can continue to be issues at the level of underlying activities inside these sectors (including baseline issues where domestic project schemes are employed). But just as with

developed countries with targets, these are more of an internal economic distributive equity nature, not a global environmental issue per se²⁷.

Low hanging fruit versus moving up the abatement curve

This issue can be explained using the example of HFC-23 projects. Within the CDM, these have been heavily criticised by some for providing no sustainable development value. However, these projects are undisputedly additional. In fact, the carbon market has been extremely successful in reaching the most cost-effective emission reductions first; something it was designed to do. The issue for policy makers is at what point does incentivising profit seeking behaviour in the public interest turn into what might be seen as 'windfall profits'?

Should HFC-23 projects therefore generate CERs past their first crediting periods, as these projects have been financed on the basis of pre-2012 value and these early movers have been well rewarded? If these projects are renewed, carbon buyers will be paying over and over again for the same reductions but if they are not renewed, there will be no incentive for HCFC-22 installations to maintain HFC-23 destruction equipment. Some suggest that these low hanging fruit should be regulated away at the international level and domestically by developing countries. At the international level, the CDM Executive Board could take account of 'common practice' including technology penetration rates, while domestically, host countries could make HFC-23 destruction mandatory. These can be seen as the application of a concept of *technology additionality* which progresses up the 'technology curve' over time. Importantly, this would enable the carbon market to move more rapidly up the abatement curve.

Another requirement for including new technologies is the availability of an approved baseline and monitoring methodology for estimation of emission reductions. Typically, a new methodology takes 18 to 24 months to be approved and some have taken up to four years. This forms a significant risk that investors find very difficult to manage and has prevented innovation as many investors will use only approved methodologies and technologies. Sectors with high transaction costs and low volumes of credits from individual projects (such as transport demand side energy efficiency and industrial processes) have not benefited significantly from the CDM, despite their enormous potential for mitigation and scaling up.

Reform amidst continuity

Regulatory innovation is essential as different asset classes have different characteristics and may be better suited to new approaches. For instance, in the case of energy efficiency measures which may be considered net negative cost over the longer term, additionality can become hard to demonstrate. However, there is a significant upfront cost that is often ignored in the lifetime cost discussions. Thus energy efficiency, which provides the greatest opportunity for emissions mitigation potential, remains largely unfulfilled in most countries and sectors. Incentives to realise this potential are needed but project-based CDM would need significant reform.

²⁷ If a developed country government with a Kyoto target chooses to implement a domestic baseline-and-credit projects scheme to help encourage emission reduction activities and uses the incentive of its Kyoto compliance units as the incentive, it still cares about *additionality*. It will not want to give away government assets (its compliance units) for 'anyway tonnes'. But this is not an environmental issue as the environmental outcomes have been set already through the multilateral target setting exercise.

The regulatory system governing the CDM is fairly dynamic and has been evolving as it develops. Much of this self-correction has created investor uncertainty, for example by creating unpredictable delays during project review and by not clarifying reasons for decisions and rejections. However, as the CDM moves along the abatement curve and volumes increase, new regulatory issues arise and have to be addressed. Policy makers need to ensure that reform measures are justified, communicated and aligned with current processes to ensure continuity and growth.

Innovation and Capacity

A good case example here is programmatic CDM. A substantial amount of negotiating energy was put into this enhanced mechanism, and expectations were high. While this mechanism works within the constraints of the project based approach, it was considered a first step towards the idea of using carbon finance to implement policies that deliver emission reductions and low carbon development (a form of sectoral carbon finance).

However, despite significant interest and commitment the implementation of pCDM has been very slow. It took almost two years to prepare detailed guidance on Programme of Activities. Regardless of the momentum and enthusiasm, third party validators have limited capacity to understand the risks and methods to assess, validate and verify programs. Another factor stalling implementation of PoAs is the lack of in-country institutional capacity to guarantee effective management of PoAs. While innovation is important, it is equally important to develop the capacity for agencies and institutions to support and implement new approaches.

IS THERE SUFFICIENT DEMAND FOR SCALED UP SUPPLY?

Section 2 set out the cases made in a range of studies for the need for *scaling up*, and that there was an expectation that the private sector, and the carbon market specifically, would play a, if not the, major role in providing this investment. But where does the market demand come from? Discussions about enhanced mechanisms serving the supply side will be moot if there is not a compelling answer to this question.

Indeed, there are reasons for concern. First, the primary demand driver of the market for CERs has thus far been the EU ETS. The Commission's 23 January '08 proposal for amendment of the ETS Directive²⁸ does not provide any new demand for imports after 2012 in the absence of an international agreement. Given that installations are only allowed to carry over their unused import allowances from Phase 2 (2008-2012) to Phase 3 (2013-2020), it is expected that demand under this scenario will be very small, perhaps a few million tonnes over the entire phase. In the event of an international agreement, the amount of imports permitted would increase significantly, but would still represent proportionately less than under Phase 2; however, demand from other countries would be expected so that the overall size of the carbon market would grow.

Second, governments are unlikely to transfer the full liability associated with their targets agreed to in international negotiations to the private sector for the following reasons:

²⁸ See http://ec.europa.eu/environment/climat/emission/ets_post2012_en.htm for updates on plans for the EU ETS in the post-2012 period.

- Governments may exercise a preference, e.g. for reasons of practicality/efficiency regarding 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.

Finally, as CDM project activities registered for 7 years can request renewal for a second and third crediting period, current CDM projects could have a 21 year life cycle and up to 4.8 billion tonnes of CER supply may already have been created between 2013 and 2020 by the current project pipeline.²⁹

In short, the key demand and supply messages are:

- For the Kyoto Protocol's first commitment period, 2008-2012, there currently appears to be a relative balance in the market between demand and supply of CERs from CDM projects already implemented and in the pipeline. However, delays and complexities in the CDM could result in shrinking of expected volumes. Further, failure by Annex I governments to fully implement their commitments could result in oversupply, e.g. if they choose to be in non-compliance and take the compliance consequences (or default).
- Governments are unlikely to pass on the full liability for their targets to the private sector, preferring other policy instruments to the carbon market in some instances. Thus, private sector demand may not be equal to the full expected shortfall against post-2012 targets.
- For the period 2013-2020, if there is renewal of all projects beyond their first crediting period, this amount could significantly limit the incentive for new investment. For example, it could easily meet import demand from the EU ETS after 2012, even at their proposed 30% target.

Given the situation set out above, those who view the carbon market from 2012 with some optimism would clearly need to believe that renewal rules will be implemented conservatively, that post-2012 demand will be abundant (i.e. deep reductions are taken on by developed countries, including the United States), and/or that the current pipeline of projects will fail to deliver the expected volume of credits. Clearly, there are uncertainties across all these issues which need to be resolved to ensure that the capital markets continue to be interested in 'carbon' in the long term.

CERTAINTY FOR INVESTORS IN 'SCALED UP' MECHANISMS

A key emerging concern here is with the notion of credits being earned at the overall sector level and not at the project level, which would imply the government's management of the credits should emissions be lower than the overall baseline. This role for the government would likely be the case for most forms of policy CDM and in some variants of *sectoral CDM*. It specifically is the case for *SNLTs*. Private sector practitioners hold the view that if this issue is not managed properly this will substantially reduce the private finance sector's interest in the carbon market.

²⁹ Source: J Fenhann, UNEP Risø, based on October 2008 *CDM Pipeline*

If *SNLTs* are transferred directly to the private sector through the introduction of standardised baselines for carbon crediting, this will provide a tool that the private sector can easily use. However, if *SNLTs* are subject to government crediting, the private sector will likely be dependent upon governments for their rewards. This issue needs to be addressed. While a detailed exploration of this issue is beyond the scope of this paper (but is a major topic in *Ward, M 2008*), the domestic enabling environment will be the key determinant of success. Solutions include a variety of carbon market facilitating mechanisms (e.g. cap and trade schemes, and domestic ‘offsets’ schemes) under which governments could transfer their no lose targets to the private sector within national policies. There are also some proposals to ‘nest’ project mechanisms with international institutional crediting, where such credits are ‘carved out’ of subsequent national crediting.

THE IMPORTANCE OF CAPACITY BUILDING AND DATA

Data availability, reliability and comparability have been identified as a key barrier to the introduction of streamlined, yet environmentally integral approaches to carbon finance. Whilst project based CDM has improved the situation in some sectors of some countries, sectoral approaches will hinge on setting benchmarks or baselines at achievable, but beyond business-as-usual levels. The process of setting benchmarks or baselines in certain sectors will be a highly politicised process, and to ensure robustness and integrity, those on both sides of the negotiations will require the best available data upon which to base their views. This can be difficult in the first instance, given the typical asymmetry of information between governments and the private sector. The price collapse in Phase 1 of the EU ETS – due to an overly generous initial allocation to many installations covered by the EU-ETS – illustrates the importance of good data in the carbon market. (It is important to note, however, that this first phase did provide governments with new and very useful information and data on the performance of different industrial sectors.)

At the international level, the topic of non-Annex I National Communications has demonstrated the political sensitivity of this issue. Developing countries have rightly requested assistance in developing national emissions reporting systems, but this is not the complete picture as there is clearly a reticence to allow greater international scrutiny of emissions in general.

At the national level, other data problems arise. In particular, data that relates to energy consumption and production volumes is often viewed as commercially sensitive. In addition, although many industry associations already collect emissions-relevant data, data sharing and verification is a complex regulatory issue, as it can enable collusion, hence run afoul of anti-trust and competition regulations.

Other significant capacity building issues are (a) the creation of the enabling environment for programmes including potentially regulatory reform and industrial restructuring, and (b) business and organisational models. Any programs to achieve *scaling up* through enhanced carbon finance mechanisms will need to have an in-built capacity building “readiness” plan to address these issues.

6 KEY INSIGHTS AND CONCLUSIONS

The preceding sections have set out data and information that presents the ‘big picture’ context for thinking about the *what* and *how* of *scaling up* low carbon investments in developing countries. This final section brings this together and draws out key messages. In particular, it seeks to provide a sense of how the World Bank’s new *Carbon Partnership Facility* can most helpfully contribute in the near term.

Section 2 provides information from various respected, widely referenced and influential studies. Critical messages are:

- The scale of low carbon investment needed globally is an order of magnitude (or greater) higher than exists today. It is tens to a ‘hundred plus’ billions of dollars, annually. These additional investment and financial flow amounts are large compared with current funding available under the UNFCCC and the Kyoto Protocol, but are small in relation to estimated global GDP (0.3-0.5%) and global investment (1.1-1.7%) in 2030.
- The types of needed investments – the technologies and localities of these – are increasingly well understood. There is no single “silver bullet”. Fifteen “1 gigatonne wedges” have been identified, and within these wedges exist hundreds of individual technologies. What is needed is a complete roll out of technologies and measures in order to achieve the levels of emission reductions necessary for global emission to peak by around 2020, and for radical reductions by 2050 compared with today’s emission levels.
- This includes investments in developing countries. Indeed, the majority of the investment needs to be in developing countries, because of the scale of capital infrastructure investment occurring in rapidly industrialising developing countries with large populations and a ‘rural-to-urban’ development pattern.
- While redirecting this ‘new build’ investment towards more efficient and low carbon technologies is important and necessary, a huge mitigation potential lies in energy efficiency in industries, buildings and transport systems. Energy efficiency, as the findings of the IPCC Working Group 3 suggest, provides the greatest mitigation potential in the near term. Other global cost curve studies (e.g. McKinsey) support this view.
- It is important to focus on the role of private sector investments as they constitute the largest share of investment and financial flows (86%). The *carbon market*, which is already playing an important role in shifting private investment flows, needs to be significantly expanded to address the needs for additional investment and financial flows.

The areas where carbon finance can make the most contributions are often those where low cost mitigation opportunities are also expected. However, in some areas such as energy efficiency in buildings, industry and transport systems, the stand-alone, non-strategic use of the CDM and current approaches have thus far had relatively little success. This problem needs to be proactively tackled by taking a strategic *program approach*, including utilising enhanced carbon finance and other investment/finance mechanisms.

Section 3, in particular, makes the crucial point that to effect substantial *scaling up* within developing countries it will be necessary for them to implement strategically focused and targeted **programs** combining policies and measures with carbon and other project finance

mechanisms. These should encourage and facilitate aggregations of both *vertical* and *horizontal* forms in a manner conducive to provide transformational impacts across the economy inducing shifts in a low carbon and climate resilient development direction.

Given current policy settings with respect to the CDM, it is shown that there can be three main different program streams. The current project-based CDM sits in the first of these, but is quite limited in terms of scalability in the absence of enabling policies and measures that are part of a focused program. With these, the promise for scale could be much improved.

The new *programmatic CDM* sits in the second stream and offers some promise. But it too is constrained by the current pCDM rules, in particular with the concerns regarding liability rules for DOEs and limitations around application of methodologies. Again, a program with enabling policies and measures is needed to lead to an aggregation of pCDM activities.

Finally, a third possible very large potential for increased scale in low carbon investments sits in the third stream. This stream refers to support activities not currently directly generating CERs, but nevertheless creating a low carbon program environment that:

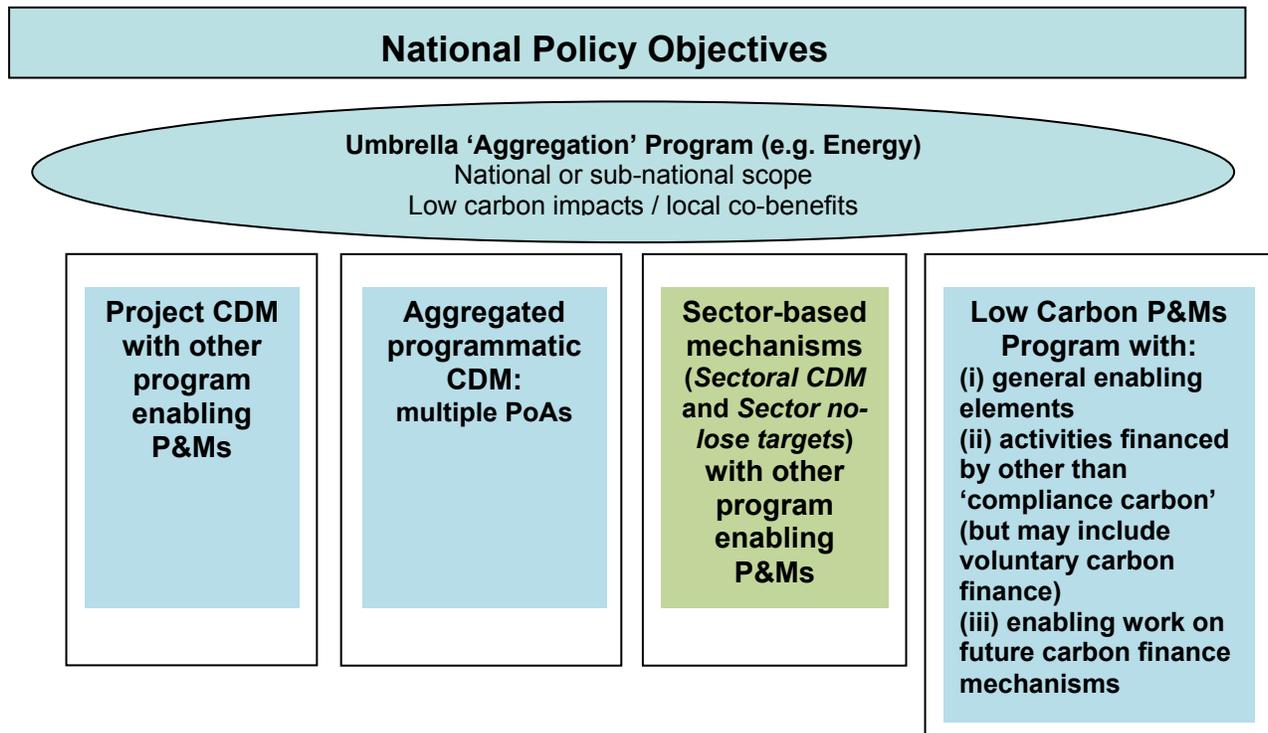
- (i) helps make possible the other two streams through general enabling activities;
- (ii) can facilitate and attract other forms of financing and investment in activities that are not currently supported through streams one and two; and
- (iii) can begin to create the basis for enhanced carbon financing that may in the future occur under existing streams one and two, or new sectoral streams or indeed carbon finance mechanisms yet to be 'invented' – e.g. through the development of new baselines and methodologies.

The issue flagged in (iii) above about future enhanced carbon financing mechanisms, leads into the discussion in **section 4**, in particular about *sectoral CDM* and *SNLTs* and the roles of these enhanced compliance carbon mechanisms post-2012. One key message to be taken from the detail in Table 3 is of a 'horses for courses' nature, i.e. that different carbon finance mechanisms may be applicable for different activities in different sectors in different countries at different times/stages of their development and capacity. There is no 'silver bullet' mechanism. Although it is not mentioned in Table 3 (which is about 'compliance carbon' mechanisms), it is worth noting again the complementary role that the voluntary carbon market might play. This may be significant, especially in the near term.

This 'horses for courses' message is consistent with, and supports, the strategic *program approach* advocated in this paper, which shows that all forms of policy and financial instruments have a potential role and can work in synergy. Moreover, this will depend on the priorities and national circumstances of each developing country. Determining the right mix of policy and financial instruments needed for specific technology and system 'scaling up' objectives is the essential task of taking a strategic program approach.

The addition of new sector based mechanisms to the 'toolkit' means that the three column domestic program depiction in Figures 5 and 6 can be expanded. In particular, aggregating activities that would likely have fallen under 'stream three' (i.e. supported by non-compliance carbon finance instruments) could shift to a new compliance carbon column. Also, some activities that may have fallen under pCDM might now also feature as well or better under the sector mechanisms. This enhanced depiction of a strategic *program approach* for domestic implementation of a low carbon development plan is shown in Figure 10 below.

Figure 10. A strategic *program approach* including future sectoral ‘compliance carbon’ policy tools



It is important to note that, in order to maintain the environmental integrity of the schemes and avoid double-counting of emission reductions, ‘regular’ project-based CDM and pCDM activities would not be able to be done inside any sectors covered by *sectoral CDM* or *SNLTs*, unless any credits from these were deducted from any credits provided at the national sector level. However, the domestic program that implemented aggregating activities under these sectoral approaches would need to have elements that incentivised bottom up project-level activities with carbon finance.

While both versions of sector mechanisms are shown in the same column, there is a key difference and, in practice, this may have a significant effect on the magnitude of *scaling up* activities that may be possible. *Sectoral CDM* (as with any form of CDM) is an additionality-based mechanism, which implies that this sector in this developing country is outside the quantitative elements possibly agreed for that sector in a post-2012 agreement. *SNLTs*, in contrast, implies the inclusion of these sectors emissions in the quantitative ‘deal’ of what constitutes “allowed emissions”, such that international additionality processes do not apply.

There are direct and indirect effects here in terms of the potential magnitude of *scaling up*. The direct effect relates to the inevitable constraints that exist with any international additionality-based approval process. The indirect effect is the higher level ‘political’ one; namely that the targets that developed countries may be prepared to take on are likely to connect to some degree with the nature of commitments that key developing countries may be prepared to take on. This affects the potential demand in the compliance carbon market. *SNLTs* are likely to be seen as a more significant form of commitment by developing countries, than just having these same sectors operate under *sectoral CDM*. Developed country governments may not want to commit themselves to deep reduction targets while, on the other side, developing countries

agree only to limited forms of emission reduction action – especially in some key sectors and in some key countries.

Returning to the depiction in Figure 10, what such a purposeful *program approach* implies can be seen as being very consistent with the strategic ‘thinking framework’ set out in section 3, i.e. in short:

- What activities should be aggregated so that significant *scaling up* occurs?
- Who are the ‘natural’ key coordinating actors for these aggregations?
- What is the role of new financing to help achieve these aggregations, as compared with other possible interventions?
- What are the available sources and, among these, what is the potential role for *carbon* financing, i.e. where ‘carbon assets’ are being generated and acquired?
- Where are carbon finance mechanisms needed? Is moving from project-by-project CDM to CDM programmes 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 the easier and/or quicker route to follow? Might there also be other forms of carbon finance mechanisms that may have greater low carbon investment *scaling up* potential?

There was also a last bullet point to this list:

- 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 (e.g. as determined through taking a *strategic program approach*), 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?

This links to the discussion on the importance of capacity building (or “preparedness”) activities, especially with respect to emissions data and other information relevant to how economies may develop and emissions may trend in the future. Linked to this capacity building point is the notion of learning-by-doing pilot level activities. These could just be about “preparedness” or they could integrate preparedness with actual scaled up emission reduction activities.

Section 5 provides somewhat sobering reality checks regarding scaled up carbon finance from compliance carbon markets. This is particularly so with respect to the demand side of the market – without which there is no market. Noting that the major demand and value driver for CERs from CDM projects in developing countries thus far has been the EU ETS which has (and proposes more) quantitative restrictions on the import of CERs, the key concern set out is the potential for there being little extra demand in the EU ETS for the 2013-20 period beyond the supply of CERs from CDM projects already implemented or in the known pipeline. This hinges mostly on whether projects creating high quantities of CERs are revalidated (with similar baselines) as CDM projects following their first crediting period. And overall, of course, there is also the issue of what demand in the 2013-20 period emerges from other developed countries.

The extent of EU ETS demand post-2012 also depends significantly on the outcomes of the post-2012 negotiations. The EU has unilaterally committed to a 20% emissions reduction target for 2020, but with limited 'import' of emission units, including CERs. Its additional commitment "to 30% depending on what other countries are willing to contribute to the global effort" would provide demand for 'imported' CERs and other compliance units. But the extent to which this creates demand for new scaled up activities on the supply side in developing countries depends on both the project renewal issue noted above and how much demand is also implied in the targets taken on by other developed countries.

Another important point is that, left to the market alone, there is an inherent constraint to the *scaling up* potential due to the effort, time and risks associated with developing baseline methodologies under the current CDM. The tendency has become for carbon project developers to 'free ride' on existing methodologies or, put another way, not be prepared to do all the hard work and expend their intellectual property for others to free ride on, as risks are often perceived as too high. Given that programmatic CDM PoAs work from the base of existing CDM methodologies, this problem is an important possible constraint for all new potential activities unless the regulatory process becomes more streamlined and more predictable.

Two additional points need noting. The first is the potential disconnect between the current explicit additionality-based concept of the CDM, and using the CDM as an incentive to unlock the huge potential in energy efficiency. The second is the inherent constraints because of lack of capacities among all players involved in the CDM, both in developing countries and among the practitioners in project development and carbon finance. Both these points will be taken up further in the discussion below about how the World Bank's new CPF can make an immediate difference in the quest to scale up low carbon investment in developing countries.

ENTER THE CARBON PARTNERSHIP FACILITY

In its introductory literature on the CPF, the World Bank notes:

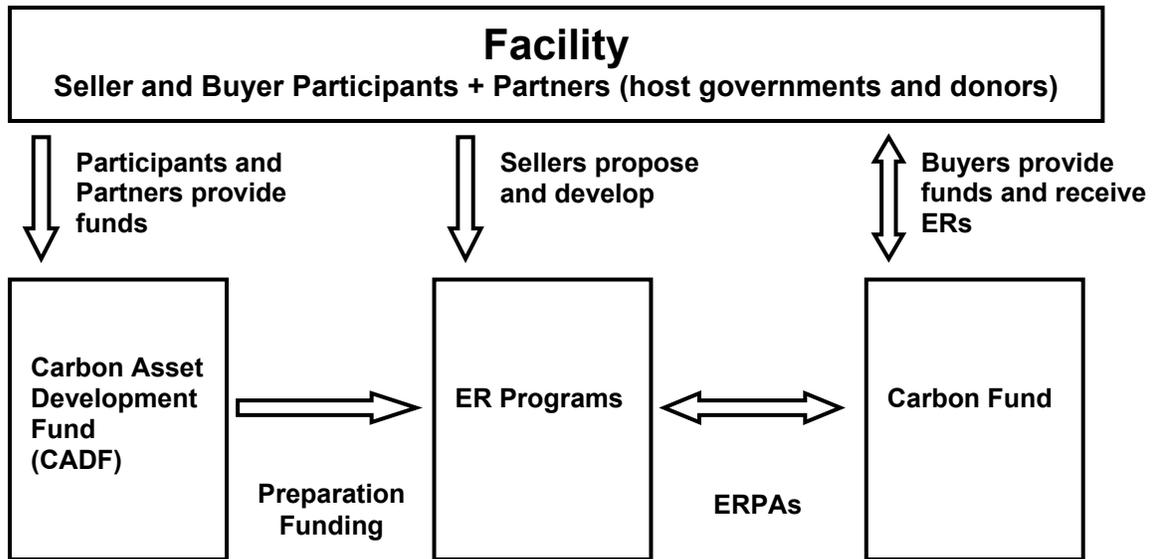
The CPF intends to reduce greenhouse gas emissions through large-scale longer-term carbon finance investments in programmatic and sectoral initiatives.

The CPF will help catalyze a change in the way developing countries and countries with economies in transition approach greenhouse gas mitigation and in that way, their development pathway

The CPF will demonstrate how *scaling up* through a program approach can work and how the impact of carbon finance can transform sectors to reduce carbon emissions and deliver co-benefits to the world's poorer countries. To do this, the CPF will help client countries build the enabling environment for large mitigation programs. The CPF will likely be used in areas such as power sector development, energy efficiency, gas flaring, transport, integrated waste management systems and urban development.

In terms of institutions and process, the following depiction in Figure 11 is provided for the "Basic Structure" of the CPF.

Figure 11. Basic Structure of the Carbon Partnership Facility



Source. World Bank (2007)

The Carbon Asset Development Fund (CADF) is a new feature compared to existing World Bank Funds. It will benefit sellers and host country entities by providing resources for:

- ER program development
- Carbon-related elements of feasibility studies
- Methodology work
- Enabling environment

It will benefit buyers by enhancing the quality and timeliness of the ER programs. It is to be funded by donor contributions and fees from buyers (upfront and annually over time) and sellers (ERPA payment deductions).

Some example ideas for pilot programs provided in the CPF literature include:

- 500 MW of windfarms in South America, over 3-5 years, within a program involving tariff structure reform and the introduction of a feed-in tariff for the wind part of the program.
- Rehabilitation of hydro power facilities in South America. Over 10,000 MW of hydropower requires rehabilitation, and feasibility studies have been conducted covering 2740 MW.
- Geothermal power in East Asia. The host government has a target of 6000 MW by 2020. 970 MW has been developed to date.
- Large scale deployment of bio-digesters for households in East Asia. An existing World Bank program has potential for scale-up including into large-scale farms and biomass gasification. A pilot CDM program will establish a standardized procedure for quick replication.

Other ideas for pilots include reduction in gas flaring and municipal energy efficiency programs.

Key messages of this paper and the CPF

There is a strong consistency between the concepts set out in the CPF descriptions above and the *strategic program approach* framework set out in Figure 11 and the ‘thinking framework’ points set out beneath this figure. Both have a strong focus on a purposeful program to achieving scale through aggregating key activities. And the Carbon Asset Development Fund seems to be aimed at addressing the types of capacity building issues (or at least part thereof) raised in various sections of this paper.

This provides confidence that in its design the CPF is targeting the key issues. However, an external factor it will need to grapple with (and over which it has little control) will be the question surrounding the scale of demand for compliance carbon assets post-2012. Whether or not this key external factor will be a serious challenge to the potential success of the CPF will largely turn on what ‘buyers’ can be attracted to join this partnership. These can be governments as well as private sector actors.

Because of the role the World Bank can play as an intermediary agent between governments of both developed and developing countries, it is feasible that a portfolio of buyer and seller interests can be established through the CPF that would not develop as quickly through the regular ‘private sector’ market. Here, the major private sector players can be expected to be more risk adverse in the face of uncertainties that will exist still for some time about the post-2012 multilateral framework – including the demand-supply balance of tradable compliance carbon units that emerges from this ‘deal’.

It is also conceivable that there may be some scale possible in the voluntary carbon market that the CPF may be in a unique position to attract. The buyers here may be large private sector organisations, for example in the international aviation sector (e.g. Virgin Airlines) or other consumer retail (e.g. UK supermarket chains) or IT/media players (e.g. Google/News Corp). Or they could be collectives of major cities with carbon neutrality programmes (e.g. Dongtan Eco-City, China, or Masdar City, UAE, or C40 initiatives generally). The voluntary market therefore seems a potentially fertile source of buyers who may be attracted to the CPF because of the World Bank’s ability to ensure scale and quality on the sellers side – just as many developed countries have used the original PCF or special country funds managed by the World Bank carbon finance programmes to acquire CERs from CDM projects (and ERUs from JI projects) to help them meet their Kyoto first commitment period obligations.

In terms of the important ‘value-add’ role that the CPF can play on the supply side, it may:

- Bring new mechanism ideas forward through pilot programs, including in the near term, *at general and program level*, by supporting
 - countries to assess the opportunities for investment in specific sectors
 - countries to develop a *strategic program approach* through necessary aggregations of on-the-ground activities and correspondingly enhanced finance and investment
 - the development of long term project finance instruments that can help support large scale strategic programs that mitigate project risk and blend various sources of finance, along with carbon revenue flows
 - the development of emission accounting and baseline methodologies that can nest reductions derived from project based instruments into larger region or sector

baselines, while avoiding double counting and facilitating national or sub-national low carbon schemes

- Support *specific policy instruments*
 - Implementation of programmatic CDM by developing methodology for identified (pilot) program opportunities
 - Evolution of sectoral crediting mechanisms, e.g. by (1) examining how sectoral baselines at regional or national scale can operate as precursors to sector-based approaches³⁰; and (2) by being a third party intermediary between the underlying project developers/carbon financiers undertaking activities within the sectors and the host governments that may, in the first instance, receive the credits because sector baselines are beaten
- Be a conduit or facilitator for developing countries getting some of the ‘non carbon’ funds becoming available (e.g., the Clean Investment Funds) and other funding sources.
- Generally help countries with the needed capacity building “readiness” preparation if they are to achieve low carbon ‘scale’

A key practical means by which the CPF process can seek to succeed in all these tasks is to play a very proactive role in supporting the in-country deliberations of what taking a *strategic program approach* might entail for a given aggregation program in a given sector. Such deliberations should involve the participation of all possible providers of technology and financing (‘traditional’ and carbon) – and the policy practitioners whose ideas can help put in place the domestic and international policy environments required to support the needed magnitude of *scaling up*. In this way the term *partnership* goes well beyond just matchmaking activities between buyers and sellers of compliance or voluntary carbon.

However, some care is needed to ensure that the CPF doesn’t expend its energies in areas of the market that could already be managed through existing private sector carbon market specialists – in essence ‘crowd out’ the private sector. In order to achieve this, the Bank should endeavour to stay ahead of policy development and hence private sector risk appetite, both at international and host country levels. The World Bank should support the development of innovative carbon methodologies, particularly during the international post-2012 negotiations. Of course, this requires a delicate balancing of the needs of CPF investors with the need to push the envelope on policy risk. In effect, negotiation of the CPF investment strategy will provide a microcosm of the complex trade-offs around the future development of the carbon market.

³⁰ It is noteworthy that a number of the potential pilot programs noted in the CPF literature (e.g. electricity generation and gas flaring) are likely to be amenable to sector-wide carbon finance policy tools.

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