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An Overview of the Carbon Trading Landscape: Possibilities and Pitfalls for South Africa

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South African Institute of International Affairs

African perspectives. Global insights.

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ABSTRACT

In order to meet its international and domestic carbon emissions requirements, South Africa needs to substantially rethink its current energy and industrial trajectories. This represents a massive challenge for any country with such a high dependence on coal as part of its energy mix – especially in light of retaining its global competitiveness and maintaining its economic growth.

This paper interrogates the opportunities and pitfalls of international carbon trading and market schemes, as a means to reduce carbon emissions and increase the participation of developing countries in voluntary mitigation activities.

To date, African countries remain marginalised in the debate and underrepresented in the local generation of carbon credits. While South Africa fares slightly better than the rest of the continent, it still faces challenges of securing conventional finance to initiate projects, and the adequate capacity to deal with the numerous infrastructural, technical and procedural hurdles. Policymakers need to be aware that domestic regulatory and institutional policy processes can both facilitate or hinder the inclusion of South Africa in these markets.

It is clear that project funding will only be guaranteed when there is more clarity in the expected outcomes of the multilateral process, and increased policy certainty in the future scope and nature of the carbon trading system and the Clean Development Mechanism. The global demand for carbon credits exists but it is essential to first obtain the necessary financing and emerge from the regulatory process more quickly.

ABOUT THE AUTHORS

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ABBREVIATIONS AND ACRONYMS

AAU	assigned amount unit
CCN	carbon credit note
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CER	certified emission reduction
EU	European Union
EUA	European Union allowance
EU ETS	European Union Emission Trading Scheme
GHG	greenhouse gas
JI	Joint implementation
LDC	Least developed country
LTMS	long-term mitigation scenario
MtCO ₂ e	metric tonne carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change

INTRODUCTION

In the global climate change regime of the future, more stringent emissions targets for South Africa and other large developing countries are inevitable, as the second phase of the Kyoto Protocol contains a mandatory cap on emissions levels. Effective international market-based mechanisms and regulatory-based policies are urgently needed to encourage countries to meet their emissions targets, while developing countries should participate voluntarily in mitigation activities for reducing emissions. For South Africa to realise its domestic mitigation targets, government needs to encourage renewable energy projects and investments that can substantially decrease the nation's carbon footprint. As discussed below, African member states remain marginalised in the debate on the future of a post-2012 regime. Developing countries, including South Africa, are also underrepresented in the Clean Development Mechanism (CDM) – the local generation of carbon credits through the Kyoto's market mechanisms.

SOUTH AFRICA'S PARTICIPATION IN THE FUTURE CLIMATE REGIME

Despite the ambiguity surrounding the future of the global climate change regime, once the existing Kyoto Protocol lapses in 2012, new emission targets will undoubtedly include more stringent commitments and timeframes for developing and developed countries. While some uncertainty also exists regarding the nature and scope of trade in carbon credits (and particularly the future of the CDM), the general consensus is that carbon markets will exist beyond 2012 and are important mechanisms for involving developing countries further in the voluntary market.

Against this background, South Africa recently introduced an ambitious strategy to reduce its domestic carbon emissions, which includes a framework to improve the uptake of domestic renewable energy projects. Although the country adopted a carbon tax on motor vehicles in September 2010, the introduction of a local carbon market in the next decade should be considered. Carbon trading has advantages that would offset the disadvantages of a carbon tax, and could be part of a wider policy mix in government's efforts to mitigate against the effects of climate change.

South Africa's greenhouse gas (GHG) emissions rank among the top 20 in the world and contribute 1.8% to global emissions.¹ In order to deal with these mitigation challenges, South Africa undertook a long-term mitigation scenario (LTMS) exercise in 2006, to complement its national policy document *Vision, Strategic Direction and Framework for Climate Policy*. The exercise's main objective was to explore feasible ways of reducing South Africa's emissions levels without jeopardising economic growth. The LTMS recognises a scenario in which South Africa's GHG emissions will peak in the next two decades, then plateau around 2030–2035 and start to decline thereafter. This path is recognised as the most sustainable one in terms of projected growth and the major source of energy (coal-fired electricity) powering the growth.² The conclusion was that South Africa must achieve a peak, plateau and decline in carbon emissions from 2030–2035, through reduced coal dependence, increased use of renewable energy sources and adoption of clean energy technologies. South Africa's commitment to the reduction of carbon emissions will be

enshrined in a climate green paper in 2010, followed by a white paper in late 2011 or early 2012. Thereafter, it is hoped that the policy will be translated into a legislative, regulatory and fiscal implementation package.

In December 2009, the United Nations Climate Change Conference produced the Copenhagen Accord, in which South Africa pledged to reduce its projected ‘business as usual’ emissions growth by 34% in 2020, and by 42% in 2025. However this pledge is conditional upon receiving assistance, as explained by one of the negotiators: ‘The extent to which this action will be implemented depends on the provision of financial resources, the transfer of technology, and capacity building support by developed countries.’³

These are ambitious targets for any developing country, and especially for South Africa given its emissions profile and mineral-energy complexities. South Africa’s per capita emissions are higher than those of China and India and exceed the global average. They are attributed to the country’s reliance on coal energy sources and energy-intensive industries (such as mining, iron and steel, aluminium, ferrochrome and chemicals).⁴

In South Africa, a shift away from coal dependence to dedicating resources to climate mitigation is often perceived as a trade-off with other pressing development priorities, such as economic growth and job creation. However, environmental analysts are quick to dispel this assumption and highlight the opportunities for simultaneously addressing emissions reductions, ensuring sustainable economic growth, new green jobs⁵ and investment, through the increased use and deployment of renewable energy resources. The international carbon trading and markets schemes – both considered key components of national and international attempts to mitigate the growth in GHGs – also offer opportunities to operators in developing countries.

The Kyoto Protocol offers three such market-based mechanisms aimed at helping developed countries meet their international emissions targets through transfers in carbon credits. The carbon market, established through these mechanisms, allows for the generation and trade of carbon credits and allowances.⁶ They include:

- 1 International emissions trading: the trading of allocated allowances and carbon credits, which can be used either to cover a country’s shortfall in assigned amount units (AAUs) under Annex B of the Kyoto, or for countries or companies to sell their surplus of credits.
- 2 The CDM: investments by developed countries in projects that reduce emissions in developing countries.
- 3 Joint Implementation (JI): investments by a developed country in projects that reduce emissions in countries predominantly from Eastern Europe (Annex B states).

Joint Implementation is reserved for projects between Annex 1⁷ (40 industrialised and countries in transition) and Annex B member states.⁸ CDMs however are implemented in developing countries, such as South Africa. They can be implemented both by public or private entities from Annex 1 member states, and unilaterally by public or private entities from within a developing country. Using any of above three mechanisms, the public or private entity can receive carbon credits for emission reductions that take place in another country; these credits are either ‘banked’ or traded on various markets.

CARBON TRADING AND CARBON MARKETS

Carbon trading involves the selling and purchasing of emissions credits generated by a carbon-reduction project, which are distributed through a market or exchange. These trading initiatives are intended to increase private and public sector participation in investments that enhance the mitigation of GHGs. Under the CDM, a carbon credit – or certified emission reduction (CER) – is generated for each tonne of carbon that is captured or prevented.⁹ CERs are interchangeable with several other kinds of carbon credit, which vary according to the purchaser and the types of credits being exchanged. For example, in the European Union (EU), credits are created by companies that have managed to bring their emissions below a certain level, based on EU ‘allowances’ (EUAs) granted by their governments. The EU allows companies that have exceeded their ‘quota’ (or EUAs) to make up the shortfall by either purchasing EUAs from other companies that have a surplus, or buying carbon credits such as CERs.¹⁰ The possibility exists to link the European Union Emission Trading Scheme (EU ETS) to the Kyoto’s CDM and JI in order to help countries meet their targets.

Carbon trading, which started tentatively before the Kyoto Protocol was ratified, is now one of the world’s fastest growing markets. The market was worth \$63 billion in 2007, with 70% of trade taking place within the EU ETS – the EU’s internal market that is now the largest operating emissions trading market globally. Under the EU ETS, some 10 000 energy-intensive plants in the EU are able to trade carbon credits, representing 40% of the EU’s total emissions.¹¹ For the period 2008–2012, the EU’s emissions cap has been set at 2.08 billion tonnes of carbon dioxide.

Carbon markets are divided into the following categories depending on the types of standards and methodology used in their verification.

Compliance markets

Compliance markets apply to utilities or industries that trade their allowances, or buy CERs, to meet their legal or Kyoto Protocol treaty requirements, in order to prevent severe penalties and reputational risk for non-compliance. These markets adhere to stringent regulatory and verification methods and standards, to ensure a benchmark for premium quality and price in the carbon offset market, and to confirm their contribution to sustainable development. Clearly projects which undergo this type of verification take longer to generate carbon credits and are therefore more costly. These credits are generally traded on the EU ETS, which by virtue of its size generates the majority of the demand for CERs.

Voluntary compliance markets

Voluntary compliance markets do not follow the above mentioned regulatory framework and credits are accumulated quicker. Credits are traded on the Chicago Climate Exchange (CCX). A company sets its own baseline and emission reduction target (its own allocation plan and target date). The use of viable renewable energy certificates or verified emission reductions can be used to meet these reduction goals.

Voluntary carbon markets

Voluntary carbon markets apply to companies, individuals, and other entities that are not subject to mandatory limits, yet wish to offset their emissions by buying CERs. They are used for various applications, such as for those wishing to 'neutralise' or offset their carbon footprints. There is no emissions allocation, but a carbon footprint is used as the baseline from which emission reduction targets are set. This type of market is a 'buyer-beware' market, as credits undergo less rigorous verification methods and standards.

Table 1 below depicts the overall volumes and values from the trade in carbon markets. The overall carbon market grew from \$63 billion in 2007 to \$126 billion in 2008. Approximately \$92 billion of the 2008 value is from trading in emissions allowances, primary CERs and derivatives, on the EU ETS. The second largest portion is the secondary CDM market for secondary CERs, valued at over \$26 billion. There is clearly a demand for more credits from CDM projects but, as stated in the World Bank's *State and Trends of the Carbon Market 2009*, this demand can only be realised if the projects can 'obtain necessary financing and emerge from their regulatory process more quickly'.¹²

Table 1: Carbon markets at a glance, volumes and values in 2007 and 2008

	2007		2008	
	Volume (MtCO ₂ e)	Value (Million\$)	Volume (MtCO ₂ e)	Value (Million\$)
Project-based transactions				
Primary CDM	552	7,433	389	6,519
Joint Implementation	41	499	20	294
Voluntary market	43	263	54	397
Sub-total	636	8,195	463	7,210
Secondary CDM				
Sub-total	240	5,451	1 072	26,277
Allowances markets				
EU ETS	2 060	49,065	3 093	91,910
New South Wales	25	224	31	183
Chicago Climate Exchange	23	72	69	309
Regional Greenhouse Gas Initiative	Na	Na	65	246
AAUs	Na	Na	18	211
Sub-total	2 108	49,361	3 276	92,859
Total	2 984	63,007	4 811	126,345

Source: *The State and Trends of the Carbon Market 2009*, World Bank¹³

The planned development of a global carbon emissions market will depend on the outcome of a legally binding resolution to limit emissions at the multilateral level, or on ambitious voluntary mitigation efforts of big companies and member states. At present, the largest carbon market is the EU ETS but other markets, such as the CCX and the Western Climate Initiative, also exist.

Should the South African government decide to embark on the establishment of a local carbon market, certain policy interventions would be necessary to link the market to the international system. A domestic market can only be established when South Africa faces a cap on its emissions levels – either as part of its national voluntary commitments (and linked to domestic legislation) or as part of mandatory, international requirements under the second phase of the Kyoto Protocol.¹⁴ The necessary domestic legislation for implementation would need to be in place to support this decision, and South Africa would also have to increase its CDM portfolio.

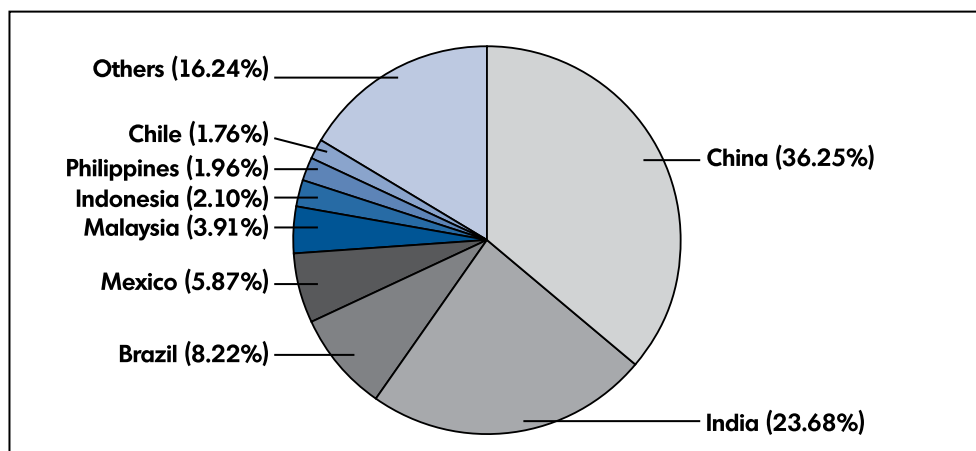
THE CLEAN DEVELOPMENT MECHANISM

As mentioned earlier, the CDM is a project-based mechanism that allows a developed country to implement an emission-reduction project in a developing country. On average, CDM projects globally have reduced more than 300 million tons of GHG per year.¹⁵ Such projects earn saleable CER credits, which can count towards meeting Kyoto targets.

By February 2010, the CDM Executive Board of the United Nations Framework Convention on Climate Change (UNFCCC) had approved approximately 2 044 CDM projects and received 6 101 959 CER requests for issuance. These figures do not reflect projects in the pipeline currently being validated and registered. Globally, 60% of the CDM projects are renewable energy technologies in the energy sector, mainly hydropower, followed by biomass and wind energy. Only 17% are for waste handling and 5% for agriculture. The large amounts of CERs generated through technologies that are considered emissions free explain why the majority of CDM projects are in renewable energy.

While the distribution of CDM projects across the sectoral scope leans toward renewable energy, the distribution across countries is shown in the diagram below: of the 2 044 registered CDM projects worldwide, China accounts for 36.25%, India 23.68%, Brazil 8.22% and Mexico 5.87%. Despite the abundance of natural resources and the potential for large emissions reduction, Africa performs poorly, with only 36 registered projects in eight countries. African countries struggle to secure conventional finance to initiate CDMs, and lack adequate capacity to deal with the numerous technical and procedural challenges.

South Africa should be a sought-after candidate for CDM initiatives, given the country's emissions per capita and carbon intensity – the only one of the top 20 CDM host countries to be located in Africa. The country also has a less risky investment environment and a more sophisticated industrial and financial infrastructure than other African countries.

Figure 1: Registered CDM project activities by host party (Total: 2 044)

Source: Adapted from the UNFCCC, Registered CDM projects by region,¹⁶ <http://cdm.unfccc.int>

However, compared to global figures, the number of CER issuances from CDM projects in South Africa is low: as of January 2010, South Africa's CER issuances were 1 138 467, compared to a worldwide total of 375 064 035.¹⁷ Proposals for more than 100 additional initiatives have been submitted to the Department of Minerals and Energy, South Africa's Designated National Authority.¹⁸ Yet, as of February 2010, only 17 projects were operational in South Africa, of which four have been issued CERs. The majority of South African CDM projects cover biofuels, energy efficiency, waste management, cogeneration, fuel switching, and hydropower, and occur in the manufacturing, mining, agriculture, energy, and housing sectors. Successful projects include the Omnia Fertiliser Nitrous Oxide Reduction project, and the Lawley Fuel Switch project, which have issued 321 234 and 17 032 CERs respectively.¹⁹

To encourage the implementation of more CDM projects in South Africa, and to increase incentives for energy efficiency, on 30 September 2009, two amendments to tax legislation were signed into law: the Special Allowance for Energy Efficiency Savings and the Exemption for Certified Emissions Reductions, which acts as a form of tax relief to 'overcome the market failure associated with environmental protection'.²⁰

POTENTIAL ADVANTAGES AND PITFALLS INVOLVED IN CARBON TRADING

There are potential advantages to establishing a local carbon market in the near future. According to Deloitte's sustainability and climate change manager, Peter Oldacre, 'a local emissions trading system could create a system that is more flexible, more affordable and better suited to the African environment. If the platform was set up through the Johannesburg Stock Exchange, it would encourage local investment in African projects, create transparency and generate trading volumes.'²¹ An increase in investment in CDM projects in South Africa and other African countries would in turn create more jobs, stimulate sustainable development and assist developed (as well as emerging economy) countries in meeting their respective commitments to climate change mitigation.

Although not explicit, technology transfer occurs through the development of clean technologies required for CDM projects.²² CDM projects also create incentives for investing in climate change mitigation and sustainable development, as well as additional revenue, skills-transfer and capacity for adaptation.

Nevertheless, the CDM has encountered a number of challenges and weaknesses, and has been criticised for its unequal regional distribution of projects, lack of concern about environmental integrity and actual technology transfer, complex governance procedures, and questions about its contribution to sustainable development. CDM project cycles are also complex and require extensive specialist knowledge. The stringent regulatory framework and lengthy time period for verifying methodology and validating CER issuances act as barriers to CDM market entry (particularly for Africa), as these factors influence the price of CERs. However, for carbon trading to remain credible, and for CDM projects to provide genuine emissions reductions (as well as technology transfer), stringent verification and validation procedures must be adhered to. Many of these factors are being looked at in the review process of the CDM at the highest political level.

The status of CDM projects in the second phase of the Kyoto Protocol is still uncertain, as emission targets under the existing Kyoto Protocol will lapse in 2012, and to date only voluntary pledges have been made. It seems that the EU will continue to allow CERs from least developed countries (LDCs) in phase III, but whether exceptions will be made for non-LDCs in Africa is still not clear. Contentious political discussions on emissions trading centre predominantly on sectoral targets, nationally appropriate mitigation actions, and the introduction of modalities for the recognition of voluntary emission cuts in developing countries for trading and compliance purposes under the Kyoto Protocol.

Intense discussions at Copenhagen in December 2009 revolved around the reform of the CDM in the above mentioned areas, but also, importantly, the increased scope of the CDM to include additional sectors, most importantly: land-use, land-use change and forestry; carbon capture and storage; and nuclear power.

There is also ongoing discussion about differentiating developing country eligibility and improving access for LDCs and small island developing states (as mentioned previously, Brazil, Russia, India, South Africa and China could face carbon emission caps post-2012), expanding the CDM to include sectoral CDM,²³ and a fund-based mechanism.²⁴ All of these points will have a direct impact on African countries' ability to attract investment and participate more effectively in the CDM market.

The concept of 'additionality' also sparked heated debate. To generate CERs from a CDM project, the project must demonstrate a net reduction in GHG accumulation, by proving that more emissions were reduced than would have occurred in the absence of the project activity.²⁵ However, various environmental non-governmental organisations such as the World Wildlife Fund complain that many projects which do not meet 'additionality' criteria have been classified as such and have received credits, thus allowing 'companies to maintain their domestic emissions without bringing about any new, additional carbon reductions in the project's host country'.²⁶

To refute such criticism, each CDM project must adhere to the stringent verification processes. Trade in carbon credits should not be an opportunity for developed economies to outsource their environmental responsibility to developing economies. Concerns are growing about international offsets, which some view as a wealth transfer, arguing that the current CDM market does not reflect actual reductions in emissions²⁷ or contribute to

sustainable development. CDM projects to date appear to be ways of generating additional income streams through the sale of carbon credits, rather than catalysts for transforming into a low-carbon economy.

The UNFCCC Executive Board should increase the verification and validation capacity, which would be to the advantage of all stakeholders concerned, and would help increase such projects and reduce harmful emissions.

CONCLUSION

Despite potential pitfalls and a general uncertainty about the characteristics of a future carbon market, carbon trading and market-based mechanisms present an opportunity for countries facing challenges in reducing their carbon emissions. It is a financial incentive designed to encourage the proliferation of CDM projects, with the aim of increasing sustainable development and reducing carbon emissions.

Most discussions about the expansion or reform of market mechanisms post-2012 focus on the increased supply of credits from the South, taking CDM as the starting point for including developing countries in the mitigation of climate change. However, many potential market mechanisms and approaches exist beyond the CDM.

It is essential that South African policymakers remain part of the debate about the post-2012 regime. They need to understand which market-based mechanisms offer the greatest potential for the inclusion of LDCs, small island developing countries and African nations in the carbon market, and what is needed to expand and link international emissions trading schemes so that these countries can benefit. A successful implementation of CDM projects and carbon trading can be assured as long as all stakeholders are consulted in the domestic policy process, and as long as the government provides the necessary regulatory and institutional framework to support their inclusion in international markets. The private sector, for example, plays an important role in the investment in carbon projects. These stakeholders have called for increased policy certainty at the multilateral negotiation process, especially regarding the future of the institutions and frameworks surrounding international climate policy. Reliability and transparency of policymaking, and moving quickly towards level legislative playing field are also key priorities for business.

ENDNOTES

- 1 United Nations Development Programme, *United Nations Human Development Report*, 2006. South Africa is ranked as the 12th highest emitter of greenhouse gasses in the world. SA emits approximately 450 million tones of CO₂ per year, and this amount equates to one per cent of annual global emissions.
- 2 Nhamo G, 'Co-Leadership in Climate Change: An Agenda to 2013 and Beyond', *Politikon*, 36, 3, pp. 463–480.
- 3 Van der Merve C, 'More countries pledge to cut emissions under Copenhagen Accord', *Engineering News*, 22 February 2010, <http://www.engineeringnews.co.za/article/more-countries-pledge-to-cut-emissions-under-copenhagen-accord-2010-02-22>.

- 4 Department of Environmental Affairs, *State of the Environment: Per Capita Carbon Emissions*, 2010, <http://soer.deat.gov.za/612.html> and <http://millenniumindicators.un.org/unsd/mdg/Data.aspx>.
- 5 At the Green Economy Summit in Johannesburg on 17 May 2010, in a statement made by South African Minister of Economic Development, Ebrahim Patel: 'It is estimated that some 300 000 jobs could be created in South Africa's renewable energy sector over the next ten years, of which 20 000 is achievable in the next two years'.
- 6 The emissions reductions realised via the various mechanisms illustrated above have different names depending on development criteria of the trading nation (AAUs, CERs, emissions reduction units) but each unit corresponds to one tonne of CO₂.
- 7 Annex I to the United Nations Framework Convention on Climate Change (UNFCCC) sets out a list of developed country parties and economies-in-transition parties that commit themselves under Article 4 to achieve certain quantified emission limitation and reduction objectives. If they have ratified the Kyoto Protocol, these parties can authorise the participation of entities in Clean Development Mechanism (CDM) projects, but are not eligible to be host parties. The countries listed as Annex I are: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, European Economic Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and the United States of America. For further reference, see <http://www.jirulebook.org/3566>.
- 8 JI is similar to the CDM, however JI addresses emissions trading among Annex I countries, while CDM allows Annex I parties to purchase carbon credits from projects undertaken in non-Annex I countries. The main purpose of the JI is to spur investment from industrialised countries to countries that are characterised as 'undergoing the process of transition to market economy', and are identified as Annex B states on the Kyoto Protocol. The following countries are listed as Annex B states: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia and the Ukraine. For further reference, see [http://climate.org/climatelab/Joint_Implementation_\(JI\)#ref_1](http://climate.org/climatelab/Joint_Implementation_(JI)#ref_1).
- 9 One CER represents the reduction of GHG equal to one metric tonne of CO₂ (MtCO₂e).
- 10 However, many EU national governments have imposed limits on the substitutability of CERs for EUAs which is typically at 25% of the total requirement.
- 11 The reduction will be achieved partly within the EU emissions trading scheme, and partly by steps taken in other sectors. The trading scheme will be extended and the number of allowances will be reduced gradually so that the emissions covered by the system decrease by 21% compared with 2005 levels.
- 12 World Bank, *The State and Trends of the Carbon Market*. Washington: World Bank, 2009, p. 3.
- 13 *Ibid.*
- 14 The only carbon trading or investment that has occurred in South Africa has been through the carbon credit note (CCN), released by Sterling Waterford Holdings in 2005 and in 2008. It is the world's first carbon credit derivative and investment product to be listed on an exchange. The CCN is a pre-paid forward contract, which places an obligation on the issuer to deliver either a carbon credit or the cash equivalent on the delivery date. Carbon credits are the underlying security of the CCN, and credits are obtained by contracting with various countries through intermediaries. CCN investors do not participate directly in CDM projects. It allows

- South Africans to invest in the overseas carbon market and benefit from the hedge fund characteristics of this instrument without affecting their offshore allowances.
- 15 Ndongsok D, 'CDM in Africa: Facing the Hurdle of Conventional Finance', *Ecosystem Marketplace*, 16 September 2009, http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=7128§ion=home.
 - 16 The pie chart illustrates the geographical spread of CDM projects. As of 10 July 2009, of the 1 718 CDM projects that are fully registered with the UNFCCC, Asia and the Pacific have 1 251, Latin America and the Caribbean have 427 and Africa has 31. This graph is updated daily and can be accessed at <http://cdm.unfccc.int/Statistics/RegisteredProjByRegionPieChart.html>.
 - 17 *Ibid.*
 - 18 The CDM project developer submits the project plans to the Designated National Authority, who gives final approval after they have assessed the sustainable development criteria of the project.
 - 19 See the UNFCCC website for regular updates of CER issuances. This data can be accessed at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1162558371.82/iProcess/SGS-UKL1236681217.02/view> and <http://cdm.unfccc.int/Projects/DB/DNV-CUK1135341553.72/iProcess/SGS-UKL1189699960.07/view>.
 - 20 For further information, see <http://www.sustainabilitysa.org/CarbonTrading/FriendliertaxtreatmentonCarbonCredits.aspx> and <http://www.pmg.org.za/files/docs/090901explanatorytaxlaws.pdf>.
 - 21 See <http://allafrica.com/stories/201010070147.html>.
 - 22 Brewer T, 'Climate Change Technology Transfer: a new paradigm and policy agenda', *Climate Policy*, 8, 2008, pp. 516–526.
 - 23 A sectoral CDM is to encourage developing countries to enact policies that make relevant sectors (energy, industrial, forestry etc) less carbon intensive over time – thus further mainstreaming climate considerations into economic policy decisions.
 - 24 Murphy D, Cosby A & J Drexhage, 'Market mechanisms for sustainable development in a post-2012 climate regime: Implications for the development dividend', *Perspectives Series*. Denmark: United Nations Environment Programme, 2008.
 - 25 According to Article 12.5 of the Kyoto Protocol, activities must generate emission reductions additional to any that would have occurred in the absence of the project activity.
 - 26 See <http://www.climatechange.org/content.asp?ContentID=4781>.
 - 27 Wara M & D Victor, 'A realistic policy on international carbon offsets', PESD Working Paper, 74. Palo Alto: Stanford University, 2008.

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