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Market Readiness: Building Blocks for Market Approaches

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ABSTRACT

Market-based mechanisms offer a number of advantages to other regulatory approaches for GHG mitigation such as technology or performance standards and feed-in tariffs. Advantages include their ability to attain an emissions goal at lower cost and to create incentives for innovation among sources covered by the mechanism (i.e. static and dynamic efficiency). Beyond these critical cost benefits, these mechanisms provide a potential revenue source for governments. This paper examines essential elements of “market readiness” for possible new mechanisms, looking at the necessary technical, policy and institutional frameworks that a country and/or its entities need to develop market mechanisms for accessing private and public financing for low-carbon development.

The three main categories of market readiness building blocks covered in the paper are: i) technical readiness, including coverage of emitters, monitoring and verification and establishing registries; ii) policy readiness, including setting clear goals, choosing appropriate instruments and distributing benefits; and iii) institutional and legal readiness, including establishing responsibility for collection of emissions data, issuance of allowance and credits, and handling legal compliance issues. Whilst some of these elements of readiness will be developed in parallel, the paper suggests a phased approach beginning with assessing mitigation potential and feasibility studies of different policy instruments, then establishing the technical framework before the necessary legal and institutional framework, and finally entering a piloting phase with a critical review process. The establishment of existing market mechanisms such as the EU ETS and the CDM provide some lessons on the capacity building challenges encountered in developing market tools, and the time it took to overcome these. However, with the prospects of a more bottom-up and fragmented carbon market post-2012, efforts to harmonise and develop international minimum requirements for some of the market readiness building blocks such as MRV and transaction registries may be required. Such harmonisation efforts would facilitate market access and integration, as well as the development of an international post-2012 accounting framework.

JEL Classification: F53, Q54, Q56, Q58

Keywords: Climate change; greenhouse gas; market-based mechanisms; finance; low-carbon development; policy instruments; mitigation potential

RÉSUMÉ

Les mécanismes de marché présentent divers avantages que n'offrent pas d'autres approches réglementaires de l'atténuation des émissions de GES comme les normes technologiques et de performance ou les tarifs d'achat. Ils permettent notamment d'atteindre un objectif de réduction des émissions à moindre coût et de créer des incitations à l'innovation pour les sources auxquelles ils s'appliquent (efficacité statique et dynamique). Outre ces effets déterminants sur les coûts, ces mécanismes peuvent produire des recettes publiques. Le présent document examine les composantes essentielles qui font qu'un marché est « prêt » à accueillir d'éventuels nouveaux mécanismes, en s'intéressant aux cadres institutionnels, opérationnels et techniques dont un pays, et/ou ses entités, doit disposer pour mettre au point des mécanismes de marché permettant d'accéder aux financements publics et privés nécessaires à un développement à faibles émissions de carbone.

Le document distingue trois catégories de conditions à remplir pour appliquer des mécanismes de marché, axées sur : i) le niveau de préparation technique - identification des émetteurs, suivi, vérification et établissement de registres ; ii) le niveau de préparation opérationnel - fixation d'objectifs clairs, choix des instruments les plus adaptés et répartition des avantages ; et iii) le niveau de préparation institutionnelle et juridique - définition des responsabilités en matière de collecte d'informations sur les émissions, octroi de quotas et de crédits et gestion des questions de conformité aux prescriptions juridiques. Bien que certains de ces éléments soient appelés à évoluer en parallèle, le document suggère une approche en plusieurs étapes dont la première consistera à évaluer le potentiel d'atténuation et à réaliser des études de faisabilité des différents instruments ; le cadre technique sera ensuite défini avant d'en venir au nécessaire cadre juridique et institutionnel puis à la phase finale d'expérimentation, qui donnera lieu à un examen critique. L'établissement des mécanismes de marché existants tels que le SCEQE et le MDP a fourni des précédents sur les écueils, en termes de renforcement des capacités, rencontrés lors du développement d'instruments de marché et sur le temps nécessaire pour les surmonter. Néanmoins, les perspectives pour l'après-2012 allant plutôt dans le sens d'un marché du carbone plus décentralisé et fragmenté, il pourrait être nécessaire d'harmoniser les exigences minimales internationales pour certains des éléments renseignant sur le niveau de préparation d'un marché (MNV et registres de transactions par exemple), et de les développer. Un tel effort d'harmonisation faciliterait en effet l'intégration et l'accès au marché, ainsi que le développement d'un cadre de comptabilité international pour l'après 2012.

Classification JEL: F53, Q54, Q56, Q58

Mots-clés: Changement climatique; gaz à effet de serre; mécanismes de marché; financement; stratégies de développement à faible intensité d'émissions; politiques: potentiel d'atténuation

FOREWORD

This document was prepared by the OECD and IEA Secretariats in 2010 in response to a request from the Climate Change Expert Group on the United Nations Framework Convention on Climate Change (UNFCCC). The Climate Change Expert Group oversees development of analytical papers for the purpose of providing useful and timely input to the climate change negotiations. These papers may also be useful to national policy-makers and other decision-makers. In a collaborative effort, authors work with the Climate Change Expert Group to develop these papers. However, the papers do not necessarily represent the views of the OECD or the IEA, nor are they intended to prejudice the views of countries participating in the Climate Change Expert Group. Rather, they are Secretariat information papers intended to inform Member countries, as well as the UNFCCC audience. Members of the Climate Change Expert Group are Annex I and OECD countries. The Annex I Parties or countries referred to in this document are those listed in Annex I of the UNFCCC (as amended at the 3rd Conference of the Parties in December 1997): Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and United States of America. Israel, Korea, Mexico and Chile, as OECD member countries, are also members of the Climate Change Expert Group. Where this document refers to “countries” or “governments”, it is also intended to include “regional economic organisations”, if appropriate.

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Executive summary

The latest rounds of negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) did not provide clear guidance on the future role of the international carbon markets. Global projections of greenhouse gas (GHG) emissions show that the climate challenge requires significant reductions in both developed and developing countries. International market mechanisms are one way to support developing countries in mitigation actions, while lowering the cost of global mitigation and generating new sources of revenue in these countries. The Clean Development Mechanism has initiated this approach, yet it is widely recognised that scaling up the participation of developing countries in the carbon market is necessary.

Market-based mechanisms offer a number of advantages to other regulatory approaches for GHG mitigation such as technology or performance standards and feed-in tariffs. Advantages include their ability to attain an emissions goal at lower cost and to create incentives for innovation among sources covered by the mechanism (i.e. static and dynamic efficiency). Beyond these critical cost benefits, these mechanisms provide a potential revenue source for governments. This paper examines essential elements of “market readiness” for possible new mechanisms and highlights some of the past and new market readiness activities, of use as UNFCCC Parties are to consider decisions on future market approaches.

This paper uses the term “market readiness” to describe the necessary technical, policy and institutional frameworks that a country and/or its entities need to access and employ, through market mechanisms, private and public financing for low-carbon development. It describes the various elements, or building blocks, needed to make the intended market mechanism operational – i.e. the key components of market readiness. It draws on previous experience to provide insights on the financing needs, timeframes involved, and the need for co-ordinated capacity building efforts. Such information can help the international climate community outline and prioritise support for market readiness efforts and focus international negotiations on the topic of market mechanisms and support for establishing new market instruments.

Proposals for new market mechanisms have been tabled by a number of Parties to the UNFCCC. In parallel, several developing countries are considering or preparing for market-based approaches as an option to help meet their domestic mitigation goals. Examples include: India’s Perform-Achieve-Trade (PAT), an energy efficiency certificate system; the call for provincial and city low-carbon pilot programmes in China; and REDD-plus (Reducing Emissions from Deforestation and Degradation) activities underway across many developing countries. In the context of new market mechanisms, “market readiness” initiatives include developing capacity for domestic emissions trading systems (ETS) at sectoral or national level, and credited nationally appropriate mitigation actions (NAMAs). Many developed countries have supported bilateral and multilateral capacity building in developing countries as they consider market mechanisms. It is likely that both these new market-based activities and the initiatives to support them will increase in the near future.

This bottom-up development of market readiness activities should build on lessons learned from earlier market-building efforts. Minimal international co-operation efforts could facilitate more co-ordinated and cost-effective capacity building efforts. In addition to coordination of efforts, international guidance on market readiness can be catalytic in terms of providing a general framework, improving performance, enhancing cost-effectiveness and encouraging information exchange.

Building blocks for a domestic market mechanism and international crediting

Different types of market-based mechanisms require different types of technical, policy and institutional foundations. The paper considers such foundations for two categories of market mechanisms, namely domestic market mechanisms such as emissions trading systems, and international crediting mechanisms such as NAMA crediting. If these initiatives are intended to link to the international carbon market, either

directly or indirectly, additional market readiness elements must also be considered. The three main categories of market readiness building blocks covered here are:

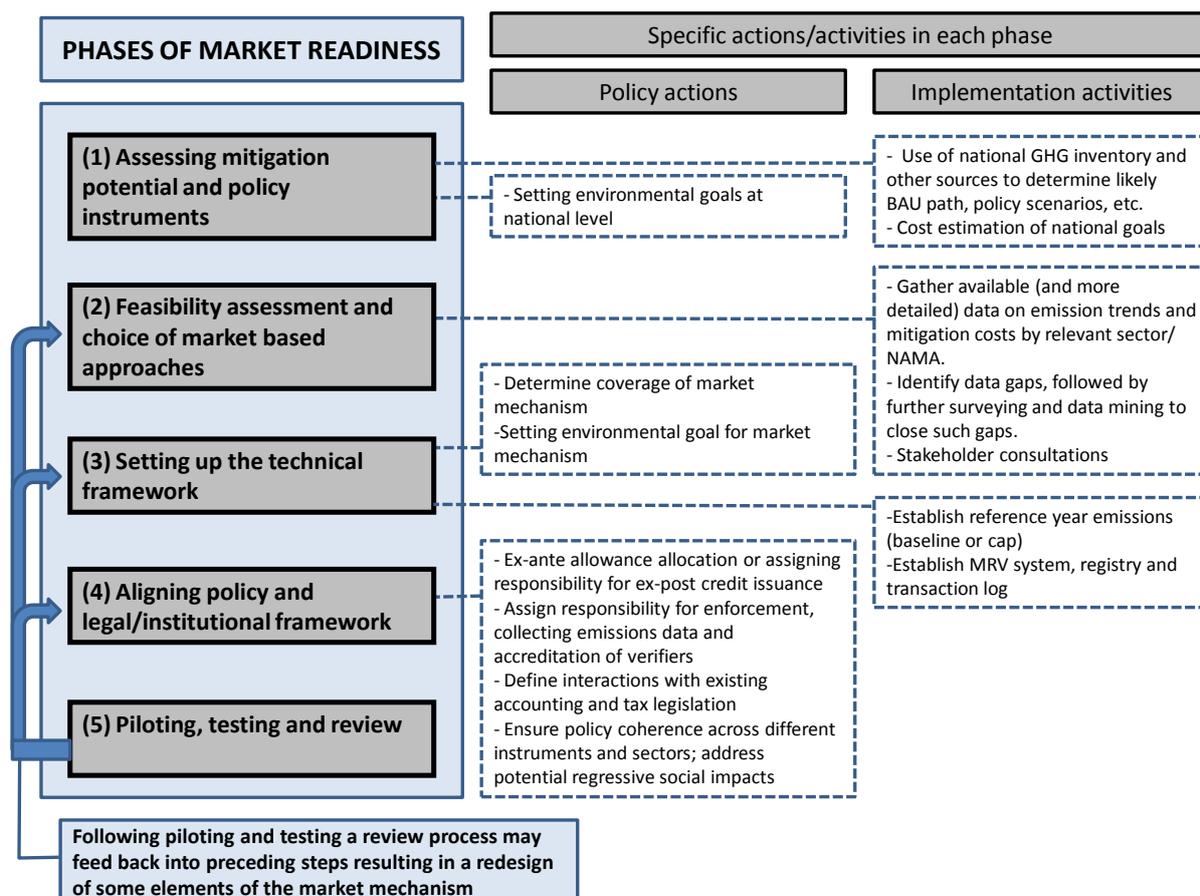
- **Technical readiness:** These are the essentials in establishing a market mechanism and may also represent eligibility criteria for accessing international carbon markets. The following would need to be addressed to participate in market mechanisms: coverage (what sources are to be included in the system); reference year emissions (i.e. for an emissions cap or for baseline data expressed in absolute or intensity terms); a measurement, reporting and verification (MRV) system; a registry; and a transaction log.
- **Policy readiness:** Setting the environmental goals, the choice of the appropriate policy instrument and a mechanism for the distribution of benefits from the carbon market are pre-requisites for a market instrument. To strengthen policy coherence, policy co-ordination will be needed at the domestic level, as well as at the international level.
- **Institutional and legal readiness:** New institutions and laws are needed for the smooth operation of a market mechanism, for government regulators and sources alike. These need to define the following responsibilities: collection and compilation of inventory data; domestic issuance of allowances or credits; verification of installation level emissions data; compliance; and legal regulation of domestic trading markets. Existing institutions may take on these new tasks, while others will require new structures and knowhow.

The building blocks for each of the two main categories of market mechanisms covered are summarised in Table 1 below.

Though several of these market-readiness elements will probably develop in parallel, such efforts could be structured along the phases outlined in Figure 1. Experience shows that feedback mechanisms should be included to update and improve the market-readiness process at regular intervals.

Financing needs for market readiness in developing countries are estimated to be USD 2-5 billion over the next ten years. Though certain developing countries are already building domestic capacity on new market mechanisms without international financial support, such as India's PAT scheme, other developing countries may require support. Parties could reflect on using a portion of the fast-track finance pledged under the Copenhagen Accord for market readiness activities.

Figure 1: Phases of market readiness



Source: Authors

Market readiness: earlier examples and current activities

The establishment of the EU ETS and the CDM provide some lessons on the capacity building challenges encountered in developing these market mechanisms, and the time it took to overcome these. Both mechanisms evolved relatively quickly and much experience has been gained on market readiness through the process. However, crediting mechanisms such as NAMA crediting, require greater host country involvement than CDM. It is therefore difficult to make direct comparisons with CDM in terms of the time needed to develop the mechanism.

Activities on readiness for REDD offers another such experience, even if the carbon market aspects of REDD remain controversial. First proposed at COP 11 in 2005, there are now hundreds of REDD demonstration activities underway, and numerous processes in place to develop capacity in this area. Lessons learned from REDD-Readiness initiatives, such as the World Bank Forest Carbon Partnership Facility Readiness Fund and the UN REDD Programme, as well as other bilateral initiatives, can be of use for market readiness in other sectors.

UNFCCC negotiations have yet to address the details of possible new market approaches, either in the context of NAMAs by developing countries, or in the broader context of low-emission development strategies. As scaling up market approaches raises new challenges, pilot activities may be a useful first step - along the lines of Activities Implemented Jointly (AIJ) launched at COP 1 and, more recently, for REDD demonstration activities promoted at COP 13. Decisions in Cancún or after could provide guidance on any market readiness pilot activities to help provide a framework for their development, based on the various

building blocks identified in this paper. Pilot activities need not be initiated directly through the UNFCCC (as was undertaken with AIJ), but could be independent pilot activities which are reported back to the UNFCCC. An encouragement by Parties in Cancún to co-ordinate international support for market readiness initiatives would be another useful contribution. Furthermore, with the prospects of a more bottom-up and fragmented carbon market post-2012, efforts to harmonise and develop international minimum requirements for some of the market readiness building blocks such as MRV and transaction registries may be required. Such harmonisation efforts would facilitate market access and integration, as well as the development of an international post-2012 accounting framework.

Table 1: Summary table of building blocks for market mechanisms

<i>Building blocks and elements</i>	<i>Description</i>	<i>Domestic market mechanisms (e.g. emissions trading system)</i>	<i>Crediting-based mechanisms (e.g. NAMA-crediting)</i>
Technical			
Coverage	Defining the scope of the market mechanism by deciding which sources are covered, e.g. based on a minimum threshold.	Decision needed on system boundary (e.g. large installations only)	If sector-based need a decision on sector boundary. For policy-based NAMAs a boundary can be difficult to monitor/account for (e.g. public transport policies) and requires close consideration.
Reference/baseline year emissions	Choosing a reference year(s) as the basis for emissions baselines or cap. Collecting data to identify historical emissions and project future emissions. This includes deciding on the type of baseline (intensity-based or absolute)	Data needed on emissions and in the case of intensity-based baseline also on output. Data normally needed at entity level. Baseline and allocation decided domestically.	Emissions data needed at the sector or NAMA-level plus output data in the case of intensity based baseline (data availability could be an issue).
MRV system	Providing the environmental integrity of the market mechanism. The measurement and reporting parts can be developed as part of the work with defining reference year and projected emissions. Verification could involve developing standards for third-party verifiers but a system could also rely on sample checks and penalties rather than systematic verification.	Installation-level MRV of emissions (and output if intensity-based baseline) needed. An upstream liability normally involves fewer participants and may lower MRV requirements. If there is a risk of leakage MRV outside system boundaries may also be needed, although this complicates matters. MRV requirements are domestic domain but linking to international markets may imply needing to take outside considerations into account.	MRV of emissions (and output if intensity-based baseline) at sector/NAMA-level. MRV may be subject to minimum international requirements to gain access to international crediting mechanisms. If there is risk of leakage, MRV outside NAMA/sector boundary may be needed.
Registry	Developing the system for tracking either the issuance of credits or the allocation of allowances, and the net position of a country/entities.	A registry is a key part of the infrastructure allowing transactions to take place in the trading period.	A registry is needed but only to record credits issued <i>ex post</i> , and therefore does not necessarily be to be held domestically
Transaction log	Needed to track domestic transactions. For <i>ex post</i> issuance of credits, the existing Kyoto Protocol international transaction log would suffice.	A domestic system of tracking permit transfers e.g. a transaction log is needed for trading across registry accounts.	A domestic transaction log not necessary as long as there is an international transaction log, meeting functions similar to those of the Kyoto Protocol ITR.
Policy			
Identify mitigation potential and cost	Identify possible emission reduction opportunities at different costs at national and sectoral level – set the national or sectoral environmental goal (could also be multiple sectors). Related to <i>coverage</i> .	Needed to inform overall policy design, including assessing suitability of market instruments.	Needed to inform overall policy design, including adequate policy instrument and benefit of international carbon market support.
Selecting appropriate policy design	Enhance policy coherence and effectiveness. Choosing appropriate market-based instruments (could set up e.g. a pilot ETS for one sector and crediting for another). <i>Ex ante</i> analysis needed to assess interactions and avoid unintended consequences. Address distributional implications of policy e.g. reform of fossil fuel subsidies.	Needed to assess value/effectiveness of domestic market mechanism, including deciding on point of obligation, i.e. upstream (wide coverage with few entities) or downstream (more direct incentives to more entities).	Needed to assess value/effectiveness of crediting mechanisms, including deciding on point of obligation, i.e. upstream (wide coverage with few entities) or downstream (more direct incentives to more entities).

Building blocks and elements	Description	Domestic market mechanisms (e.g. emissions trading system)	Crediting-based mechanisms (e.g. NAMA-crediting)
Policy (continued)			
Sharing possible carbon revenues	Deciding on how to allocate domestically any revenues obtained via international crediting mechanisms and how to provide incentives for individual investors when operating under non-project based crediting mechanisms.	Done through the initial allocation of individual entities' emission goals.	Need clarity <i>ex ante</i> on revenue distribution to create transparency and gain support from individual investors. Multiple options for channelling revenues (distributing credits, tax rebates, feed-in tariffs)
Policies to encourage pilot activities	Encourage pilot mechanisms or voluntary agreements with private sector for market based activities (e.g. voluntary emissions trading). Could be set up at sectoral level, province level, cluster of business sectors, etc.	Pilot or start-up phase often needed to assess operational effectiveness of the market mechanism.	Pilot activities often needed to test new mechanisms and build knowledge and support among covered entities.
Institutional/legal			
Responsibility for collecting emissions data	Assigning domestic institutional responsibility for collecting base year and emissions data. The agency in charge of the national greenhouse gas inventory could take on this responsibility.	Need clear domestic responsibility for this but not necessarily just within one institution. Coverage of mechanism may impact range of institutions involved.	Need clear domestic responsibility for this but not necessarily just within one institution. Coverage of mechanism may impact range of institutions involved.
Issuance of trading units	Assigning institutional responsibility for <i>ex-ante</i> allocation of allowances or <i>Ex post</i> issuance of credits.	Domestic policy matter through which allowances are allocated or auctioned.	Responsibility for issuance of credits could rest with the international framework or with domestic authorities.
GHG and performance verification	Allocate responsibility for accreditation of verifiers; conduct accreditation.	Domestic policy defines accreditation requirements, but some systems rely on audited self-reporting rather than third-party verification.	Depending on the mechanism accreditation may be subject to international rules (Article 8 of the Kyoto Protocol outlines the <i>ex post</i> review process).
Compliance	Establishing a legal framework creating a credible enforcement system for compliance.	Penalties for non-compliance (e.g. fines) are needed to ensure credibility and value of traded units.	As credits are issued <i>ex post</i> compliance is less of a concern, but if sale of credits is allowed before end of crediting period, or permanence is an issue (e.g. REDD), compliance becomes relevant.
Regulating trading	Assigning responsibility for overseeing trading of allowances or credits and integrating this into the existing legislation, including defining accounting rules and tax treatment for trading units.	Clear responsibility and integration with legal framework is needed to ensure clarity for investors as well as international recognition and trust in trading system.	A crediting mechanism does not involve international two-way trading, but accounting and tax rules for revenues from sale of credits must be defined.
Stakeholder involvement	Carry out consultations with relevant stakeholders impacted by the introduction of a market instrument.	Needed to gain support and build knowledge and institutional capacity, and ultimately facilitate implementation of a domestic market mechanism.	Needed to gain support and build knowledge and institutional capacity, and ultimately facilitate implementation of a crediting mechanism.

1. Introduction

A range of different policy tools are available for countries aiming to limit or reduce their greenhouse gas (GHG) emissions. These include command and control approaches such as technology or performance standards, direct R&D support, technology subsidies like feed-in tariffs, and market-based instruments. While a mix of different policies is normally needed to address different sectors and market imperfections across an economy, market mechanisms offer some clear advantages compared to other policy measures. Using market mechanisms to put a price on carbon will incentivise least-cost abatement options.¹ As the presence of a carbon price provides incentives for finding least-cost solutions it also fosters innovation, whereas command-and-control tends to hinder it. Pricing carbon should therefore be at the core of a cost-effective climate policy package (OECD, 2009). Market mechanisms can also reduce public spending on more expensive policies like direct technology support or subsidies, and generate new sources of revenue for governments through the auctioning of allowances.

The recognition of the advantages of carbon pricing through domestic and international carbon markets is triggering an increasing interest in the role of such mechanisms to help address the GHG mitigation challenge. A number of developed and developing countries are actively researching market-based policy instruments while others have already accumulated significant experience in this area. This issue is also actively debated in the climate negotiations.

The United Nations Framework Convention on Climate Change (UNFCCC) COP 15 negotiations and the Copenhagen Accord did not provide detailed guidance on the use of market mechanisms in the post-2012 climate regime. The Accord simply states that various approaches, including the use of markets, will be pursued to enhance cost-effectiveness and promote mitigation action. This reference to market mechanisms was a result of difficult discussions. There is, in particular, a lack of clarity on the possible modes of engagement of developing countries in future market mechanisms. Since Copenhagen, the progress on post-2012 market mechanisms has been limited (see Box 1), in spite of recognition by many of the advantages of carbon markets.

Box 1. Status of UNFCCC negotiation texts on new market mechanisms

The draft negotiation text of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) following the last negotiation session (October 2010) does not include detailed language on new market mechanisms. The limited text on this issue highlights that such mechanisms should reflect net contributions to global mitigation efforts by developing countries. The heavily bracketed text coming out of the Ad Hoc Working Group on Long-Term Cooperative Action (AWG-LCA) includes references to new approaches leading to net reductions, being supplemental to developed countries' domestic actions, correcting failures of existing market mechanisms, and stimulating emission reductions across broad segments of the economy. Both the AWG-KP and AWG-LCA text include references to recommending modalities and procedures and forwarding a draft decision to COP-17 in South Africa.

Sources: UNFCCC (2010a); UNFCCC (2010b)

The basis for the current international carbon market stems from Annex I Parties' emission limitation or reduction commitments under the Kyoto Protocol, and the associated market instruments for putting a price on carbon such as the EU Emissions Trading System (EU ETS) as well as voluntary emission objectives. The existing market is often divided into the allowance market, involving trading of allowances within or between domestic emissions trading systems or directly between Parties, and the project-based offset market consisting of CDM, JI, and the voluntary market. The two market segments are linked in the sense that most of the demand for project-based offsets (CDM and JI)

¹ Establishing a price on carbon through taxes is another option that has many of the same benefits as market mechanisms. However, experience to date has shown that political support for this option is harder to attain.

comes from the compliance needs of entities under the allowance market. The World Bank estimated the total allowance market in 2009 at USD 122 billion, dominated by the EU ETS; and the project-based market to be about USD3.3 billion, dominated by CDM (Table 2). Exchanges like BlueNext and European Climate Exchange (ECX) dominated the trading of EU ETS allowances. The voluntary carbon market represented a volume of USD 338 million in 2009 (Kosoy and Ambrosi, 2010). The prices for offsets in the voluntary market are typically lower than what is seen in the compliance market (e.g. in the EU ETS or for CDM offset). For an overview of voluntary carbon markets and exchanges see Annex 2.

Table 2: Carbon markets in 2008 and 2009

	2008 (US\$ million)	2009 (US\$ million)
Allowance Market		
EU Emissions Trading System (EU ETS)	100526	118474
New South Wales (NSW)	183	117
Chicago Climate Exchange (CCX)	309	50
Regional Greenhouse Gas Initiative (RGGI)	198	2179
Assigned Amount Units (AAUs)	276	2003
Total	101492	122822
Project-based offset market		
CDM (primary)	6511	2678
Joint Implementation (JI)	367	354
Voluntary market	419	338
Total	7297	3370

Source: (Kosoy and Ambrosi, 2010)

There are also other market instruments currently being implemented or under consideration to help countries mitigate their GHG emissions. Together with the two main existing market mechanisms outlined in Table 2, the different market instruments can be grouped in four main categories:

- *National and regional emissions trading systems*, these can be linked to each other directly, indirectly linked via the international carbon markets through the use of offsets, or may be established to meet a domestic target without being linked to international market.
- *New crediting-based market instruments*, which could be based on nationally appropriate mitigation actions (NAMAs) or sectoral objectives.
- *Current offset mechanisms* (e.g. CDM or voluntary offset mechanisms), these focus on project-based offsets, and are integral to the current international carbon markets.

- *Domestic market instruments* with only an indirect impact on GHG emissions, such as renewable energy certificates or energy efficiency certificates.

This paper considers the market readiness aspects of the first two categories of market instruments only - emissions trading systems and new crediting-based market mechanisms.

An expansion of the existing carbon market, and introduction of new market mechanisms, requires improved international awareness on the role of market mechanisms, as well as increased national and international capacity for designing, implementing and overseeing such mechanisms in developing countries. To date the main market instrument for engaging developing countries has been the Clean Development Mechanism (CDM). This project-based mechanism has contributed to meeting the commitment of Annex 1 countries under the Kyoto Protocol more cost-effectively. It has also contributed to technology transfer and in particular technology diffusion, as well as building capacity in developing countries for using carbon finance for supporting GHG mitigation (World Bank, 2010a). The CDM has delivered an estimated 440 MtCO₂e of certified emission reductions to date and is expected to deliver about 1000 MtCO₂e by 2012 (UNFCCC, 2010c). The CDM could continue to play an important role but was not designed for, nor is likely to deliver, the scale of GHG mitigation needed in developing countries.² Effectively scaling up international carbon markets requires adopting a well-designed and structured approach to building capacity for market mechanisms. Market readiness is meant to answer to needs in this area. The term market readiness is used in this paper to describe the necessary technical, policy and institutional frameworks that a country needs to access and employ, through market mechanisms, private and public financing for low-carbon development. This paper summarises information on the necessary building blocks for market mechanisms – i.e. the key elements of market readiness. This can help the international climate community outline and prioritise support for market readiness efforts and focus international negotiations on the topic of market mechanisms and support for establishing new market instruments. The paper does not consider market readiness issues for scaling up CDM, but rather focuses on possible new market mechanisms. There is already extensive literature addressing issues for scaling up CDM - examples include Ellis (2006), Ellis et al (2007), World Bank (2005), and World Bank (2010a) - and many developing countries now have broad experience with such mechanisms. However, some of the challenges and lessons learned from the development of market mechanisms, including project-based mechanisms, as well as initiatives that are currently underway are discussed. The paper does not address the political economy considerations associated with introducing market mechanisms, as these are generally dependent on local circumstances and likely to differ from country to country.

Market readiness activities already abound. These include capacity building for advancing CDM in least developed countries and broadening CDM to encompass programmes of activities, building capacity to implement mechanisms for reducing emissions from deforestation and forest degradation, together with the conservation and enhancement of carbon stocks in existing forests (REDD-plus) – so-called REDD-Readiness, and more broadly, developing standards and tools for GHG measuring, reporting and verification (MRV). Many of these are bilateral initiatives but there are also broader programmes such as the International Carbon Action Partnership (ICAP) and the World Bank's new Partnership for Market Readiness focusing on capacity building for a broad range of market instruments beyond traditional CDM. These initiatives are discussed in more detail in Section 4.5.

The paper is organised as follows: Section 2 provides a framework for categorising different types of new market mechanisms by distinguishing between domestic emissions trading mechanisms and international crediting mechanisms. In section 3, the core building blocks of market readiness, namely the technical, policy and institutional pre-requisites, are identified and discussed. Some general issues, including differences in market readiness needs depending on previous exposure to market mechanisms and minimum requirements for harmonising market mechanisms are also explored. Section 4 examines some cross-cutting considerations related to market readiness: the different phases

² In comparison, total CO₂ emissions from fuel combustion in non-OECD countries in 2007 alone were almost 16,000 MtCO₂ (IEA, 2009).

of market readiness; the estimated costs associated with market readiness; the timeframe for achieving market readiness; and the need for co-ordination of bilateral and multilateral initiatives to support market-readiness. Section 5 provides a summary and conclusions, and suggests areas where further work is merited.

2. Categories of market mechanisms

Looking at domestic market mechanisms and international crediting mechanisms, a distinction can be made in terms of the link to international carbon markets. A domestic market mechanism such as an emissions trading system, if linked to international markets, would imply a direct link between domestic and international mitigation activities (i.e. where individual emission sources are trading directly). A crediting-based mechanism, e.g. NAMA crediting, would be indirectly linked to the international carbon market (i.e., whereby a mitigation goal can lead to crediting but is not necessarily implemented via a domestic carbon market instrument and without liability internationally in case of underperformance against an agreed crediting baseline). Figure 2 illustrates this distinction.

There is a further distinction between these two types of market instruments as to whether the rules governing the market instrument are designed domestically or internationally. An emissions trading system will be designed domestically, and a link to another domestic market mechanism agreed bilaterally, while the link to international markets through offsets may be indirectly governed by internationally agreed offset rules. For crediting mechanisms, mitigation policies are also a domestic domain but the crediting mechanism itself may be internationally agreed and certain international requirements would then have to be fulfilled before crediting takes place.

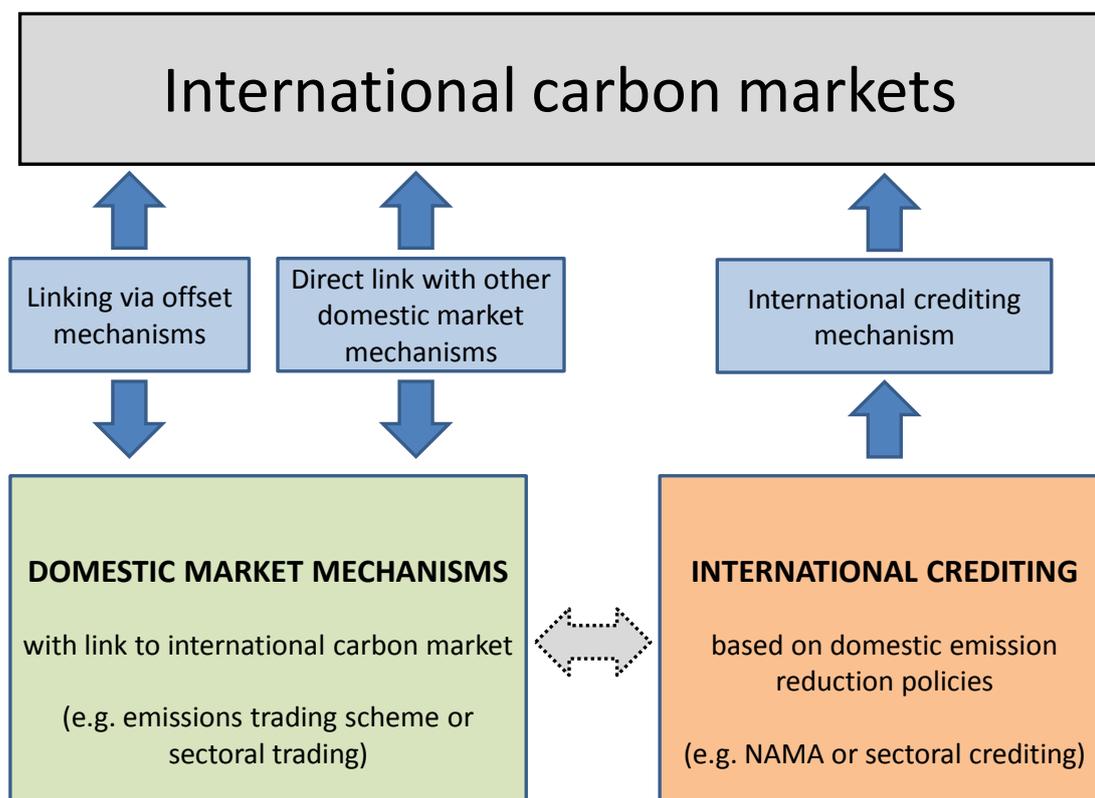
Figure 2 outlines two distinct approaches for accessing the international carbon market:

- *Domestic market mechanisms* (e.g. domestic emissions trading systems) which can be linked to international carbon markets either through offset mechanisms or direct linking to other domestic market mechanism; and
- *International crediting mechanisms* (e.g. NAMA crediting) for emission reductions achieved through domestic mitigation policies, but without liability internationally for underperformance.

This categorisation is used throughout the paper when analysing the different building blocks of market readiness.

Some emerging economies and developing countries are already implementing policy instruments, including market mechanisms, to achieve domestic GHG mitigation and/or related energy policy goals. One example is the Indian energy efficiency certificate system (perform-achieve-trade - PAT) which aims to trigger cost effective energy savings in nine energy-intensive industries (described further in section 4). Other developing countries have, or are planning to implement, similar market-based mechanisms, primarily supporting domestic development priorities and energy use optimisation. It is not necessarily clear whether or how different developing countries would seek to link such market instruments to international carbon markets. Such instruments could be used to meet future targets established through NAMAs, and thus be a starting point in many countries for linking market mechanisms to international carbon markets. However, for NAMA crediting to take place countries may have to comply with minimum international requirements as explored in more detail in sections below. Other developing countries have expressed the desire to access finance directly via the international carbon market (e.g. Indonesia via emission reductions from the forestry sector). Although some developing countries are considering domestic market mechanisms, countries will have very different capacity to start with and will therefore approach new market mechanisms at different paces. Project-based mechanisms will also continue to play a role.

Figure 2: New market instruments and the link to international carbon markets



Source: Authors

Note: New domestic market mechanisms such as emissions trading systems or sectoral trading (shown on the left-hand side) can link to international carbon markets through offset provisions, or directly and bilaterally to other domestic market mechanisms (e.g. other emissions trading systems). New domestic emission reduction policies like NAMA or a sectoral goal³ (shown on the right-hand side) can link to international carbon markets through a crediting mechanism, but this is a one-way link since such mechanisms are not domestic market mechanisms as such and will therefore normally only sell credits into the international market and not purchase credits or trade allowances in the market. There is also a link between the two categories of market instruments: both types of instruments may operate simultaneously in the same country to address different sectors or activities. A domestic emissions trading system will often only cover part of the economy and other policy measures are put in place to address emissions from other parts of the economy – the case in EU Kyoto Parties, where AAU trading can occur on the basis of emission reductions outside the EU ETS. Categorising market mechanisms along the lines of domestic trading or international crediting mechanisms is nonetheless useful as market readiness requirements will differ both in scope and nature between these two different categories of market instruments. This is discussed in section 3 below.

Another factor to consider is the supply and demand balance of a future carbon market including new crediting mechanisms. This paper does not look at this issue, but it is an important consideration for both developing and developed countries considering new market mechanisms. The analysis of future supply and demand is difficult as new crediting mechanisms on the supply side are yet to be defined, and on the demand side emissions trading systems are still debated in some developed countries. The uncertain future of any national-level emissions trading system in the US in particular creates uncertainty about future demand for credits. As a consequence existing analyses of potential supply and demand differ widely with some predicting a large oversupply of international credits, and others forecasting a shortage of international credits (Erickson et al., 2010).

³ For definitions and an overview of sectoral crediting and trading mechanisms see OECD/IEA (2010).

3. Building blocks of market mechanisms

Market readiness aims to bring together the various elements, or building blocks, needed to make the intended market mechanism operational. When considering the introduction of market-based instruments as part of the broader policy mix of national climate change mitigation strategies, governments will first need to: evaluate their existing policy instruments; identify whether and the extent to which these can be scaled up; and determine what other instruments may be needed to complement these. This *ex ante* assessment is part of the necessary first steps in defining a set of nationally appropriate mitigation actions (NAMAs), and is also relevant for the preparation of Low Emission Development Strategies (LEDS) (see Clapp et al. 2010).

Although countries will approach the use of market mechanisms differently, a market-based instrument for GHG mitigation requires some basic elements: the definition of the environmental scope of the instrument, an environmental goal, an allocation of the effort to meet that goal, safeguards to ensure the environmental integrity of the system, as well as the trading infrastructure itself, to name a few. This section outlines the building blocks of market readiness along three categories:

- Technical building blocks, i.e. the bare bones of a market instrument
- Policy building blocks, related to the ambition of the environmental goal and the policy measures needed to deliver on the goal
- Institutional and legal building blocks necessary for the stability of the system and its effective operation.

Where relevant, distinctions are made between the two categories of market instruments identified above - domestic market mechanisms and international crediting mechanisms - including in summary tables for each category of building blocks.

While this paper does not address market readiness for CDM, some of the building blocks discussed below involve the installation level, e.g. for measurement and reporting, areas where CDM experience can be useful. CDM has also created capacity at other levels, for instance through the creation of Designated National Authorities (DNAs), and by improving the understanding the potential of using carbon financing to enhance mitigation efforts. Furthermore, many of the building blocks and capacity required for establishing new market-based instruments are also relevant when implementing non-market based instruments and policies. Market readiness for measurement, reporting and verification will for instance have co-benefits in terms of developing low-carbon strategies and informing policy development or reform.

3.1 Technical building blocks

The following technical elements of market readiness relate to the environmental goal, i.e. the basis from which credits or trading units would be generated. The technical requirements related to the environmental integrity of the system are then examined and lastly, the building blocks necessary to operationalise transactions, whether domestic or international. These building blocks can form the basis of eligibility requirements to participate in international carbon market transactions.

Coverage. Any market-based environmental control mechanism beyond project-based instruments needs a definition of covered sources. The scope can vary between a country's total GHG inventory – or a subset thereof, e.g. energy-related CO₂ emissions – to emissions in a specific activity, or from sources subject to a specific policy measure (or NAMA). The coverage, once decided, must be accompanied by a list of existing installations or sources that fall under the system. A set of criteria should also be defined to select which, among the new sources in the identified sector, will be covered by the system. Experience shows that administrative costs make governments reluctant to include all emitters in a given sector: smaller emitters may be exempted from the system, and be instead covered

by alternative policy instruments. The ‘coverage’ building block may therefore need to include thresholds for eligibility in the case of both domestic trading and international crediting mechanisms.

The definition of a ‘sector’ is not necessarily straightforward either. For example, it is not clear whether a cogeneration unit producing heat and electricity in a cement plant should qualify as a power generator, or as an energy supply source in the cement sector, which may not be covered (Ellis and Baron, 2005). These questions have been addressed during the establishment of trading systems in existence today (the EU ETS, the system operated by the UK, etc) and such experience could be transferred to countries going down this policy track.

Reference year emissions. Whether the environmental goal is expressed as absolute or intensity levels of emissions, a reference year or period is needed as the basis of an emission cap or baseline. For domestic emissions trading systems agreement on the cap may be the result of a political process involving different stakeholders. In the case of a crediting mechanism, the process for agreeing on the baseline may also be guided by internationally agreed principles. A range of methodologies exist in this area, starting with IPCC guidelines for national inventories to various sector-specific measurement protocols (see among others: the WRI-WBCSD Greenhouse Gas Protocol –Box 2).

Box 2. WRI/WBCSD GHG Protocol

Since 1997, the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD) have co-operated to develop an accounting protocol for GHG quantification for businesses, governments and environmental groups. Later on various calculation tools and additional guidance documents such as the GHG protocol for project accounting have been added. In 2006 the International Organisation for Standardisation (ISO) adopted the Corporate Standard of the GHG Protocol as the basis for its ISO 14064 (Specification with Guidance at the Organisation Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals). Since the first edition of the GHG protocol in 2001 more than 1000 businesses and organisations have developed their GHG inventories using the protocol, including some of the world’s largest companies.

The GHG protocol provides guidance on the inventory development process and in addition a range of calculation tools present one or more approaches for determining GHG emissions, guidance on collecting activity data, and likely emission sources. The calculation tools provide step-by-step guidance and are either designed for specific sectors or industries or as cross sector tools. They are used at a company level, but are nevertheless consistent with those proposed by IPCC for compilation of emissions at the national level.

WRI and WBCSD have also been working with partners around the world to adopt and implement the GHG protocol as a foundation for GHG programmes and registries. To date, the GHG Protocol has established such partnerships to facilitate the design and implementation of GHG programs in Brazil, China, India, Mexico, Philippines and North America. The main objectives for this outreach strategy is to promote harmonisation of GHG markets and building capacity for further collaboration in addressing climate change in the participating countries (The Greenhouse Gas Protocol Initiative, 2010).

Among the different carbon accounting standards the WRI/WBCSD GHG protocol is perhaps the most prevalent at the moment. Further consolidation and convergence towards a uniform international standard would improve consistency and transparency in GHG reporting across the world and facilitate market readiness. In addition there are sector and industry group specific protocols like the Cement Sustainability Initiative (Box 3).

Box 3. The Cement Sustainability Initiative (CSI)

The Cement Sustainability Initiative (CSI) under the World Business Council for Sustainable Development (WBCSD) has developed a protocol for measuring and reporting CO₂ emissions from cement manufacturing. The protocol was first developed in 2003 and updated in 2005. It provides a harmonised methodology for calculating CO₂ emissions, with a view to reporting these emissions transparently. All direct and the main indirect sources of CO₂ emissions related to the cement manufacturing process are covered, in absolute as well as in specific or unit-based terms. The protocol has been widely adapted, in whole or in part, to many other CO₂ inventory programs, including: the US EPA Climate Leaders Program, the California Climate Registry, the EU Emissions Trading System, and the Asia Pacific Partnership. Using the CO₂ accounting and reporting protocol a data gathering exercise called “Getting the Numbers Right” was launched in 2006. The objective is to obtain current data for CO₂ and energy performance of clinker and cement production at global and regional levels across cement companies worldwide. The data includes non-CSI members and about 31% of the world 2007 production. The protocol has recently also attracted five of the largest Chinese cement producers. More broadly the initiative’s objective is also to identify actions and facilitate steps cement companies can take to limit GHG emissions (Baron, Barnsley and Ellis, 2008).

The Cement Sustainability Initiative is only one of several examples and other industry federations including iron and steel, aluminium, and oil and gas have developed similar GHG measurement protocols.⁴ These various industry group initiatives show that such federations can play an important role in engaging the private sector and could directly contribute to market readiness efforts for their industries. It may often be easier for an industry federation to engage the private sector on these issues than the government as the government is typically seen as the regulatory body in this context. It is therefore important for governments to build on and try to integrate such private sector efforts into government policies rather than trying to create parallel initiatives.

CDM methodologies also rely on broader emission inventories than just project level emissions – e.g. projects in grid-based electricity generation – which can provide reference year emission data for a broader policy instrument or coverage. In addition, work is now under way in the Subsidiary Body for Scientific and Technological Advice (SBSTA) on standardised baselines under CDM. Standardised CDM baselines could be relevant to establish reference year emissions for crediting-based mechanisms like NAMA or sectoral crediting. In all cases, a time series of country’s national GHG inventories is a good foundation for the definition of the environmental goal.

As the basis of either an emissions cap for a domestic emissions trading system, or a baseline for a baseline-and-credit system (irrespective of whether this is for an economy-wide, sectoral, or firm level market mechanism), three years of observations seem like a minimum to identify emission trends.⁵ More data points are desirable, particularly from sectors and sub-sectors where wide variations in emission levels are common place, e.g. emissions from the “energy sector” or LULUCF.⁶

In some cases, basic underlying data for eligible sources may be missing, which can delay definition of reference year emissions and other phases of market readiness. The definition of eligible entities will also be influenced by how difficult and costly it is to obtain the relevant reference year emissions for various types of entities, as mentioned above.

⁴ Baron, Barnsley and Ellis (2008) also reported on some efforts to date in iron-and-steel, cement and aluminium. See also World Steel Association www.worldsteel.org/climatechange/index.php for information on their data collection project.

⁵ Note that historical trends could be useful to define the general evolution of a sector/sources, but that the reference year may focus on those installations that will be actually covered, with a more precise data gathering mechanism. Different inventory procedures may be needed for each.

⁶ Energy emissions in Spain for example were 336,000tCO₂e in 2006; 345,000tCO₂e in 2007; and 318,000 tCO₂e in 2008 (IEA statistics).

In all, data gathering undertaken during the readiness phase will consist of (i) collecting existing, readily available data e.g. energy statistics, and (ii) gathering additional data e.g. via surveys, to address any data gaps.

As emission reduction goals can be set on an intensity basis (i.e. tCO₂e per unit of output), **a measure of output** consistent with the above-mentioned sectoral boundaries may also be necessary. While this may seem trivial, possible barriers include:

- Confidentiality concerns: in cases where only a few companies operate in a sector/country, output levels may be critical information in competitive markets. Possible solutions include masking the data once aggregated - a method used routinely by industry federations. However, in case the government were to re-distribute credits on the basis of performance, it would be difficult not to divulge such information. *Ex post* crediting may make this problem less acute as information would relate to older performance data.
- Defining a metric that will maximise the scope of mitigation actions and minimise the risk of leakage – e.g., a CO₂ goal per quantity of product may encourage outsourcing the production of the most CO₂-intensive input. This may be important for sectors with several outputs (e.g. petro-chemicals), or with CO₂ emissions linked to different stages of the production process (e.g. clinker in the cement sector). Some of these issues are addressed in the technical work on benchmarks used for the allocation of allowances under the EU ETS.

A measurement, reporting and verification (MRV) system, to assure market participants that emission reductions from the cap or baseline are real. This MRV system would cover both baseline/allocation estimations, emissions and the indicator of output in cases of intensity-based goals. The measurement and reporting elements of the trading or crediting system should be generated in the process of gathering reference year (or historical) emissions (and output level, in the case of an intensity goal), and in developing projections for future emissions.. Experience shows that the verification system can be a new activity developed by the financial and environmental auditors. These are often companies with a global reach, which suggests that capacity development needs may be minimal in this area.⁷ Traditionally, third party verification is based on a pre-agreed verification standard, to be used by all accredited verifiers. A single standard does not, however, imply a unique procedure to measure and verify emissions and authorities may need to be flexible to accept measurement protocols that are best suited to various activities, to avoid imposing unnecessary monitoring costs (Gemmil, 2009). To ensure credibility, the MRV system should include some form of accreditation of verifiers (a practice that is common in ISO standards, which generally include a specific standard for the accreditation of certifiers). Some flexibility is of course possible in this area. For instance the EU ETS legislation does not include a standard for the accreditation of verifiers, and difference countries apply different standards for the profile of verifiers (Landgrebe, 2009). New Zealand does not rely on systematic verification but runs sample checks and applies high penalties to entities that do not report their emissions accurately (Rashbrooke, 2010).

The requirements of a MRV system covering a domestic market mechanism, such as emissions trading systems, may differ in its level of detail from a MRV system put in place to monitor NAMA or sector-wide mitigation pledges – the MRV requirements allowing entities to trade under the EU ETS differ from the eligibility requirements for Article 17 (emissions trading) under the Kyoto Protocol. The Copenhagen Accord included language indicating a differentiation for non-Annex I countries between MRV of domestic actions, which would be subject to domestic MRV, and internationally supported mitigation actions, which would be subject to international MRV in accordance with guidelines adopted by the Conference of the Parties. In the Kyoto Protocol there is a distinction between the MRV framework related to CDM and to emissions trading. Both Articles 12 and 17 provide only a rudimentary framework for CDM and emissions trading, respectively. A much more detailed MRV framework was later established internationally for CDM in the Marrakech

⁷ Examples of companies include Ernst&Young, Det Norske Veritas Certification AS (DNV), TÜV SÜD Industrie Service GmbH (TÜV SÜD), Deloitte-TECO, etc.

Accords. For emissions trading under Article 17, a specific MRV system was developed by EU countries as they devolved their AAUs to industrial entities in order to enhance intra-EU trading.

The goal of a domestic MRV system is to allow the domestic regulator to monitor emissions and to ensure compliance with domestic policy goals. In the case of linking an emissions trading system to international markets, or having credits issued from an international crediting system, the MRV system also needs to be regarded as robust and transparent internationally.

A registry of emission allowances (covering emissions of all sources involved in the mechanism) or credits (when the trading unit is only allocated after verification of performance) enables market transactions. In the case of a trading system, the registry plays a central role as it is the infrastructure for transactions that can take place anytime during the trading period. In the case of crediting, the registry only records credits as they are being issued, e.g. not before a year after the system has been launched.

A transaction log is needed as the vehicle for trading across registry accounts. In the case of crediting, with *ex post* issuance of credits and one-way transactions to the international market, a domestic transaction log may not be necessary as an international transaction log such as the Kyoto Protocol ITL would be sufficient. If a domestic emissions trading system is established, its registry would need to include a transaction log function to track domestic transactions. While the transaction log is a purely technical matter (IT technologies), delays in putting such instrument in place can create much market uncertainty as market participants are eager to conclude transactions and be “physically” in possession of the acquired units.

Table 3: Summary of technical building blocks

<i>Building blocks and elements</i>	<i>Description</i>	<i>Domestic market mechanisms (e.g. emissions trading system)</i>	<i>International crediting mechanisms (e.g. NAMA-crediting)</i>
Technical building blocks			
Coverage	Defining the scope of the market mechanism by deciding which sources are covered; e.g. based on a minimum threshold.	Decision needed on system boundary (e.g. large installations only)	If sector-based need a decision on sector boundary. For policy-based NAMAs a boundary can be difficult to monitor/account for (e.g. public transport policies) and requires close consideration.
Reference/baseline year emissions	Choosing a reference year(s) as the basis for emissions baselines or cap. Collecting data to identify historical emissions and project future emissions. This includes deciding on the type of baseline (intensity-based or absolute)	Data needed on emissions and in the case of intensity-based baseline also on output. Data normally needed at entity level. Baseline and allocation decided domestically.	Emissions data needed at the sector or NAMA-level plus output data in the case of intensity based baseline (data availability could be an issue).
MRV system	Providing the environmental integrity of the market mechanism. The measurement and reporting parts can be developed as part of the work with defining reference year and projected emissions. Verification could involve developing standards for third-party verifiers but a system could also rely on sample checks and penalties rather than systematic verification.	Installation-level MRV of emissions (and output if intensity-based baseline) needed. An upstream liability normally involves fewer participants and may lower MRV requirements. If there is a risk of leakage MRV outside system boundaries may also be needed, although this complicates matters. MRV requirements are domestic domain but linking to international markets may imply needing to take outside considerations into account.	MRV of emissions (and output if intensity-based baseline) at sector/NAMA-level. MRV may be subject to minimum international requirements to gain access to international crediting mechanisms. If there is risk of leakage, MRV outside NAMA/sector boundary may be needed.
Registry	Developing the system for tracking either the issuance of credits or the allocation of allowances, and the net position of a country/entities.	A registry is a key part of the infrastructure allowing transactions to take place in the trading period.	A registry is needed but only to record credits issued <i>ex post</i> , and therefore does not necessarily be to be held domestically
Transaction log	Needed to track domestic transactions. For <i>ex post</i> issuance of credits, the existing Kyoto Protocol international transaction log would suffice.	A domestic system of tracking permit transfers e.g. a transaction log is needed for trading across registry accounts.	A domestic transaction log not necessary as long as there is an international transaction log, meeting functions similar to those of the Kyoto Protocol ITL.

3.2 Policy building blocks

Much of the data and information obtained while developing the technical building blocks can be used to feed into an *ex ante* policy assessment to determine whether and what type of market mechanism is appropriate. Indeed, many of the technical and policy building blocks will need to be developed in parallel.

3.2.1 *Setting the environmental goal: emission reductions potential and cost*

A country that wishes to link its mitigation actions to an international carbon price, whether through trading or crediting, ought to assess the costs/benefits that will be incurred/reaped in light of the mitigation effort required. This will indicate which activities may gain through the possible sales of emission credits, and which would gain by accessing cheaper mitigation potential through the purchase of internationally-traded units. These are important considerations when engaging activities and sectors in a discussion on mitigation efforts.

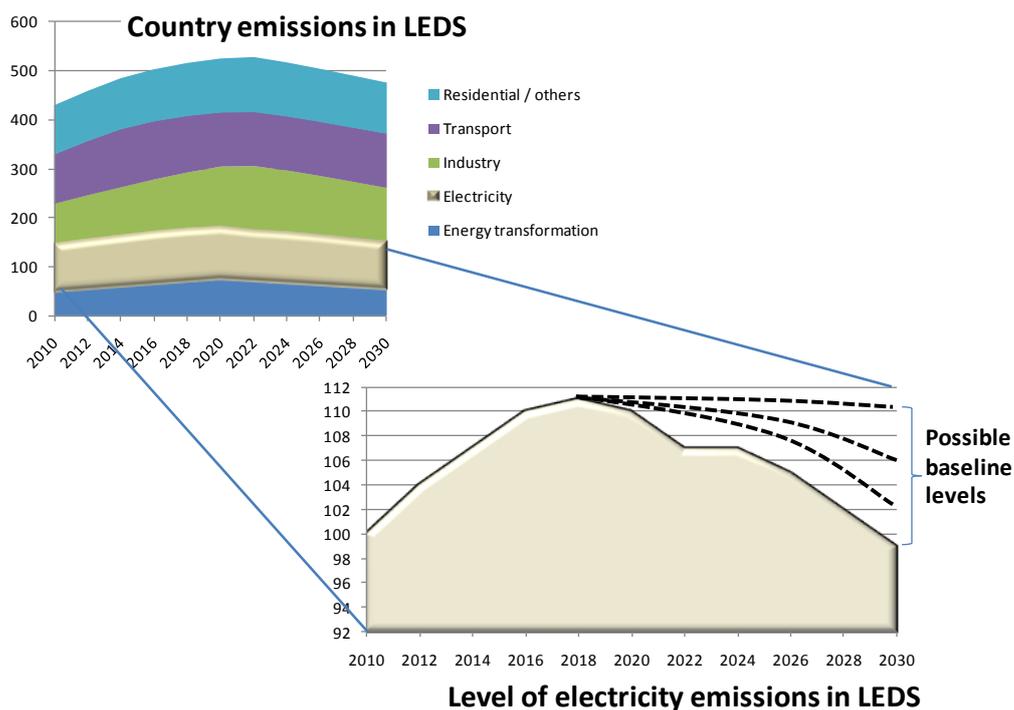
The drivers of emissions, mitigation costs and potential across different sectors should first be identified to prioritise national mitigation actions. Earlier studies have confirmed the importance of detailed mitigation cost information as the basis of policy design, especially when countries consider some international commitment on GHG reductions at policy or sectoral level (see CCAP, 2010, for sectoral case studies in China, Mexico and Brazil). Estimates of mitigation potential may also point to possible policy, technology or other needs towards accessing the emission reduction potential. For example, a country may have significant solar potential, but also a tariff on imported technology that makes such potential prohibitively expensive.

Estimating mitigation potential and cost is one step towards defining the environmental goal. The environmental goal and distribution of effort will, in most cases, be negotiated between the government and relevant domestic stakeholders. This requires an effective public-private forum with these stakeholders, and the existence of representative employers or industry associations. It has been reported that international industry federations can be particularly helpful in domestic policy discussions: these federations can bring forward their members' experience in countries where climate policy is far more advanced. This is true for data collection and GHG measurement protocols, as mentioned earlier, but also for discussions of policy instruments and best policy practice.

The finalisation of the emissions cap or baseline could take several forms, and there is limited guidance from the UNFCCC process at present on which is most probable, in the context of new international mechanisms. A country could set its own emissions cap or baseline for the policy or sector at stake, in coherence with its LEDS, if it exists (see Figure 3):

- The baseline could also be subject to the assessment of an international review mechanism under the UNFCCC, akin to the CDM Executive Board and its Methodology Panel. This review mechanism could be tasked with the assessment of the baseline's ambition and/or additionality.
- It could discuss its baseline with the regulators of an existing emissions trading system with which it seeks to link bilaterally.

Figure 3: LEDS and sectoral baselines



Source: Authors

Note: While not necessarily the objective of a LEDS, sectoral emission projections could be used to establish the baseline of a sector-based market mechanism. In the above, the dashed lines indicate a baseline above the LEDS level. The expectations are, then, that the carbon market will trigger mitigation down to the LEDS level. The baseline could also be set at the LEDS level. This would depend on the level of ambition of the LEDS in light of the country's capability.

3.2.2 Selecting appropriate policy instruments

Prior to embarking on the development of market-based instruments, governments should assess their potential effectiveness and feasibility for key emitting activities, in comparison to other policy approaches. This phase will also be the opportunity to select whether a NAMA-based, baseline-and-crediting or cap-and-trade system is most appropriate.

Analysis will need to clarify: the relative magnitude and drivers of GHG emissions across different sectors, and how these are projected to change over time; the number of sources of emitters within each sector and their characteristics (e.g. location and magnitude: many disperse mobile sources of emissions or few large sources; whether the industry is competitive, a monopoly, or regulated).

Other questions should be raised *ex ante* to determine whether, and what type of, market mechanisms are the most appropriate:

- Is there marginal cost heterogeneity in emission reductions across different sectors and/or individual sources? If not, there may be low economic gains from a domestic trading system. If directly linked to the international carbon market, this question is of lesser relevance.
- Are there sufficient numbers of sources to ensure a competitive and liquid market in credits or allowances (in other words, to avoid market power and collusion)? If not, then a domestic trading system is less suitable. Again however, if the trading system is linked to the international carbon market, this will not be an issue.

- What are the types of emission sources (e.g. large stationary sources vs. multiple non-point sources) and could the emissions sources be targeted upstream as well as downstream? If the coverage of the mechanism includes a multitude of small, non-point sources, then the transaction costs associated with implementing a downstream emissions trading system are likely to outweigh the possible cost-savings from using a market-based approach.
- Is there sufficient jurisdiction/authority to implement and enforce a market mechanism? This particular question relates to the MRV technical building block mentioned above. In the context of REDD-plus for example, unclear and contested land tenure rights pose a barrier to the development of direct market or incentive-based mechanisms to induce individual forest managers to change their land-use management decisions.

At this stage, the government must also ensure coherence across all policies at the national level. It is important therefore that those involved in the preparation of LEDS and NAMAs and those exploring the potential for using market mechanisms, co-ordinate their activities to avoid duplication of effort and harness synergies. This will help foster policy coherence across any market and non-market based mitigation approaches or actions that are adopted domestically.

3.2.3 *Sharing possible carbon revenues*

An important policy question that a government will need to consider under a crediting-based mechanism is how to allocate any finance obtained via the international carbon market domestically. For example, Dellink et al. (2010) find that implementing the upper-end of mitigation targets and actions indicated in the Appendices to the Copenhagen Accord through market-based instruments (auctioned permits, carbon taxes, linked ETS) could lead to government revenues of as much as 1% of GDP annually, or over USD 400 billion in 2020.

Baron et al. (2009) and IETA (2010) have explored how to best provide incentives for potential individual investors to undertake GHG mitigation when operating under a sectoral emissions objective. This is an issue that arises in REDD-plus, where there is a general understanding that finance earned for REDD-plus would also need to be channelled directly to the individual forest owners/users making the land use decisions, so as to change the opportunity costs of alternative land or management uses.⁸

Thus, the government should decide in advance how any potential finance from the sale of credits on the international market is to be allocated domestically, i.e., whether it will directly reward those that have improved the GHG performance of the sector at stake, be allocated to the general budget, or otherwise. Transparency on this matter in terms of systems of accounting for use of revenues and timing of credit issuance would eventually help gather support for the needed policy change.

There are multiple options for channelling carbon revenues back to the actual entities that mitigated emissions. One approach is to directly distribute credits obtained internationally back to entities in accordance with their mitigation effort. There are also indirect ways of channelling carbon revenues and creating incentives at the investor level for instance by providing tax incentives for low-carbon investments or feed-in tariffs, later to be financed by international carbon revenues obtained as a result of such policies.

3.2.4 *Policies to encourage pilot activities*

Another policy-related decision that has been made in several contexts to contribute to market readiness is the encouragement or requirement of a pilot or start-up phase. This can build capacity and expertise via learning-by-doing, as well as gather better data which can be used to inform the next phase of the market-based mechanisms.

⁸ In the context of REDD-plus, Karousakis and Corfee-Morlot (2007) suggest that this could follow models similar to Payments for Ecosystem Services (i.e. performance based payments).

In the context of REDD-plus for example, the UNFCCC agreed in 2007 to encourage REDD Demonstration Activities, to obtain practical experience with REDD pilots on the ground. In the EU, the EU ETS was established as early as 2005 to allow for a first phase (2005-2007) preceding the first commitment period of the Kyoto Protocol (2008-2012) – incidentally, the first phase brought some very useful data for later improvements and adjustments of the ETS. Earlier, the UNFCCC Parties established Activities Implemented Jointly under the Pilot Phase, which provided the experience of use for the development of project-based activities under CDM and Joint Implementation.⁹

Official Development Assistance (ODA) is also used to finance capacity building in developing countries and facilitate readiness activities. Germany, through its International Climate Initiative financed by the auctioning of part of the country's EU allowances, supports the enhancement of the carbon market overseas, among a range of other GHG mitigation and adaptation activities (Weiss, 2010). Other examples include US ODA for developing GHG inventories and Norway's financial support to e.g. Guyana for REDD-Readiness. As donor finance for market readiness increases, either via ODA or through other channels, donor co-ordination is needed to ensure that all efforts are complementary and avoid duplication.

For governments that are considering establishing domestic trading systems a pilot phase can be a useful means to collect better data, create policy support among stakeholders, adjust policy instruments, build domestic expertise (among covered sources themselves, but also for entities in charge of MRV-related activities), and assess effectiveness. The experience of CDM, while useful, may not be fully adequate for these purposes as its coverage of a sector in a country is likely to be patchy at best.

3.3 Institutional and legal building blocks

The creation of market mechanisms will require effective governance so as to ensure transparency, and enhance stakeholder participation. Participants in a market mechanism need to be confident that emissions are adequately monitored, reported and verified, and that in cases of non-compliance, appropriate enforcement measures will be put in place. Market mechanisms will not be effective, for example, in regions where corruption is prevalent and where illegal activities cannot be controlled. Providing the right institutions for this purpose is an absolute prerequisite for an effective market mechanism, but also for other systems to accept linking their markets with emerging ones.

The above sections seek to provide a comprehensive overview of the tasks that must be undertaken to launch a market mechanism, whether it is directly or indirectly linked to the international carbon market(s). To complete the market readiness picture, one has to identify the institutional building blocks that will support the technical and policy activities, and fully integrate the market instrument in business and government practices. This section briefly describes the main institutional activities, although without trying to cover the full list of technical and policy building blocks: national circumstances will mostly define which institutions are best placed to undertake these activities.

3.3.1 Assigning responsibility for collecting emissions data

There is sometimes a natural fit between existing institutions in a country and the establishment and operation of the technical and policy building blocks. If countries have an agency in charge of the national greenhouse gas inventory, this may be best placed to define the scope of the market instrument, collect base year(s) data as well as emissions data once the instrument is in operation. In some cases, however, responsibility may be split between a statistical bureau or an energy administration that runs surveys of energy use, and the Ministry of the environment or environment agency that will typically translate such data into CO₂ emissions and aggregate other GHG data into the national inventory – the process to obtain REDD-related data would of course differ radically from the collection of energy statistics.

⁹ Though not directly mandated by Parties to the UNFCCC, the carbon market actors have played an important role in kick-starting project-based mechanisms on the ground, through early initiatives such as the World Bank's Prototype Carbon Fund and Carbon Partnership Facility.

Table 4: Summary of policy building blocks

<i>Building blocks and elements</i>	<i>Description</i>	<i>Domestic market mechanisms (e.g. emissions trading system)</i>	<i>International crediting mechanisms (e.g. NAMA-crediting)</i>
Policy building blocks			
Identify mitigation potential and cost	Identify possible emission reduction opportunities at different costs at national and sectoral level – set the national or sectoral environmental goal (could also be multiple sectors). Related to <i>coverage</i> .	Needed to inform overall policy design, including assessing suitability of market instruments.	Needed to inform overall policy design, including adequate policy instrument and benefit of international carbon market support.
Selecting appropriate policy design	Enhance policy coherence and effectiveness. Choosing appropriate market-based instruments (could set up e.g. a pilot ETS for one sector and crediting for another). <i>Ex ante</i> analysis needed to assess interactions and avoid unintended consequences. Address distributional implications of policy e.g. reform of fossil fuel subsidies.	Needed to assess value/effectiveness of domestic market mechanism, including deciding on point of obligation, i.e. upstream (wide coverage with few entities) or downstream (more direct incentives to more entities).	Needed to assess value/effectiveness of crediting mechanisms, including deciding on point of obligation, i.e. upstream (wide coverage with few entities) or downstream (more direct incentives to more entities).
Sharing possible carbon revenues	Deciding on how to allocate any revenues obtained via international crediting mechanisms and how to provide incentives for individual investors when operating under non-project based crediting mechanisms.	Done through the initial allocation of individual entities' emission goals.	Need clarity <i>ex ante</i> on revenue distribution to create transparency and gain support from individual investors. Multiple options for channelling revenues (distributing credits, tax rebates, feed-in tariffs)
Policies to encourage pilot activities	Encourage pilot mechanisms or voluntary agreements with private sector for market based activities (e.g. voluntary emissions trading). Could be set up at sectoral level, province level, cluster of business sectors, etc.	Pilot or start-up phase often needed to assess operational effectiveness of the market mechanism.	Pilot activities often needed to test new mechanisms and build knowledge and support among covered entities.

The government will have to decide where the tracking of the environmental goal fits best in the country's national inventory system.

3.3.2 Issuance of trading units

The responsibility to issue trading units will differ according to the adopted system:

- Under a domestic emissions trading system, the issuance of allowances to entities is a domestic policy matter that follows immediately the allocation of effort across covered sources (e.g. under a grandfathering system) or is done via auctioning of the total cap. The registry then records which entity is liable for what level of emissions, and keeps track of transactions thereafter.
- Under a system based on *ex post* verification of the sector/country's performance before credits are issued, the responsibility for issuance could rest on the international framework, or on the domestic authorities. In the latter case, the government would measure sectoral or policy performance, compare it with the environmental goal and generate credits for the difference between the two (if it shows a surplus).

3.3.3 Institutions for GHG and performance verification

Verification is an absolute prerequisite to ensure the credibility of a market instrument, as it provides the trust needed for other market participants. Countries with carbon market experience have adopted various approaches to verification. Verification can be undertaken via independent third-parties (by the private sector), based on government-defined rules and regulations, with some specification related to accreditation. Under the Clean Development Mechanism, accreditation of verifiers (Designated Operational Entities) is the responsibility of the CDM Executive Board, with support of its accreditation panel (CDM-AP). In domestic/regional emissions trading systems, a **regulation** establishes the profile of companies that would be eligible to verify GHG data, also known as accredited verifiers. Some government body is in charge of controlling the accreditation process (Watterson, 2009). There is an example, New Zealand, of a system where third-party verification is not mandatory; the government runs spot checks and applies heavy fines to entities that have not adequately reported their emissions.

Depending on the type of mechanism and links with an international carbon market, verification may also be needed **at the international level**. Such a link, although still subject to negotiations under the UNFCCC, could help ensure that domestic measures adopted to verify entities emissions are robust. In the case of the Kyoto Protocol, this is done *ex ante* through the eligibility requirements for the various flexibility mechanisms, and *ex post* through the review process under Article 8. Governments that seek to link systems will need to agree on some regulation that defines how to verify each others' emissions and compliance (registry) data.

An institutional example where the tasks of collecting emissions data, allocating and issuing allowances and verifying monitoring reports have been integrated into one entity is the German Emissions Trading Authority (DEHSt). In addition to these fundamental tasks, DEHSt is also responsible for: operating the registry; prepare national and international reports (to the EU and UNFCCC); making relevant ETS data available to the public; contributing to the development of the National Allocation Plans; and integrating CDM and JI into national strategies (Landgrebe, 2009).

3.3.4 Compliance

A domestic emissions market mechanism requires a credible enforcement system to ensure the credibility of traded units or credits as means of compliance. Several legal options are used in existing systems, addressing the whole chain of compliance, from emissions measurement to financial and other legal penalties once non-compliance has been identified. Some systems involve independent verification of emissions inventories, while others rely on self-reporting and audits. There are also differences in type of penalties applied. The EU ETS for example involves reporting with independent verification, and non-compliance with emission caps penalised by a fine per tonne. In the India PAT scheme verification is undertaken by auditors accredited by the Bureau of Energy Efficiency. In the New Zealand emissions trading system, a system based on audited self-reporting, failure to collect data, calculate emissions and keep records results is considered an offence, and results in a fine. The penalty gets stricter where there is failure to monitor and report with intent to deceive, in which case a larger fine or even imprisonment may be imposed. Non-compliance is penalised by a fine per tonne as in the EU ETS.

Crediting-based market instruments raise less of a concern on compliance, as the tradable units would only be issued after performance has been verified. For options allowing trading of these units before the end of a commitment period, when performance would be assessed, it has been proposed that the host government assumes full liability in case of overselling – i.e. it would buy back from the market the quantity of compliance units necessary to make good on its sectoral or NAMA commitment (Baron et al., 2009; IETA, 2010; CCAP, 2009). These issues should be addressed in the broader context of countries' compliance with their internationally communicated targets, whether these are based on NAMAs, sectoral or national goals.

3.3.5 Regulating trading

A domestic emissions trading market needs to be fitted into the legal apparatus of the country. What part of existing legislation may apply would depend on how a country defines the trading units legally. Barbéris and Tignol (2010) provide an extensive review of the various definitions of tradable quotas in various jurisdictions that have either implemented or considered developing a domestic emission trading system. They conclude on the lack of homogeneity in the regulation of emission trading, in part due to the different legal definitions of trading units.

The following are important in the regulation of the trading activity:

- Entities need to know how trading units will fit in the national accounting rules;
- The tax treatment of transactions across entities is also important, as shown by a recent case of carousel fraud over the Value Added Tax on EU allowances (Lexology, 2010).

Even though there does not seem to be any universal rule for the accounting of emission allowances at present (see also Emissions-EUETS.com, 2010), there is experience that countries can draw from when they establish their own accounting rules. Existing institutions must be taken into account, as governments may be interested in expanding the remit of their current organisations before creating new structures. In some cases, the legal process of amending the role of existing institutions to allow them to take on tasks for market readiness may be difficult and new institutions may need to be created ‘from scratch’. It is nonetheless useful to identify in which institutions the technical and policy building blocks would ‘naturally’ fit.

3.3.6 Other governance aspects

A domestic emissions trading system, or a policy measure that is set to significantly alter the trend in a sector’s emissions will stand more chance of success if it can be elaborated through discussions with all relevant stakeholders, and if such discussions are based on agreed data. Not all governments and Ministries have a practice of public-private discussions, nor the capacity to verify the data provided by stakeholders. Involving the NGO community is also important as NGOs can play a role in reaching out to various stakeholders and establishing trust at the local level, and in so doing facilitate implementation of new market mechanisms. These are important elements in the institutional capacity of countries if they decide to embark on such mechanisms.

A domestic emissions trading system also requires a credible commitment to a market approach by the government. Experience shows also that the regulator of an ETS has to plan for the integration of lessons that will come through the early implementation of the regime. A balance needs to be struck between these two important requirements.

3.4 Market building blocks and linking issues

When establishing domestic market instruments, the objective may not necessarily be to link it to the international carbon markets. A government may not wish to expose its economic activities to the higher price of an international carbon market, while at the same time pursue domestic emission trading to meet an international pledge at least cost domestically. Linking domestic market mechanisms to international carbon markets is nonetheless a natural evolution for governments that wish to provide the full economic benefit of such systems to emission sources. However, some care is needed when designing market instruments in terms of key building blocks, environmental ambition and international co-ordination to allow and facilitate access to international markets.

Table 5: Summary of institutional and legal building blocks

<i>Building blocks and elements</i>	<i>Description</i>	<i>Domestic market mechanisms (e.g. emissions trading system)</i>	<i>International crediting mechanisms (e.g. NAMA-crediting)</i>
Policy building blocks			
Responsibility for collecting emissions data	Assigning domestic institutional responsibility for collecting base year and emissions data. The agency in charge of the national greenhouse gas inventory could take on this responsibility.	Need clear domestic responsibility for this but not necessarily just within one institution. Coverage of mechanism may impact range of institutions involved.	Need clear domestic responsibility for this but not necessarily just within one institution. Coverage of mechanism may impact range of institutions involved.
Issuance of trading units	Assigning institutional responsibility for <i>ex ante</i> allocation of allowances or <i>Ex post</i> issuance of credits.	Domestic policy matter through which allowances are allocated or auctioned.	Responsibility for issuance of credits could rest with the international framework or with domestic authorities.
GHG and performance verification	Allocate responsibility for accreditation of verifiers; conduct accreditation.	Domestic policy defines accreditation requirements, but some systems rely on audited self-reporting rather than third-party verification.	Depending on the mechanism accreditation may be subject to international rules (Article 8 of the Kyoto Protocol outlines the <i>ex post</i> review process).
Compliance	Establishing a legal framework creating a credible enforcement system for compliance.	Penalties for non-compliance (e.g. fines) are needed to ensure credibility and value of traded units.	As credits are issued <i>ex post</i> compliance is less of a concern, but if sale of credits is allowed before end of crediting period, or permanence is an issue (e.g. REDD), compliance becomes relevant.
Regulating trading	Assigning responsibility for overseeing trading of allowances or credits and integrating this into the existing legislation, including defining accounting rules and tax treatment for trading units.	Clear responsibility and integration with legal framework is needed to ensure clarity for investors as well as international recognition and trust in trading system.	A crediting mechanism does not involve international two-way trading, but accounting and tax rules for revenues from sale of credits must be defined.
Stakeholder involvement	Carry out consultations with relevant stakeholders impacted by the introduction of a market instrument.	Needed to gain support and build knowledge and institutional capacity, and ultimately facilitate implementation of a domestic market mechanism.	Needed to gain support and build knowledge and institutional capacity, and ultimately facilitate implementation of a crediting mechanism.

Another important aspect related to market mechanisms, and especially to the international trading dimension, is transparency over the financial flows associated with international carbon markets. Buyers may show less interest in a country's trading units if they fear that the acquired units are tainted by financial mismanagement. Entities that will trade allowances are of course entitled not to reveal the details of transactions – e.g. the price of each transacted allowance.

3.4.1 Minimum requirements to link market mechanisms with international carbon markets

Initial market design choices of domestic market mechanisms may influence if and how easily a domestic market mechanism can be connected to international carbon markets in the future. This issue relates to both the connection of domestic emissions trading systems to the international market and to the possibility of selling credits or offsets into various international markets.

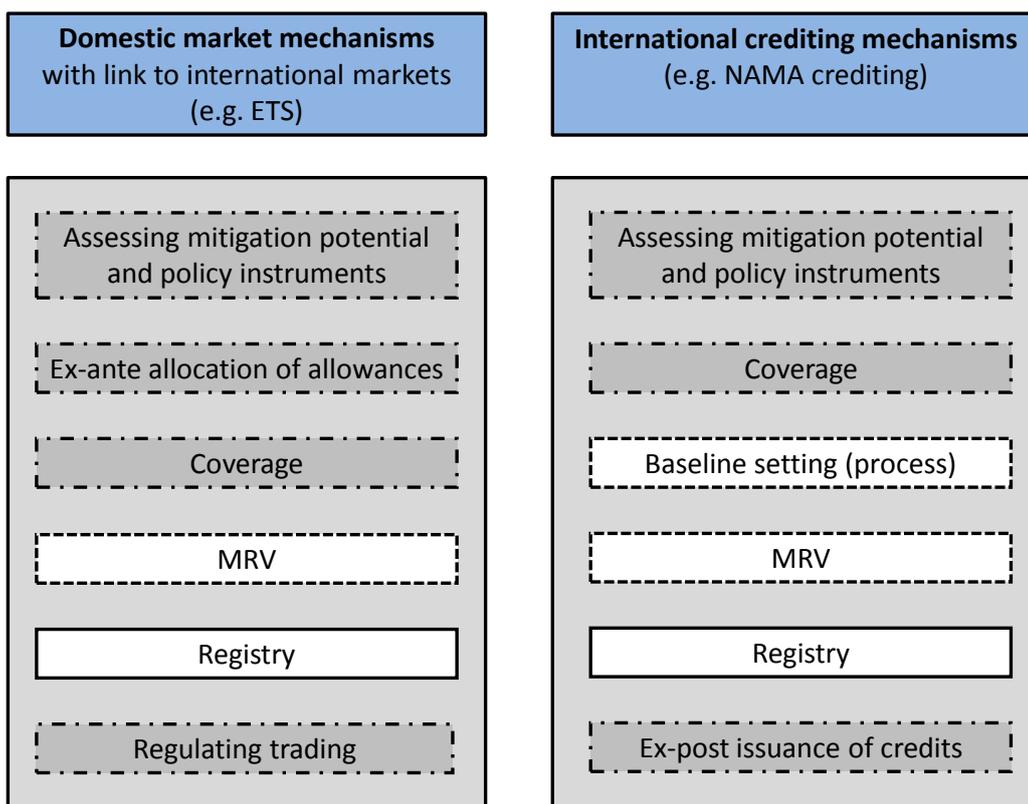
For some of the technical building blocks described above there is a risk that initial design choices may complicate or preclude access to international carbon markets. One obvious feature that would impact the attractiveness to others of linking with a particular domestic system is the robustness of its MRV system. However, differences in MRV procedures themselves may not preclude linking systems as long as the MRV system is robust and ensures integrity (Carbon Trust, 2009).

Several studies have looked at how different design features affect the performance of a linked ETS. Harmonisation of a range of different design features could help facilitate linking, see e.g. OECD (2009), Carbon Trust (2009) or Ellis and Tirpak (2006). These include type of target (absolute vs. intensity based), price caps, lifetime of allowances, compliance period, and monitoring, reporting and enforcement provisions. This paper only looks at the core building blocks and not harmonisation needs for such additional design elements of domestic emissions trading systems. Furthermore, market mechanisms in this paper refer not only to emission trading systems, but also other instruments such as NAMA crediting, and the issues associated with harmonising such crediting mechanisms are somewhat different from those arising from linking domestic emissions trading systems.

Figure 4 illustrates the minimum market readiness requirements and need for harmonisation internationally for the two main categories of market mechanisms defined in Section 2.

For some of the core building blocks included in Figure 4, international harmonisation is desirable. Harmonisation in this context does not require domestic systems to be the same. The goal is rather to ensure that different domestic systems perform at the same level if they are trading in the same market. MRV is one such element where harmonisation of standards will facilitate access to international markets for crediting based mechanisms. Harmonisation of MRV will also facilitate linking of domestic emissions trading systems to international carbon markets. In the case of directly linking different domestic emissions trading systems, an agreement on harmonisation would normally be part of bilateral agreements between the two systems. For crediting mechanisms harmonisation of MRV may be based on minimum requirements agreed internationally. In this case minimum international requirements on principal elements of domestic MRV systems may be enough to ensure integrity and international recognition of the system, leaving more flexibility on other design elements of the system. Areas that would benefit from some form of harmonisation include methodologies for measurement as well as the type of information that is reported internationally – the basic information needed to assess performance against the established emission goal. Agreeing on minimum international MRV requirements does not entail international oversight of domestic MRV and requirements would only apply to the part of the domestic MRV system relating to a crediting mechanism. The goal is to ensure a certain level of robustness and transparency of domestically developed systems.

Figure 4: Core building blocks and harmonisation needs



= Harmonisation required
 = Harmonisation desirable

= Harmonisation not required

Source: Authors

Note: Based on the building blocks outlined in Section 3, the figure outlines the core building blocks for both domestic emissions trading systems (on the left hand side) and international crediting based mechanisms (right hand side). Boxes with a solid line represent requirements where harmonisation between different national systems is required, while dotted boxes indicate requirements where international harmonisation is either not required or is desirable and valuable but not necessarily an absolute requirement.

In the case of international crediting mechanisms the method for setting baselines is another element where harmonisation is desirable. The baseline setting process may differ between countries, but as long as the method is regarded as transparent and rigorous by the international markets that may be sufficient. At the same time, harmonisation of baseline setting methods, e.g. for NAMA crediting mechanisms, would provide more certainty and confidence for the international markets. Final agreement of the level of a crediting baseline may in fact be part of an international process and international acceptance of the stringency of the baseline a prerequisite for market access.

Domestic registries represent a technical element that may require international harmonisation to allow trading internationally. The minimum requirement would be that a domestic registry can be linked with an international registry, e.g. the EU ETS registry being linked to the Kyoto Protocol registry or a crediting mechanism being integrated with an international transaction log. Again this does not imply that all domestic registry systems be the strictly identical – only that they communicate in a seamless fashion.

Harmonisation internationally is not needed for some of the core building blocks outlined in Figure 4. However, transparency of domestic systems may still be important to allow international recognition of trading units. For instance, in the case of a domestic emissions trading systems transparency in the *ex ante* allocation of allowances may facilitate access to international markets and international trading of allowances from the system.

As mentioned above there are additional design elements for emissions trading systems beyond the ones included in Figure 4, e.g. length of compliance period, price caps and banking provisions. Harmonisation of these additional design features may facilitate direct linking of emissions trading systems; without harmonisation, indirect linking through offset mechanisms remains possible but may not facilitate the emergence of an international carbon price and create market distortions. Such additional design elements, however, are beyond the minimum technical requirements and core building blocks for market readiness discussed in this paper.

3.4.2 Environmental ambition

The procedure to establish the environmental goal (baseline or cap) is another area that could complicate linking to international carbon markets, especially when it comes to reference emission levels. If the methodology for setting the baseline/allocation is not transparent or reliable, access to international carbon markets may be restricted.

The rules governing the Kyoto Protocol, including its flexibility mechanisms, provide a good indication of possible future rules as well. However, there is a wide difference in complexity between the rather simple eligibility requirements to participate in emissions trading (Article 17), whereby countries assigned amounts were first negotiated, and the very thorough and elaborate set of measurement, reporting and verification procedures adopted for CDM projects, including the approval process for the environmental goal on a project-by-project basis. Only when new market approaches are agreed internationally will there be clarity on the approval process, if any, for the environmental goals that will be the basis of countries/sectors participation.

There is also the possibility of a more bottom-up carbon market developing with bilateral agreements for the transaction of credits. Japan has recently announced that they are pursuing a bilateral offset mechanism that could be established as early as 2013. Projects under the proposed mechanism would not go through the UNFCCC screening process for CDM projects, and validation and verification procedures would instead be based on bilateral agreements between the governments involved. However, international acceptance and credibility of bilateral mechanisms will still be important to the participants in such market mechanisms, and harmonisation with international minimum standards may be required. Some level of international harmonisation is also required from the standpoint of comparability of efforts to meet domestic goals partly through reliance on offsets. Many developing countries that will implement emission reduction schemes have pledged carbon-intensity and energy efficiency targets and there is a need for accounting frameworks that avoid double counting of offsets used by buying countries that have already been counted towards voluntary national pledges in developing nations.

3.4.3 Ways forward in harmonisation

It is important to ensure that technical building blocks and MRV features in particular do not develop in a way that would prohibit linking or access to international markets. This potential problem points to the value of co-ordinating market readiness initiatives, discussed further in section 4.5. While it is premature to assume the development of a bottom-up market, it would be useful to envision the development of minimum MRV requirements and common principles, in the absence of rules defined through a legally binding international climate agreement. Monitoring and measurement protocols like the WRI/WBCSD GHG Protocol, or the Carbon Disclosure Project (Box 4) are among examples that could serve as starting points in such a process.

The above-mentioned International Carbon Action Partnership brings together policy practitioners from emissions trading systems and offers a possible forum for discussions on how to ensure coherence of technical building blocks in various regimes.

Box 4. The Carbon Disclosure Project

The Carbon Disclosure Project was launched in 2000 and under this scheme 2,500 organisations in some 60 countries have measured and disclosed their GHG emissions and climate change strategies. The data is made available for use by a wide audience including institutional investors, corporations, policymakers and their advisors, public sector organisations, government bodies, academics and the public (The Carbon Disclosure Project, 2010).

The Carbon Disclosure Project is an example of a voluntary global initiative for organisations to measure and disclose their GHG emissions and climate change strategies, but there are also many national initiatives along the same lines. Some examples from developing countries include: Mexico's voluntary GHG accounting and reporting program mentioned above; the Philippine Greenhouse Gas Accounting and Reporting Program which assist businesses to prepare GHG inventories and identify GHG reduction opportunities; and the India GHG Inventory Programme which is a national-level program for corporations to measure and manage their GHG emissions based on internationally recognised standards, and to monitor their progress towards voluntary reduction goals (The Greenhouse Gas Protocol Initiative, 2010).

Voluntary programmes can be a stepping stone for more comprehensive and robust monitoring systems. However, in order to establish sector-, or policy-wide inventories and baselines, with the goal of establishing market instruments, coverage of the monitoring and reporting systems need to cover all installations to be included in the market mechanism. Existing reporting schemes may also differ in terms of data reliability and verification, and the application of such programmes as the environmental basis of market mechanisms must be carefully assessed.

4. Implementing market readiness

Several developing countries are implementing or considering various new market mechanisms which directly or indirectly address their GHG mitigation profile. Examples include:

- India is launching the Perform Achieve and Trade (PAT) scheme, an energy efficiency certificate trading programme applied to industry. The PAT is an intra-country trading programme that will apply to 714 facilities in 9 energy-intensive sectors. By 2014-15 it expects to avoid electricity capacity additions of 19,000 MW and mitigate 98 million tCO₂ annually. Trading protocols, targets and the regulatory framework are expected to be ready by December, 2010. India is also introducing a renewable energy certificate (REC) mechanism which aims to increase the share of renewable energy to 10%. The RECs are intra-country tradable certificates aiming to provide flexibility to achieve renewable purchase obligation compliance, including overcoming geographical constraints across states in terms of renewables potential.¹⁰ Like emissions trading, these schemes seek to facilitate the achievement of the stated policy goals in a least-cost manner.
- Mexico in its national strategy on climate change (CICC, 2007) plans to establish a multi-sectoral cap-and-trade system. The proposal is to establish potential sector targets through assessment of technology penetration, mitigation costs, emission reduction opportunities and policy barriers. Targets would be achieved through a trans-sectoral cap-and-trade programme. Mexico also has a voluntary pilot inventory programme that seeks to promote

¹⁰ Presentations by Saurabh Kumar, Secretary, India Bureau of Energy Efficiency and Alok Kumar, Central Electricity Regulatory Commission, India at a World Bank workshop on Mitigation actions and role of market instruments - bridging the readiness gaps, Seoul, Korea, March 2010

corporate and project-level GHG management, identify cost-effective GHG reductions and build capacity. The programme is based on the accounting and reporting principles of the WRI/WBCSD GHG Protocol and could serve as a starting point for data collection for the proposed cap-and-trade system (IEA, 2009).

- China's National Development and Reform Commission (NDRC) has recently announced that it will develop pilot programmes to reduce GHG emissions intensity in five provinces and eight cities (NDRC, 2010). The programmes are expected to involve a range of measures including consideration of market-based mechanisms. China also has initiatives at the city-level with environmental exchanges launched in Shanghai, Beijing and Tianjin (see Annex 2).
- Korea as part of the effort to meet their voluntary pledge to reduce emissions by 30% below business-as-usual emissions by 2020 is introducing a project-based program to promote voluntary reductions by small and medium enterprises. The program is using CDM and ISO standards for benchmarking credits and domestically approved third party verifiers. The focus of the program is domestic companies and the Korean Certified Emission Reductions (KCERs) are issued by the Government for 5-year crediting periods. The Government also supports project development, including methodology development and verification costs. The focus is projects with more than 500 tCO₂e per year in all relevant sectors.¹¹

The above examples illustrate both the fact that some developing countries are already advancing with domestic market mechanisms and the potential differences in level of engagement and market readiness between countries. Such differences in capacity and institutions as well as interest and choice of market mechanisms – not all target GHG directly, nor do they explicitly envision international carbon market access – suggest how country specific the implementation of market readiness may need to be. This section looks at some issues related to implementing market readiness, specifically experiences to date, the financial needs, timeframe for implementation and the institutional framework for delivering market readiness.

4.1 Addressing capacity building needs – experiences to date

When developing the different building blocks outlined in Section 3 various capacity building needs will emerge. The capacity building needs will differ widely between countries and closing these gaps is the goal of the market readiness process. For instance, when introducing a new market mechanism aiming to link to international carbon markets, there is a need to ensure a certain level of consistency in MRV (to ensure environmental integrity) and registries across countries adopting the mechanism. This consistency is required for credits generated from the same type of market mechanism in different countries to be fungible and traded freely on the international carbon markets. One way of ensuring such consistency is to create minimum requirements for MRV, as it relates to international crediting of emission efforts, and then support developing countries in building the necessary capacity for meeting these minimum requirements. Setting minimum requirements does not imply international management of MRV, but rather a requirement for strong and transparent domestic MRV capacity. The goal of the market readiness efforts should therefore be to ensure that countries with potentially very different initial capacity are aligned and fulfil the minimum requirements set.

The experience with the EU ETS has been that it is best not to differentiate much between participating countries in the implementation and operation of the system, but leave some flexibility on the implementation of some of the MRV components. In order to ensure that all member states fulfilled the requirements of the EU ETS directive capacity building was provided, in particular to new member states (see Box 5).

¹¹ Presentation by Seung-Chan Chang, Korea Energy Management Corporation at a World Bank workshop on Mitigation actions and role of market instruments - bridging the readiness gaps, Seoul, Korea, March 2010

Box 5. EU ETS capacity building efforts

When the EU ETS was introduced, seminars were organised in capitals to explain the legislation; the same was done after the revision of EU ETS in 2009. Such seminars to explain new legislation are not standard EU procedure and were part of the capacity building for implementation of the ETS. Separate seminars were held for government representatives, operators and verifiers.

In addition, a separate project for capacity building for the implementation of the EU ETS directive targeted new member states. This was contracted out by the EC to BGP Engineers, in co-operation with TUV Rheinland and MOBilisation¹² Netherlands. The project took place in the period 2005 to 2006 with the objective of improving the capacity of relevant competent authorities in new member states to fulfil the requirements of the EU ETS directive and its supporting legislation. This involved improving the knowledge and awareness of the requirements among operators of and other stakeholders. Part of the project included workshops focusing on the country specific legal framework and actual implementation in combustion installations. Workshops were held in Slovakia, Hungary, Poland, Latvia, and Czech Republic, covering monitoring and reporting, verification, JI and CDM, inspection and enforcement, and information exchange. Separate seminars were held for government representatives, operators and verifiers, based on case studies and experience of operators in other member countries. Some of the content was quite technical and four manuals covering monitoring and report, verification, accreditation, and CDM/JI were developed and explained as part of the project (Emissions Trading Directive in EU New Member States, 2010).

The Commission has also organised several EU ETS compliance conferences. Their objective is to realise a more harmonised and common compliance under the EU ETS by improving communication, raising awareness and building capacity through workshops and exchange of best practices. The last conference covered topics like reporting, peer reviews, verification, accreditation and data collection. Participants include government representatives and competent authorities. The initiative has also provided a forum to transfer knowledge from older to new member states (European Commission, 2010).

A similar initiative is the EU ETS verification forum also organised by the EC. This forum has seen active participation by the International Emissions Trading Association through their validation and verification working group which has helped harmonise verification under the EU ETS and developed a verification protocol.

The experience with inclusion of new member states in the EU ETS has shown that developing the necessary MRV and institutional framework can be relatively quick, provided appropriate capacity building and support mechanisms are in place (Lazarowicz, 2009). The countries included in the EU ETS represented a diverse group of countries with very different capacities and disseminating knowledge from these different EU ETS capacity building activities would be valuable in building knowledge of emissions trading among non-Annex I countries. Subject to developing country interest, a capacity building initiative could be to extend similar seminars to interested countries outside the EU. Initial efforts have already been conducted, e.g. in China, by the International Climate Action Partnership, which also brought examples from other domestic systems.¹³

CDM is another existing market mechanism where lessons can be drawn from how capacity was built. Given the project-based design and grassroots character of CDM a lot of the capacity building occurred through learning by doing. Although there have been a range of bi-lateral and multilateral capacity building programs for CDM much capacity building, both at the project entity-level and at Government level (e.g. for the DNA), still happened as an integrated part of project development. The

¹² BGP Engineers is a Dutch consulting company specialising in climate change and emissions trading issues; TUV Rheinland is a certified Designated operational Entity (DOE) for the validation and verification of CDM projects; and MOBilisation Netherlands is a consulting firm offering services in the fields of environmental management and institutional development.

¹³ International Climate Action Partnership, website: www.icapcarbonaction.com

World Bank reviewed its experience in the carbon market over the past decade and draws some lessons from providing capacity building (see Box 6).

Box 6. Lessons from capacity building for CDM

The World Bank in its review of its experience in the carbon market to date points out that in many countries the basic infrastructure for CDM has been developed, although there are still regions where capacity is lacking. In order to scale up post-2012 mitigation efforts in developing countries there is an increasing need for capacity building programs that advance large-scale mitigation. The review also suggests that for capacity building programmes to be more rapidly and effectively administered, such efforts need to progress from a “retail” face-to-face approach to a more efficient wholesaling approach where capacity building programs can be delivered through means such as virtual platforms and regional hubs or organisations. This is important in order to maximise limited resources and ensuring the sustainability of capacity building efforts. Capacity building also needs to focus on creating an environment for low carbon investments and facilitating the expansion of domestic financial markets to include carbon finance opportunities (World Bank, 2010a).

The World Bank’s capacity building programme for CDM is only one of many such initiatives, but the lessons learned from the World Bank review point to the need for more structured capacity building efforts if aiming to scale up mitigation in the carbon market post-2012.

Another area of focus of capacity building in developing countries until now has been national emissions inventories; also a useful step towards the establishment of the emissions building block for a market instrument. Industry federations have played an important role in engaging the private sector and developing GHG measurement protocols. Industry groups could be valuable in establishing effective public-private fora.

4.2 Phases of market readiness

An area where substantial thinking has already gone into developing a readiness framework is the mechanism for reducing emissions from deforestation and forest degradation, and the enhancement of carbon stocks (REDD-plus) in developing countries.¹⁴ Many of the building blocks outlined above are part of the REDD-Readiness framework and the sector represents an interesting case study (see Box 7).

The REDD-Readiness Preparation Proposal outlines the components of REDD-Readiness, but also indicates a sequencing of these components. In similar fashion, taking into account the building blocks outlined in Section 3, phases and possible sequencing of the key market readiness elements are summarised in Figure below. Note that this process can be iterative to take into account new information as this becomes available. For example, an assessment of national emissions and mitigation costs can lead to a general vision for mitigation policy. Once more data on sectoral mitigation costs becomes available, flexibility should be allowed to revise the national emissions goal.

¹⁴ The REDD-Readiness framework is relevant for both a market-based and a fund-based approach to REDD finance.

Box 7. REDD Phases and REDD-Readiness

The REDD-Plus phases that are being promulgated under the UNFCCC are as follows:

Phase 1: The initial preparation and readiness phase involves the development of a national REDD-plus strategy or action plan. This includes, inter alia, the identification of key drivers of deforestation and degradation, and the identification and prioritisation of key policy and institutional capacity-building measures for both state and non-state actors.

Financial support from bilateral and multilateral sources (e.g. World Bank REDD Readiness Mechanism)

Phase 2: Implementation of national REDD-plus strategy, including policies and measures such as land tenure reforms and removal or reform of environmentally harmful subsidies that could involve results-based demonstration activities. This has also been referred to as proxy-based payments e.g. where payments could be made based on the area of deforestation avoided, with possible adjustments to the level of financing based on the rigour of the MRV approach used.

Financed by institutionalised sources (e.g. revenues from auctioned allowances)

Phase 3: The REDD mechanism should, by phase three, deliver performance-based payments based on third-party verifiable emission reductions and carbon stock enhancements.

Financed by the international carbon market and/or via an institutionalised fund for REDD.

The World Bank Forest Carbon Partnership Facility (FCPF), which has taken an active role in REDD-readiness, has further developed two phases in the FCPF Readiness activities. Together, these two phases are intended to address early planning, analytical work and system design - they consist of: (1) Formulation – which encompasses the Readiness Plan Idea Note (R-PIN) and the Readiness Preparation Proposal (R-PP); and (2) Preparation – which involves the Readiness Package (R-Package). The contents of the R-PP consist of:

Component 1: Organise and Consult

- 1a. National Readiness Management Arrangements
- 1b. Stakeholder Consultation and Participation

Component 2: Prepare the REDD plus Strategy

- 2a. Assessment of Land Use, Forest Policy and Governance
- 2b. REDD Strategy Options
- 2c. REDD Implementation Framework
- 2d. Social and Environmental Impacts

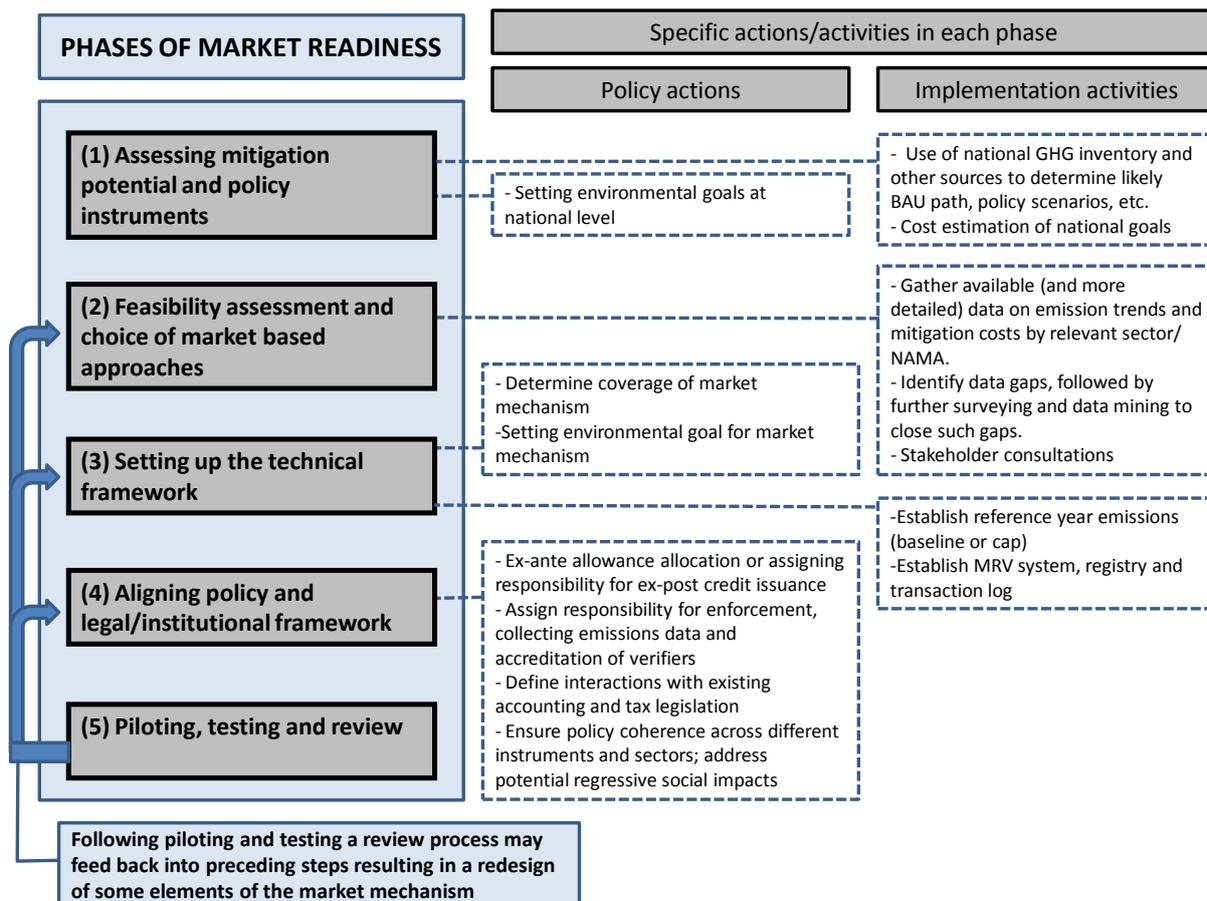
Component 3: Develop a Reference Scenario

Component 4: Design a Monitoring System

- 4a. Emissions and Removals
- 4b. Other Benefits and Impacts

Component 5: Schedule and Budget

Figure 5: Phases of market readiness



Note: Different phases of market readiness are outlined on the left-hand side. Specific actions and activities associated with each phase are included in dotted boxes on the right-hand side, categorised as either policy actions or implementation activities.

The different phases illustrated in Figure 5 may not necessarily follow the sequence indicated as several phases and the associated actions may take place in parallel. As indicated, following a piloting and testing phase there may be a need to redesign certain elements of the market mechanism. This was for example the case with EU ETS, where the first phase (a pilot phase) disclosed over allocation of allowances, and was subsequently adjusted prior to the second phase. The time and resources needed for the different phases may also vary substantially. At the same time there is a natural progression from assessing mitigation potential and costs, choosing policy instruments, putting in place the necessary framework and finally piloting a market mechanism.

Although the focus of market readiness is on preparation for market instruments, capacity building efforts can also be relevant for mitigation action more broadly. Improved measurement of GHG emissions can for example help identifying sectors where difficulty in measuring emissions or market failures would require looking at non-market based policies to mitigate emissions.

4.3 The cost and financing of market readiness

To date there have not been many studies on the costs of capacity building needs for scaling up the carbon markets in developing countries. The most comprehensive analysis so far has been prepared by Ecofys (see Box 8).

Other studies have focused on the capacity building costs needed to implement REDD activities. The Eliasch Review (2008) estimates that the up-front capacity building costs, including for monitoring capacity and governance capacity to enable forest nations to adopt and implement effective policies to

reduce forest emissions, are around USD 50 million in the first year for a total of 25 forest nations, and up to USD 4 billion over five years for a total of 40 forest nations.

The World Bank FCPF Readiness Fund, which is intended to help developing countries build capacity for REDD, has to date mobilised a total of USD 115 million (with a target of approximately USD 185 million).¹⁵ Thirty seven developing countries have been selected for participation in the FCPF; up to USD 3.4 million has been allocated to DRC and Ghana and USD 3.6 million to Mexico for readiness preparation.

Similarly, finance mobilised by the UN REDD budget has been provided by Norway (USD 52 million for 2009, and another USD 30 million for 2010), and Denmark (USD 2 million) in June 2009. Spain announced its pledge of USD 20.2 million over a period of three years. The UN-REDD Policy Board in March 2010 approved a budget allocation of USD 4.5 million for Zambia.

As an example of a bilateral arrangement, the Indonesia-Australia Forest Carbon Partnership (announced in June 2008) incorporates USD 30 million for the Kalimantan Forests and Climate Partnership and a USD 10 million bilateral package of support for Indonesia on forests and climate. The support is targeted in three key areas: strategic policy dialogue on climate change; increasing Indonesia's carbon accounting capacity; and identifying and implementing incentive-based REDD demonstration activities. In November 2008, Indonesia and Australia agreed on a Roadmap for Access to International Carbon Markets. The Roadmap is a multi-phased strategy to assist Indonesia develop the necessary technical, system and financial pre-requisites for participation in future international carbon markets for REDD.¹⁶

¹⁵ From AFD, Australia, Denmark, Finland, Japan, Netherlands, Norway, Spain, Switzerland, UK and USA.

¹⁶ The Roadmap and its activities will be progressed over four key phases: Phase I: Building necessary policies and capacity for participation in carbon markets for REDD; Phase II: Testing and strengthening of REDD policies and systems; Phase III: Exploring options to access voluntary carbon markets for REDD; Phase IV: Integration into post-2012 international carbon markets.

Box 8. Ecofys cost assessment of market mechanism capacity building requirements

Ecofys conducted an analysis of the capacity building needs and the related cost for non-Annex I countries to reach a level of capacity that allows a successful implementation of mechanisms that link to the global carbon market.

This covers capacity building to share and transfer knowledge and build expertise in monitoring, reporting and verification as well as policy and institutional reform. This estimate does not include the costs of implementation or wider sector-specific capacity building, which would substantially increase costs (e.g. REDD-plus). It also excludes the implementation costs of market mechanisms, which would constitute additional costs above and beyond what we define as capacity building costs.

The study looked at three scenarios – a low, medium and high ambition scenario – of countries' participation in the international carbon markets. For five representative countries the capacity gap in terms of institutional reform, policy and legal reform and MRV, and costs of closing this gap, were assessed for the different market mechanism scenarios. The cost estimates for the countries studied were then scaled up to the following country groups: nearly industrialised countries¹, upper middle income, lower middle income, low income countries, and China. As an example, in the high ambition scenario: nearly industrialised countries pursue national mitigation targets complemented by an ETS; China adopts national mitigation targets without an ETS (but involving links to international carbon markets); upper middle income countries adopt sectoral crediting or trading; lower middle income countries adopt sectoral CDM; and low income countries adopt CDM+.¹ Under this high ambition scenario total costs for implementation over the next 10 years were estimated to be between USD 2-5 billion with a middle estimate around USD 3.7 billion. Putting in place adequate MRV represent the largest share of these costs, followed by costs associated with putting in place policies and legal reform. In terms of average costs per country in each country grouping the highest costs in the high ambition scenario described above are not surprisingly found in China, where costs of putting in place the technical, policy and institutional building blocks for taking on national targets (without an ETS) are estimated to be around USD 160 million. The second highest costs would accrue in nearly industrialised countries when putting in place a national ETS. In low income countries, capacity building to connect to the carbon market through CDM+ comes at a relative low cost per country.

The cost estimates do not include the implementation costs of market mechanisms, e.g. running and maintaining registries and administrating designated government institutions. It also excludes wider sector specific capacity building, which could substantially increase costs, e.g. additional costs of national policies addressing REDD. The study also rightly points out that there is a range of non-capacity related barriers to implement market mechanisms, e.g. political will and stability, access to finance and the general infrastructure situation (Ecofys, 2009).

The Ecofys study rests on numerous assumptions, including that the case study countries are representative for the respective country groupings. However, it still represents a very interesting analysis of not only costs, but also the capacity needs for putting in place various market mechanism in different countries. The upper range of the cost estimate in the high ambition scenario is around USD 5 billion over the next 10 years. This amount seems like a level of funding that could be accessed considering the pledges in the Copenhagen Accord of fast track financing of USD 30 billion (2010-12). However, fully funding market readiness efforts through foreign public sources may not be acceptable and part of the costs could be covered by developing countries themselves, in particular when it comes to policy and legal reform and institutional development.

Funding from outside the carbon market will be important in the short term. Such non-market funding can come from both public, e.g. the Copenhagen Accord fast track financing, or private sources, e.g. multinational companies building capacity on ETS implementation based on their experience in the EU (Lazarowicz, 2009). In ensuring efficient use of both public and private financing in the early stages of the market readiness work, co-ordination will be important both between different sources of public funding, not the least between bilateral and multilateral sources, but also between public and private sector sources.

In addition to non-market funding, resources can also be raised through the carbon market for market readiness activities. An example is the International Climate Initiative (ICI) implemented by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. ICI supports preparation of NAMAs, LEDS and data collection and is financed through the auctioning of a portion of Germany's EU ETS allowances.

The Ecofys analysis represents a first comprehensive attempt at quantifying costs associated with capacity building for new market mechanisms in developing countries, and the results are useful in getting idea of the funding needed. However, further research on this topic would be helpful in providing a more solid basis for decision making on funding needs and capacity building priorities. In addition it would be useful to also have estimates on the running costs of operating market mechanisms, i.e. maintaining a registry, running the institutions responsible for issuing credits, regulating the market, etc.

4.4 Timeframe for market readiness

It is difficult to estimate how long it may take to build market readiness and overcome non-capacity related barriers like political commitment to implement market mechanisms. With regard to preparing for international emissions trading under Article 17 of the Kyoto Protocol, it is interesting to note that it took Annex I countries an estimated 10 to 15 year start up period for comprehensive national time-series inventory data to be available. However, as many non-Annex I countries already have experience with developing national GHG inventories, the time period that would be needed to develop harmonised inventory data and approaches in many developing countries is likely to be substantially lower.¹⁷ Also, new market mechanisms focusing on NAMAs or sectoral crediting or trading could seek to first cover sectors or NAMAs where inventory data is most readily available, and consequently reduce the time needed to come up with proper time-series. The main domestic market instruments from which some lessons can be drawn in this respect are the EU ETS, CDM, Joint Implementation and progress that is being made in REDD-plus.

4.4.1 EU ETS

Following the adoption of the Kyoto Protocol in 1997 the then EU-15 nations decided that there was a need to enact EU policies to meet the Kyoto targets. The EU ETS scheme is based on EC Directive 2003/87/EC, which entered into force in October 2003, with work having started a couple of years before this. With the accession of 10 new EU Member States, the EU-ETS was expanded to 25 countries in May 2004. A trial period took place between 2005 and 2007, with the second phase of the EU ETS starting January 1 2008. The EU ETS now covers around 10,500 installations across the 27 EU member states plus Iceland, Liechtenstein and Norway.

The development and implementation of the EU ETS took place over a relatively short period. The experience should, however, be seen in the context of fairly good existing monitoring capacity and substantial resources being allocated to the task. At the same time, it required significant co-ordination and policy decisions involving all member state governments with many differences in economic and energy profiles, and different stakes in the introduction of a cap-and-trade system.

4.4.2 Clean Development Mechanism and Joint Implementation

The experience with developing CDM provides another example in terms of the timeframe needed to introduce a new market mechanism. It also demonstrates that there are both domestic and international aspects to consider when introducing new market mechanisms. The 1997 Kyoto Protocol sets out the core principles for CDM, but the operational principles were only specified in the Marrakech Accords signed at the end of 2001. Market activities actually started even before the Marrakech Accords with participants in the World Bank's Prototype Carbon Fund (PCF) being the

¹⁷ Nevertheless, there are still large disparities amongst non-Annex I countries with some countries, including China and India, only having submitted one national inventory for 1994 (see: http://unfccc.int/ghg_data/ghg_data_unfccc/data_sources/items/3816.php).

first investors in CDM in 2000 (World Bank, 2010a). By the time the Kyoto Protocol entered into force in 2005, more than 120 transactions had already been recorded (Lecocq, 2005). However, as more and more projects were put forward, the formal UNFCCC approval process for methodologies and projects alike was delayed by a growing backlog at the UNFCCC level as well as delays in the third-party validation process. Of the 5,312 pilots currently in the CDM only 2,262 have been registered. By 2005 only 40 CDM project had been registered, 167 projects in 2006, 188 in 2007 and 205 in 2008 (UNEP/Risø, 2010)¹⁸. This fairly slow registration process in the early years of the CDM is partly a result of bottlenecks on the UNFCCC regulatory and validation side described above, and partly because of delays in putting in place the necessary institutions, mainly the Designated National Authority (DNA), in CDM host countries. This illustrates that both domestic and international market readiness dimensions have to be addressed for a market mechanism to function properly.

Nevertheless, the development and implementation of the CDM evolved fairly quickly, in particular the phase following the establishment of the international rules. Part of this relatively fast development can be explained by the project-based nature of CDM and the relatively low institutional threshold in host countries for participating in the CDM. Essentially the only requirement at the government level is the establishment of a Designated National Authority (DNA), whose basic role is to provide letters of approval for proposed CDM projects and confirm the contribution of the project to sustainable development. While the institutional requirements on a DNA are not high, the political decisions needed to establish a DNA has in some cases taken a long time. The burden of developing methodologies, project design documents (PDD) and the monitoring of projects falls on the project owner or developer, which in most cases are private sector companies. This burden on a project-by-project level, although onerous in some cases, has proven to be manageable.

The experience with Joint Implementation (JI), in particular under the JI Track I procedures which requires greater host country involvement, has shown that the higher domestic capacity needed under JI takes time to develop (see Box 9). Most of the new market mechanisms discussed, from CDM with standardised baselines to sectoral crediting or trading, would require a much higher involvement from host governments both in terms of MRV and in putting the necessary policy and legal reform in place. The market readiness needs are clearly higher than for CDM and JI, and the development path and timeframe for establishing such mechanisms could differ quite a bit from the experience with CDM.

Box 9. Joint Implementation

In 1995, the first Conference of the Parties (COP1) to the UNFCCC created a pilot phase of Activities Implemented Jointly (AIJ). The objective of this pilot phase was to establish expertise with project-based mechanisms. The 2001 Marrakech Accords (Decision 16/CP.7) provide the rules and modalities relating to JI. They indicate that a JI host country can qualify for JI via either one of two tracks, depending on its ability to meet certain eligibility requirements. Under Track I, host country requirements are stricter, but there is less international oversight. Track I requires a Party to the Kyoto Protocol to establish an assigned amount and create a national registry for tracking the transfer of any assigned amounts. Countries eligible for Track I must also have a national system in place to estimate emissions and removals by sinks; submit an annual inventory to estimate GHG emissions; and have accurate accounting of their assigned amount and submissions of information. To qualify for Track II JI, a host country must only fulfil three of the eligibility requirements: they must be a Party to the Kyoto Protocol, establish an assigned amount and have a national registry in place. Under both tracks the host country is responsible for the issuance of emission reduction units (ERUs). While the JI track I procedures on paper look more straightforward and more flexible than CDM, the development and approval of JI projects has been slower than expected. This can partly be explained by the higher requirements placed on the host countries under track I procedures. The need to establish domestic procedures and institutions requires capacity building and sustained political motivation.

¹⁸ UNEP/Risø, website: <http://cdmpipeline.org>, consulted July, 2010

The timeframe for implementing new market mechanisms is likely to be very country specific as the capacities of existing domestic institutions vary. Many countries have now established DNAs as required under the CDM, but the role and capacity of the DNA differ between countries. In some countries the DNA mainly issues letters of approval for CDM projects, while in other countries it plays a much more active role in facilitating and supporting the development of CDM projects. In the same vein, the regulatory and supervisory role of government institutions in overseeing environmental issues and emissions diverge greatly between countries. In countries where the supervisory role of government institutions in overseeing emissions in general is weak, the capacity to expand the supervisory role of existing government institutions to monitor and regulate GHG emissions would also be lower and the time needed to build the capacity longer.

4.5 Co-ordinating market readiness

As mentioned above, there are already a range of market readiness initiatives being implemented around the world. These activities are carried out by different entities from governments, both domestic and foreign, to NGOs. Such a mixture of organisations and governments working on this issue is natural and useful, but it may be useful to look at the need for co-ordination of efforts and how this can be achieved. The experience with REDD-plus may be illustrative in this context (Box 10).

Some of the issues that prompted deeper co-ordination on different REDD initiatives as well as the solutions, could also be relevant for various market readiness and capacity building initiatives on other sectors. A centralised body for co-ordinating initiatives and programmes would probably not be the right direction to go, but finding fora to exchange information and enhance co-ordination on this could prove very useful in ensuring efficient use of limited resources to build capacity. Such fora already include the International Carbon Action Partnership (ICAP) which is a partnership of countries and regions pursuing implementation of carbon markets through mandatory cap and trade systems. ICAP provides a forum for sharing experience, knowledge and best practises. ICAP has a stated goal of a global carbon market, and although only developed countries and regions are members of ICAP to date, the market readiness discussion is part of the partnership's agenda.¹⁹ The World Bank is planning a partnership for market readiness.

¹⁹ International Carbon Action Partnership, website: <http://www.icapcarbonaction.com>, consulted July 2010

Box 10. Co-ordinating REDD-readiness activities

There are currently a large number of REDD-readiness efforts underway, initiated by a range of different entities. Examples of bilateral REDD readiness efforts include the Australian International Forest Carbon Initiative and Partnerships with Indonesia and Papua New Guinea, and Norway's Climate and Forest Initiative which is supporting Brazil's Amazon Fund.

At the multilateral level, the main actors in this field are World Bank's FCPF and UN REDD Programme. These two REDD platforms emerged separately in 2008 but evolved fairly quickly to ensure more coordinated and complementary efforts. This evolution was in response to concerns raised in some developing countries about duplication of effort and unnecessary burdens on governments and other host country institutions in terms of providing information and co-operating with several external organisations promoting REDD. The agreement entailed that the two initiatives support one common REDD programme in the countries where they both intervene, which involved co-ordination of country visits and messages to the host country governments. To minimise transaction costs, the two initiatives also undertook to harmonise their guidelines on consultation and stakeholder engagement and their document templates. Complementarity between the two initiatives in some of the 'joint countries' has emerged, with the FCPF providing a broad framework for organising the REDD readiness process, and the UN-REDD focusing more on 'quick-start' readiness activities. The two agencies also strive for co-ordination with bilateral agencies (World Bank, 2009).

These examples highlight the different REDD readiness efforts that are underway today (unilateral, bilateral and multilateral). Perhaps one of the key challenges associated with undertaking these readiness efforts is the lack of international guidance to provide a clear and harmonised approach.

Given the large number of REDD Readiness initiatives underway, it would be useful for co-ordination purposes to create a single, publically accessible, registry of REDD readiness projects, demonstration activities and support initiatives.

One of the objectives of this partnership is to provide a platform for technical discussions and exchange of information on market instruments for mitigation. This partnership could represent another forum for co-ordination of market readiness efforts (see Box 11). Furthermore, in some countries the Designated National Authority (DNA) has acquired considerable knowledge and capacity on the development of CDM projects, as well as on carbon market mechanisms and carbon finance more generally. The DNA could in such cases, with additional capacity support as needed, be a point of contact for harmonisation efforts on market mechanisms going beyond CDM.

Box 11. World Bank Partnership for Market Readiness

Taking into consideration the need for capacity building and technical dialogue with respect to carbon market mechanisms, the World Bank, in consultation with a number of developed and developing countries, has proposed to establish a Partnership for Market Readiness. An important principle of the partnership is that as countries are at different stages of development they will approach the use of different instruments at different paces.

Among the main objectives of the partnership for market readiness are: to create a platform to enable policy makers and practitioners to share experiences and information regarding elements of market readiness; provide grant financing to the participating countries in building “infrastructure” for market readiness; and pilot and test new concepts for market instruments.

These objectives will be achieved through the following planned activities:

- Conducting feasibility and capacity assessment for utilising market mechanisms within a portfolio of policy instruments in the context of the mitigation strategies.
- Building or enhancing existing data collection systems and institutional capacity for data reporting and management and design or enhance the existing MRV frameworks.
- Enhancing host-country engagement and responsibility in implementing market mechanisms.
- Facilitating the design of policy and legal frameworks for implementation of market instruments.
- Piloting and testing of new instruments to generate understanding and learning of their operational aspects.

This Partnership is to be supported through a capacity building trust fund. Depending on the size of the fund²⁰, the partnership would provide packages of capacity building support to 10 - 15 countries, mainly targeting middle income countries. The tool for submitting an expression of interest for participation would be a template market readiness capacity assessment note. The template assessment note would help countries make an early assessment of existing capacity and what gaps may need to be filled. After the partnership becomes operational, a small portion of the grant would be allocated to those countries that have submitted an assessment note, in order to assist them with conducting a comprehensive assessment of their capacity building needs and to prepare a capacity building support package (World Bank, 2010b).

The World Bank already has experience with similar activities in the context of REDD through the Forest Carbon Partnership Facility (FCPF), and the associated REDD Readiness mechanism (see Box 7). The new partnership proposal would be a welcomed addition to international efforts in building capacity for scaling up carbon markets in developing countries in sectors other than REDD. The draft partnership design document highlights the need to build on ongoing efforts in countries and to coordinate capacity building efforts with other organisations and governments. From this perspective the partnership could, in addition to its capacity building role, be one forum for the co-ordination of efforts on market readiness.

²⁰ While the overall size of the fund will be determined by a number of factors such as the types of activities to be covered, depth of capacity building and piloting, and the number of participating countries, the initial target size of the fund is US\$100 million for grant financing. It is envisaged that the Partnership would become operational once contributions of US\$10 million have been pledged. The Partnership is expected to be officially launched by COP 16 in Cancun, Mexico.

5. Conclusions

This paper has reviewed market readiness elements that need to be considered for different types of new market mechanisms. These are summarised in Table 6 below. The main experiences with building market readiness to date include efforts to develop the EU ETS and the CDM. A great deal of knowledge has been gained through the establishment of EU ETS, including from the capacity building programme for new member states. Lessons learned from this capacity building effort would be useful in preparing market readiness programmes for new market mechanisms in developing countries. In the case of CDM much capacity, partly because of the project-based and bottom-up nature of CDM, has been built through learning by doing in addition to bilateral and multilateral CDM capacity building programs. It will be important to build on this when considering capacity building efforts for other market mechanisms as well. At the same time, new broader market mechanisms such as emissions trading systems or NAMA crediting may require a more structured approach to building market readiness than was the case for CDM. Both the International Carbon Action Partnership (ICAP) and the World Bank's proposed Partnership for Market Readiness are institutions and initiatives that could provide more structured and coordinated approach to building market readiness for a post-2012 carbon market.

The need for further analytical work in the area of market readiness, and its specific focus, will depend in part on how UNFCCC negotiations evolve at COP16 and beyond. Further clarity on the design of new market mechanisms would allow bringing the analytical work on market readiness forward in terms of more specific technical, policy and institutional requirements. Future work could then focus on specific domestic implementation frameworks. However, the current draft texts coming out of the Ad Hoc Working Group on Long-Term Co-operative Action (AWG-LCA) and the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) only refer to forwarding a decision on modalities and procedures for new market mechanisms to COP17 in South Africa (UNFCCC (2010a) and UNFCCC (2010b)). The prospects for further clarity from the UNFCCC process on the development of new market mechanisms in the short term are therefore limited. Bottom-up market developments may provide additional guidance on analytical needs in the area of market readiness.

Based on a more complete list of current market readiness activities (see Annex 1) a comparative analysis could examine early lessons learned from market readiness efforts, as well as possible needs and use of coordination of these initiatives among donor countries. Further clarity on new market mechanisms along with a full picture of existing activities could also allow for analysis and potentially a prioritisation of capacity building efforts by sector and country.

Possible text worth considering in the Cancún conclusions is to encourage pilot activities for new market mechanisms, along the lines of Activities Implemented Jointly (AIJ) launched at COP1. AIJ was initiated through the UNFCCC framework but under the current negotiation circumstances a perhaps more likely approach would be to promote independent pilot activities which are reported back to the UNFCCC. Such demonstration activities were encouraged for REDD-plus in Decision 2/CP.13²¹ and were successfully kicked off afterwards. This Decision also provided Indicative Guidance for REDD demonstration activities. Similarly, if any text on pilot activities for market mechanisms emerges out of Cancún, it may be useful to highlight the elements on which pilot activities should focus in their development. These could draw on the various building blocks identified in this paper.

If such text is not feasible to include in the Cancún text, an area of capacity-building that may be worth considering in the near term is to provide support for developing country-led workshops, with like-minded governments who are considering the introduction of market-based approaches for domestic climate change policy. This could include Mexico, Chile, Indonesia, China, India, as well as other developing country governments interested in participating.

²¹ "Reducing emissions from deforestation in developing countries: approaches to stimulate action".

Another area linked to the topic of market readiness is the question of market fragmentation. A more bottom-up carbon market post-2012 will also impact market readiness efforts. Additional challenges may arise with regard to MRV and registry issues in particular. A more fragmented market could lead to a proliferation of unit types and a different accounting framework may be needed under such a system. Any future work on post-2012 accounting framework would therefore further inform the findings in this paper, and such work should also consider impacts of a new accounting framework in terms of market readiness and capacity needs in developing countries.

Table 6: Summary table of building blocks for market mechanisms

Building blocks and elements	Description	Domestic market mechanisms (e.g. emissions trading system)	Crediting-based mechanisms (e.g. NAMA-crediting)
Technical			
Coverage	Defining the scope of the market mechanism by deciding which sources are covered, e.g. based on a minimum threshold.	Decision needed on system boundary (e.g. large installations only)	If sector-based need decision on boundary For policy-based NAMAs boundary can be difficult to monitor /account for (e.g. public transport policies)
Reference/base line year emissions	Choosing a reference year(s) as the basis for emissions baselines or cap. Collecting data to identify historical emissions and project future emissions. This includes deciding on the type of baseline (intensity-based or absolute)	Data needed on emissions and in the case of intensity-based baseline also on output. Data normally needed at entity level. Baseline and allocation decided domestically.	Emissions data needed at the sector or NAMA-level plus output data in the case of intensity based baseline (data availability could be an issue).
MRV system	Providing the environmental integrity of the market mechanism. The measurement and reporting parts can be developed as part of the work with defining reference year and projected emissions. Verification could involve developing standards for third-party verifiers but a system could also rely on sample checks and penalties rather than systematic verification.	Installation-level MRV of emissions (and output if intensity-based baseline) needed. An upstream liability normally involves fewer participants and may lower MRV requirements. If there is a risk of leakage MRV outside system boundaries may also be needed, although this complicates matters. MRV requirements are domestic domain but linking to international markets may imply needing to take outside considerations into account.	MRV of emissions (and output if intensity-based baseline) at sector/NAMA-level. MRV may be subject to minimum international requirements to gain access to international crediting mechanisms. If there is risk of leakage, MRV outside NAMA/sector boundary may be needed.
Registry	Developing the system for tracking either the issuance of credits or the allocation of allowances, and the net position of a country/entities.	A registry is a key part of the infrastructure allowing transactions to take place in the trading period.	A registry is needed but only to record credits issued <i>ex post</i> and therefore does not necessarily need to be held domestically.
Transaction log	Needed to track domestic transactions. For <i>ex post</i> issuance of credits, the existing Kyoto Protocol international transaction log would suffice.	A domestic system of tracking permit transfers e.g. a transaction log is needed for trading across registry accounts.	A domestic transaction log not necessary as long as there is an international transaction log, meeting functions similar to those of the Kyoto Protocol ITL.
Policy			
Identify mitigation potential and cost	Identify possible emission reduction opportunities at different costs at national and sectoral level – set the national or sectoral environmental goal (could also be multiple sectors). Related to <i>coverage</i> .	Needed to inform overall policy design, including assessing suitability of market instruments.	Needed to inform overall policy design, including adequate policy instrument and benefit of international carbon market support.
Selecting appropriate policy design	Enhance policy coherence and effectiveness. Choosing appropriate market-based instruments (could set up e.g. a pilot ETS for one sector and crediting for another). <i>Ex ante</i> analysis needed to assess interactions and avoid unintended consequences. Address distributional implications of policy e.g. reform of fossil fuel subsidies.	Needed to assess value/effectiveness of domestic market mechanism, including deciding on point of obligation, i.e. upstream (wide coverage with few entities) or downstream (more direct incentives to more entities).	Needed to assess value/effectiveness of crediting mechanisms, including deciding on point of obligation, i.e. upstream (wide coverage with few entities) or downstream (more direct incentives to more entities).

Building blocks and elements	Description	Domestic market mechanisms (e.g. emissions trading system)	Crediting-based mechanisms (e.g. NAMA-crediting)
Policy (continued)			
Sharing possible carbon revenues	Deciding on how to allocate domestically any revenues obtained via international crediting mechanisms and how to provide incentives for individual investors when operating under non-project based crediting mechanisms.	Done through the initial allocation of individual entities' emission goals.	Need clarity <i>ex ante</i> on revenue distribution to create transparency and gain support from individual investors. Multiple options for channelling revenues (distributing credits, tax rebates, feed-in tariffs)
Policies to encourage pilot activities	Encourage pilot mechanisms or voluntary agreements with private sector for market based activities (e.g. voluntary emissions trading). Could be set up at sectoral level, province level, cluster of business sectors, etc.	Pilot or start-up phase often needed to assess operational effectiveness of the market mechanism.	Pilot activities often needed to test new mechanisms and build knowledge and support among covered entities.
Institutional/legal			
Responsibility for collecting emissions data	Assigning domestic institutional responsibility for collecting base year and emissions data. The agency in charge of the national greenhouse gas inventory could take on this responsibility.	Need clear domestic responsibility for this but not necessarily just within one institution. Coverage of mechanism may impact range of institutions involved.	Need clear domestic responsibility for this but not necessarily just within one institution. Coverage of mechanism may impact range of institutions involved.
Issuance of trading units	Assigning institutional responsibility for <i>ex-ante</i> allocation of allowances or <i>Ex post</i> issuance of credits.	Domestic policy matter through which allowances are allocated or auctioned.	Responsibility for issuance of credits could rest with the international framework or with domestic authorities.
GHG and performance verification	Allocate responsibility for accreditation of verifiers; conduct accreditation.	Domestic policy defines accreditation requirements, but some systems rely on audited self-reporting rather than third-party verification.	Depending on the mechanism accreditation may be subject to international rules (Article 8 of the Kyoto Protocol outlines the <i>ex post</i> review process).
Compliance	Establishing a legal framework creating a credible enforcement system for compliance.	Penalties for non-compliance (e.g. fines) are needed to ensure credibility and value of traded units.	As credits are issued <i>ex post</i> compliance is less of a concern, but if sale of credits is allowed before end of crediting period, or permanence is an issue (e.g. REDD), compliance becomes relevant.
Regulating trading	Assigning responsibility for overseeing trading of allowances or credits and integrating this into the existing legislation, including defining accounting rules and tax treatment for trading units.	Clear responsibility and integration with legal framework is needed to ensure clarity for investors as well as international recognition and trust in trading system.	A crediting mechanism does not involve international two-way trading, but accounting and tax rules for revenues from sale of credits must be defined.
Stakeholder involvement	Carry out consultations with relevant stakeholders impacted by the introduction of a market instrument.	Needed to gain support and build knowledge and institutional capacity, and ultimately facilitate implementation of a domestic market mechanism.	Needed to gain support and build knowledge and institutional capacity, and ultimately facilitate implementation of a crediting mechanism.

ANNEX I: Current capacity building activities dedicated to market readiness activities

The table below includes examples of capacity building activities to develop and implement market mechanisms in non-Annex I countries.

Supporting country	Implementing agency	Target country/ region	Focus	Short description of activity
Germany – International Climate Initiative	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	non-Annex I	Broad, but includes preparatory work on developing NAMAs, LEDS and MRV systems	Development and testing of national and regional carbon markets / emissions trading systems and renewable energy markets, economic climate protection measures such as fiscal incentive schemes, implementation of sectoral approaches and emission benchmarks, and Programmes of Activities Establishment and improvement of sectoral and national inventories and reports on the use of market mechanisms
11 EU Member States, US States members of RGGI and WCI, Australia, New Zealand, Norway, Tokyo Metropolitan Area. Observers: Japan, Republic of Korea, and Ukraine.	International Carbon Action Partnership	All countries and governments with interest in emissions trading systems.	Cap-and-trade market development	Provides assistance to all governments interested in the development and possible linking of emissions trading systems. Activities include international workshops on experience sharing, an annual summer school and more targeted capacity-building in MR.
Multi-lateral	Inter-American Development Bank (IADB)	Colombia	Developing a voluntary domestic carbon market	Supports the development of a Colombian-based market platform for emission reductions units that can be accessed by companies and institutions interested in mitigating or offsetting their carbon footprint. Creating a nationally-based program for corporate and institutional voluntary mitigation.

Supporting country	Implementing agency	Target country/ region	Focus	Short description of activity
Japan	Institute for Global Environmental Strategies (IGES)	Cambodia China India Indonesia Lao PDR Thailand Philippines	CDM capacity building activities for Asian region	<ul style="list-style-type: none"> • Supporting institutional framework for the DNA in host countries • Supporting CDM project identification and development (PDD development and technical assistance) • Providing information and raising awareness on the CDM (Development of CDM in Charts and related CDM databases) • Proposing CDM reform based on experiences from capacity building activities
United Kingdom	Foreign & Commonwealth Office (Strategic Programme Fund)	China	Sectoral capacity building for market mechanisms	<ul style="list-style-type: none"> • Policy options for low-carbon electricity generation (2010-2011) • Technical assistance of energy savings approach in the cement sector of the Shandong Province (2010-2011) • Sectoral crediting templates for cement, transport and power generation (2008-2009) • Capacity building in the iron and steel sector (2008-2010)
United Kingdom	Foreign & Commonwealth Office (Strategic Programme Fund)	China	Carbon market development	<ul style="list-style-type: none"> • Carbon pricing through tradeable intensity standards (2010-2011). • Learning from international capacity building for China's carbon trading system
United Kingdom	Department of Energy and Climate Change	India	Energy efficiency	Sharing lessons and building capacity relevant to the design of the Indian 'Perform, Achieve, Trade' (PAT) scheme.
United Kingdom	Department for International Development	Not specified (project is currently out to tender)	Carbon market development	Piloting greater use of standardised baselines in the CDM - a project that will pilot specific practical examples of standardised approaches (e.g. performance standards and default emissions factors).

Supporting country	Implementing agency	Target country/ region	Focus	Short description of activity
Nordic countries (Denmark, Finland, Iceland, Norway, Sweden)	Nordic Council of Ministers and Nordic Environment Finance Corporation (NEFCO)	To be determined	Feasibility study with a possible pilot project for testing a “Nordic Scaled-up Mitigation Initiative” supporting a comprehensive domestic climate policy, including crediting.	The project is still in an initial phase but together with an interested partner country a suitable sector will be chosen for a first feasibility study during spring 2011. This study will result in a 2-3 year pilot programme with the aim to test the feasibility of implementing a scaled-up mitigation support approach. The approach tested will focus on offering a broad range of support to a domestically developed comprehensive climate mitigation policy. Support offered includes financial and technical support, and could in the longer term also include crediting.

ANNEX II: Voluntary carbon markets and exchanges

The voluntary carbon market is often divided into two segments:

The Chicago Climate Exchange (CCX), which is a voluntary cap and trade system, where members voluntarily join the CCX and by doing so agree to its legally-binding reduction policy. What distinguishes CCX from the rest of the voluntary market is that it is membership based cap-and-trade system where joining is voluntary but legally binding once you join.

The over-the-counter (OTC) voluntary offset market. The OTC market is driven by either voluntary or pre-compliance buyers. In the case of voluntary buyers the demand often comes from corporate social responsibility motivations to offset their own emissions. Examples of current government-based voluntary offset programs include:

- The US EPA Climate Leaders program, which encourages industrial partners to develop comprehensive climate change strategies with reduction goals. Companies complete a corporate-wide inventory of their greenhouse gas emissions and report annually on their progress to the US Environmental Protection Agency (EPA).
- Japan's Keidanren Voluntary Action Plan on the Environment, under which member companies have voluntarily committed to reducing their average emissions from 2008 to 2012 to below 1990 levels. All offset purchases are accounted for in a national registry system and used to meet Kyoto commitments. Although a voluntary system companies are driven to meet targets from a reputational perspective.
- The Canadian GHG Clean Start Registry, provides opportunities to Canadian businesses seeking to gain recognition for their greenhouse reduction efforts and by requiring use of the ISO14064 standard ensuring that those claims are made in a transparent and standardized way.

In the OTC market there is also an emergence of exchanges that accommodate or explicitly target voluntary offset transactions, providing an electronic platform for voluntary carbon market players to clear contracts for offsets. These platforms are different from the CCX in that they are not imbedded within a cap and trade program. Some examples include:

- Carbon TradeXchange, enables participants to select VERs in their registry account for sale on a "spot" basis on the exchange, the first of its kind.
- China Beijing Environment Exchange (CBEEEX), membership of CBEEEX requires compliance with national policies and rules but is not restricted to a Chinese audience. The CBEEEX platform's emissions trading service function enables the trade of certified emission reductions (CERs) and most international verified emission reductions (VERs).
- Tianjin Climate Exchange (TCX), focus on VER trades and carbon neutral services but also promotes energy efficiency through an intensity-based emissions trading. Any entity complying with national regulations and policies can utilize TCX's settlement and other services.
- Shanghai Environment Energy Exchange (SEEEEX), originally a trading platform for energy and environment related stock rights, asset rights and intellectual property rights, the SEEEEX is now launching a standard outlining quality criteria for voluntary carbon credits traded on the exchange.

- Climex, a European-based trading platform for environmental commodities entered into the voluntary carbon market in 2007 as the first platform to execute VER auctions.
- Montréal Climate Exchange (MCEX), provides an electronic trading platform for companies to trade emissions offsets and help industry meet their own reduction targets.
- The World Green Exchange, is US-based and offers a marketplace for trading of renewable energy certificates (RECs) and VERs.

Source: Hamilton et al. (2010)

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