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Title

**Carbon assets in a constrained global climate policy
regime: International perspectives and implications for
Africa**

by

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Carbon assets in a constrained global climate policy regime: International perspectives and implications for Africa

ABSTRACT

Carbon assets (also known as carbon credits) emerged from a need to address global warming that leads to climate change. Carbon assets are defined as greenhouse gas (GHG) emission reductions or removals generated by a project when project emissions are less than those that would occur in the absence of such. The carbon assets were originally instituted from the Kyoto Protocol of 1997. The Kyoto Protocol is a legally binding implementation instrument to the United Nations Framework Convention on Climate Change of 1992. The Kyoto Protocol stipulates that developed countries jointly reduce GHG emissions by 5.2% from 2008 to 2012. Hence the need to reduce GHG emissions then creates demand for carbon assets. Among the carbon assets from the Kyoto Protocol are: the Assigned Amounts Units, Certified Emission Reductions and Assigned Amount Units. Various other mandatory carbon assets emerge from domestic tax regimes. The voluntary carbon market has also created other carbon assets. This paper seeks to answer the questions: what are carbon assets? Will the market for carbon assets continue to exist without a legally binding global climate policy regime and how will Africa be affected?

Key words: Carbon assets, Africa, Kyoto Protocol, climate change policy regime

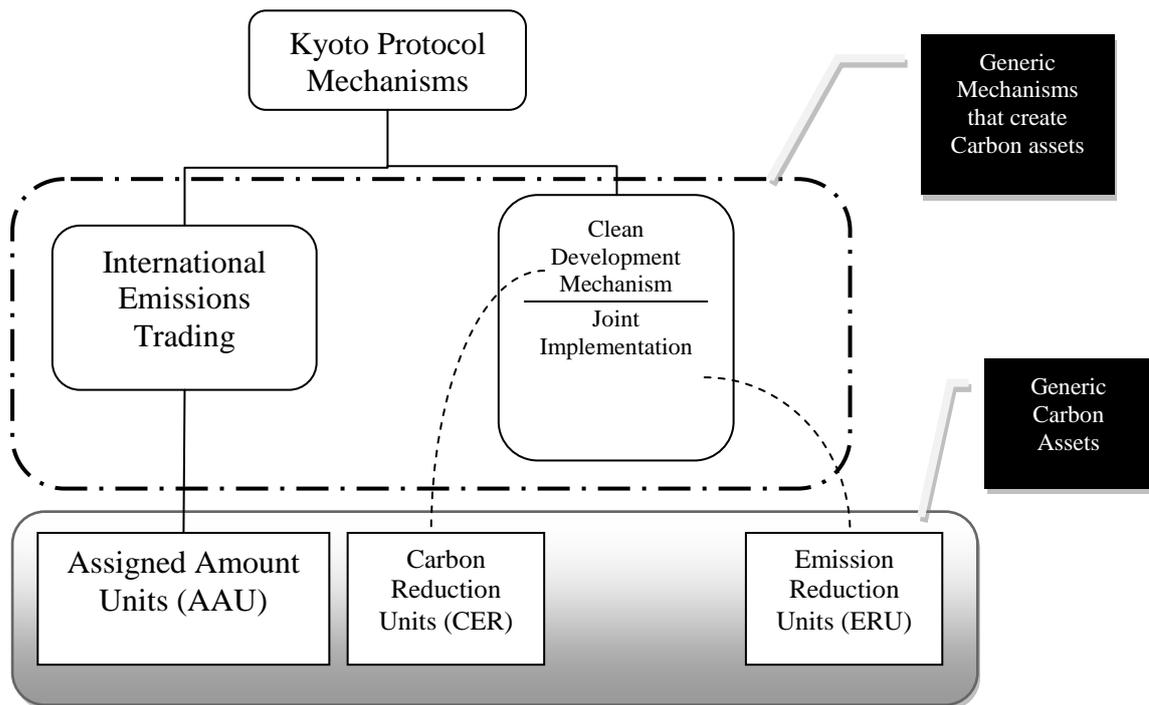
INTRODUCTION

The world over individuals, corporates, financing institutions and governments are finding opportunities emerging from the need to address climate change in new ways. Such opportunities and new ways include carbon assets and engagement with the carbon market. The focus of this paper will be on understanding the carbon assets and how these have been used in mitigation climate change globally and in Africa. Since there are so many of such carbon assets, deliberations will be limited to the Kyoto Protocol's Clean Development Mechanism (CDM), the Joint Implementation (JI) and the voluntary carbon assets like the Voluntary Carbon Unit (VCU) or Voluntary Carbon Standard (VCS) and Reducing Emissions from Deforestation and Forest Degradation – commonly known as REDD. The

paper will also deliberate on how Africa is going to be affected with regards to carbon assets as global leaders take longer to agree on a post Kyoto Protocol framework. The existing framework is the Copenhagen Accord, which is a political agreement with the UN backing.

The failure to conclude a new climate treaty in Copenhagen in December 2009 puts a dumper in terms of carbon assets and related markets. As indicated earlier, carbon assets and related markets were instituted from the Kyoto Protocol. The Kyoto Protocol came into force in February 2005 and compels 37 developed countries to collectively reduce their GHG emissions by 5.2% between 2008 and 2012 based on 1990 levels (UNFCCC 1997). This scenario creates the demand for carbon assets, thereby establishing the carbon markets. In the Kyoto Protocol is stipulated three market based mechanisms by which GHGs can be reduced namely: the JI, Emissions Trading (ET) and the CDM. A summary of the carbon asserts under the Kyoto Protocol regime is shown in Figure 1.

Figure 1: The Kyoto Protocol and carbon assets



Source: Authors

Carbon assets are defined as “greenhouse gas (GHG) emission reductions generated by a project when project emissions are less than those that would occur in a baseline scenario” (World Bank 2006: 1). The carbon assets come in two major markets: the regulated

(compliance) and the voluntary market (Markit 2009). Although carbon credits are generic they differ from region to region and from country to country. The compliance carbon credits include the: Certified Reduction Units (CER) of which is the most common and originates from the Kyoto Protocol's CDM projects in developing countries; Emission Reduction Unit (ERU) which is similar to the CER, but based in the developed nations under the Joint Implementation; Emissions Trading, popularised by the EU under its Emissions Trading Scheme (ETS) that generates the European Allowances (EUAs) as credits; and the New South Wales Greenhouse Gas Abatement Certificate (NGAC). The NGAC certification process is very comprehensive and goes beyond the Kyoto Protocol requirements (Crossley 2005). The voluntary carbon credits include the Voluntary Carbon Unit (VCU) or Voluntary Carbon Standard (VCS) credit, which is a robust global standard for approval of credible voluntary carbon credits (Markit 2009). This paper has twin objectives: to continue raising awareness regarding the new asset regime; and document progress and policy directions regarding carbon assets and Africa.

THE EVOLUTION OF CARBON ASSETS

There are over 30 atmospheric GHGs but only 6 attract carbon credits under the Kyoto Protocol (UNFCCC 1997) and these are carbon dioxide (CO₂), methane (CH₄), Nitrous oxide (N₂O), perfluorocarbons (C_xF_x), hydro fluorocarbons (HCFs) and sulphur hexafluoride (SF₆). These gases have been regarded as the prominent ones in affecting the disastrous climate change thus in reducing them, countries earn carbon credits. In terms of the Carbon assets and markets, there is need for a common denomination of the reduction point of GHGs so as to make them tradable and this has resulted in making CO₂ as the base gas (Deenapanray 2009). Table 1 shows how the carbon assets relate to conversion factors in terms of the main GHG emissions and their global warming potential.

Table 1: Carbon assets and conversion factors

<i>Greenhouse gas (GHG)</i>	<i>Global Warming Potential (GWP)</i>
Carbon dioxide	1
Methane	21
Nitrous Oxide	310
Perfluorocarbons	6,500 – 9,200
Hydrofluorocarbons	140-11,700
Sulphur hexafluoride	23,900

Source: Authors, after UNFCCC (2010d)

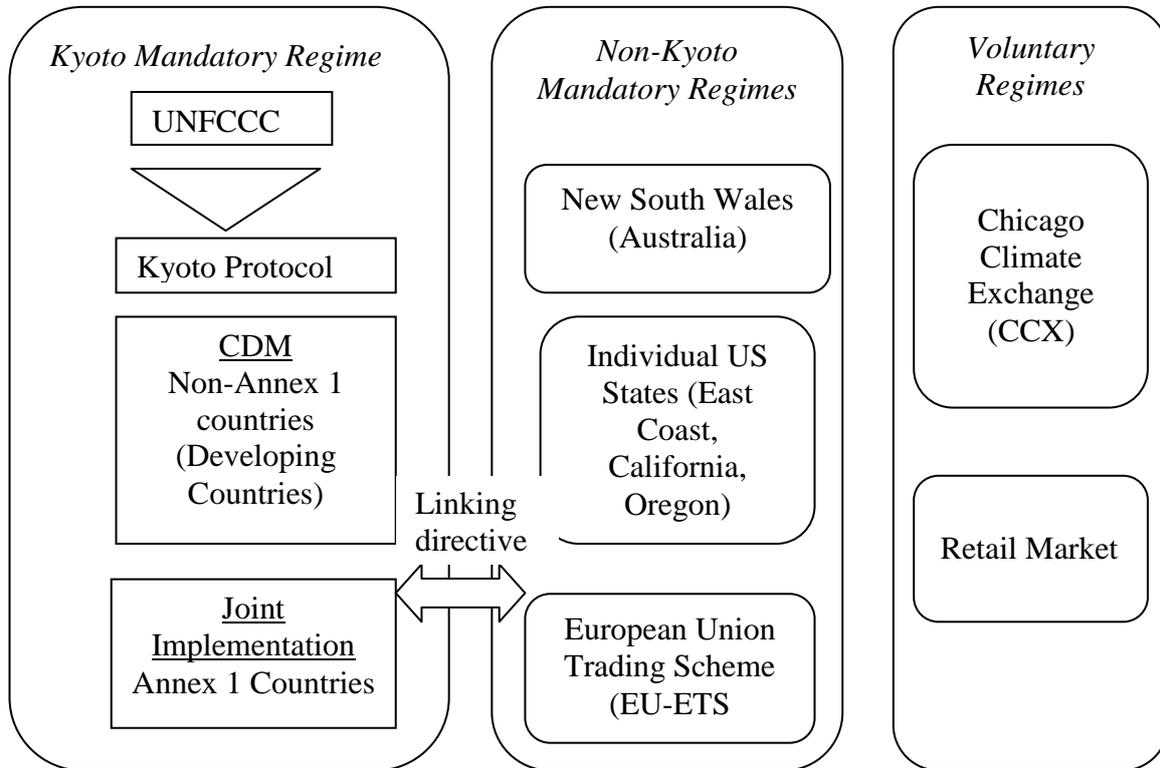
Carbon credits are measured on a relative scale based on carbon dioxide (CO₂) and global warming potential. For example (see Table 1), methane (CH₄) is 21 times more potent as a GHG than CO₂ and sulphur hexafluoride is 24,000 more potent than CO₂. Carbon credits are always expressed in terms of carbon dioxide equivalence (CO₂e). For example, one tonne of CO₂ = one tonne of CO₂e hence in terms of the carbon market, one Carbon Credit = one certified emission reduction (CER). In terms of methane, two tonnes of CH₄ = one tonne of CO₂e. Other information necessary is that one carbon credit = one CERs = one metric tonne of CO₂e (Carbon Trading Glossary 2010).

The Carbopedia (2010) explains the compliance and voluntary market carbon credits which it maintains adheres to a particular standard or certification. Although carbon credits are generic they differ from region to region and from country to country. The compliance carbon credits include the: CER units of which is the most common and originates from CDM projects in developing countries; Emission Reduction Unit (ERU) which is similar to the CER, but based in the developed nations under the Joint Implementation; Emissions Trading, popularized by the EU under its ETS that generates EUAs as credits; and the New South Wales Greenhouse Gas Abatement Certificate (NGAC). The NGAC certification process is very comprehensive and goes beyond the Kyoto Protocol requirements. The voluntary carbon credits include the Voluntary Carbon Unit (VCU) or Voluntary Carbon Standard (VCS) credit, which is a robust global standard for approval of credible voluntary carbon credits. The VCS and VCU credits should:

Be real, the abatement must have occurred, they must be additional by going beyond business-as-usual activities, be measurable, permanent, not temporarily displace emissions, the findings need to be independently verified and unique so they cannot be used more than once to offset emissions”.

Globally, the VCS is most preferred and chosen standards in the voluntary market as it is compatible with the Kyoto Protocol provisions. It is also able to manage a wide range of project types and methodologies. There are 45 carbon markets principally categorised into three regimes (Figure 2).

Figure 2: Carbon market regimes



Source: Kelly (2008)

In addition to the VCS and VCU credits (Carbonpedia 2010) there is: the Verified (or Voluntary) Emissions Reduction (VER) and Gold Standard VER, commonly used to offset GHG emissions. Most CDM and JI projects can deliver VERs before compliance assets like CERs and ERUs. The VERs could also emerge when the purported CDM and JI projects fail to reach optimal levels for the mandatory requirements due to the size of the project and the inhibitive costs associated with compliance registration. The Renewable Energy Certificate (REC) is also among the voluntary carbon credit market. A REC is not a carbon credit measured against one tonne of CO₂e emissions. Instead, the REC relates to how much CO₂e is saved by the adoption of renewable energy and how efficiently one mega watt hour (MWh) of electricity can be produced. The RECs provide financial subsidies in the power sector and help renewable energy projects become more viable. New technologies including solar, wind farms, geothermal power plants, wave collection technology, hydroelectric, tidal power, renewable biomass, etc are increasingly being recognized in this space. As RECs displace

CO₂e they also have potential for producing carbon credits such as VCUs, VERs or CERs depending on their location.

There is a wide range of perceived quality of emission reduction certificates ranging from VERs on the one hand to GS CERs on the other. Each markets has a significantly different price and prices vary widely between the voluntary and compliance markets, but the various segments within these markets also differ in terms of price. There is a range of fundamental factors and external events that have caused carbon prices to show substantial volatility over time, presenting significant price risk to projects.

The first mechanism in terms of market share is the international emission trading and involves selling of carbon allowances to another country with high demands of emission reductions. The largest implementation of emissions trading to date has been the EU ETS. The second mechanism is the CDM, a project based mechanism that allows credits from emission reduction projects in poorer (developing) countries to be used by rich (developed) countries to meet their commitments under the Kyoto protocol. The third one is the Joint Implementation and is also project based mechanism which facilitates countries with binding targets to get credit from projects carried out in other countries with binding targets.

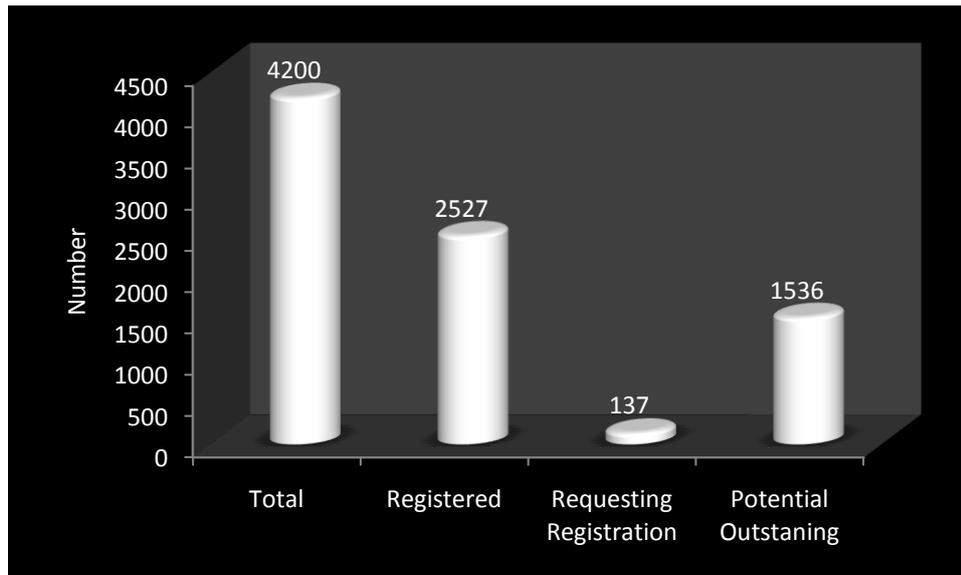
CARBON ASSETS IN UNCERTAIN CLIMATE REGULATORY FRAMEWORK

In December 2009 global leaders met in Copenhagen with an intention to reach a legally binding post-Kyoto Protocol agreement. This agreement was not reached and instead a political accord which was non-obligatory was signed by the heads of states – the Copenhagen Accord (UNFCCC 2009). In the context of carbon as an asset the lack of a binding agreement by global nations, is a highly undesirable state. Carbon markets owe their existence to the Kyoto Protocol which is running up to 2012. The overlap of the Copenhagen Accord and the Kyoto Protocol has important implications on the behaviour of prices of securities in carbon markets. A glance at the factors that influence the value of an asset shows that market expectations, risk aversion, market efficiency, arbitrage opportunities, regulation and demand and supply are some of the important factors feeding into the equation that gives the value of an asset.

An estimated 4,200 CDM projects with total carbon asset amounting to 2.9 billion CERs were expected to materialise by 2012 (UNFCCC 2010b). Further details regarding the CDM

project pipeline, those registered and those requesting registration and those outstanding as per the CDM project pipeline are shown in Figure 3. This scenario assumes that there will be no renewal of CDM crediting after 2012 and this is a problem on its own in terms of market indication.

Figure 3: CDM projects pipeline to 2012



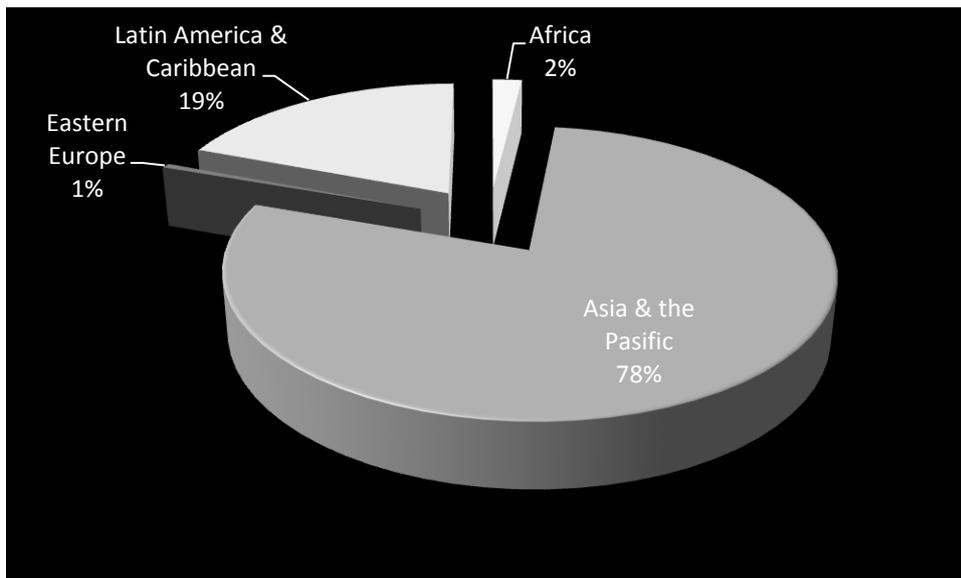
Source: Authors, based on UNFCCC (2010b)

There is still a huge backlog in terms of the uptake of the CERs from CDM projects, which is an indication of the potential demand for carbon credits. As of 24 November 2010, an estimated 1.86 billion CERs had been taken up under the registered CDM projects with a further 30 million accounted for by CDM projects seeking registration under the CDM Board. This gives a total of 2.16 billion CERs leaving an estimated 0.74 billion CERs outstanding (25.52% of the potential CDM market).

The key sectors in which the CDM project CERs are being generated include: the energy industries (both renewable and non-renewable sources), energy distribution, energy demand, manufacturing industries, chemical industries, construction, transport, mining/mineral production, metal production, fugitive emissions from fuels (solid, oil and gas), fugitive emissions from production and consumption of halocarbons and sulphur, hexafluoride, solvent use, waste handling and disposal, afforestation and reforestation and agriculture

(UNFCCC 2010c). A further analysis in terms of share shows that the energy industries (both renewable and non-renewable sources) takes up to 63.85% of the projects and this is followed by the waste handling and disposal sector that takes up to 16.22% of the projects (Ibid). The regional distribution of the 2,530 registered CDM projects presents more insights in terms of activities in Africa (Figure 4).

Figure 4: CDM projects by regions



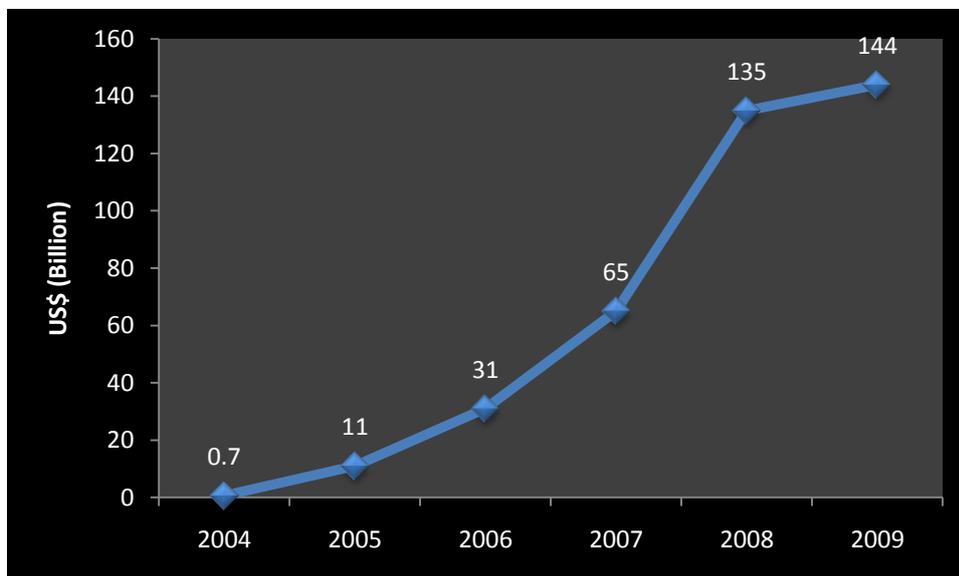
Source: Authors, based on UNFCCC (2010a)

From Figure 4, the following deductions may be made. Out of the 2530 CDM projects registered with the CDM Board (UNFCCC 2010e), a staggering 1986 (78%) are in Asia and the Pacific Region. A further analysis reveals that the bigger portion of these are in China (1046 CDM projects – 52.67%) and India (563 CDM projects – 28.35%). Both China and India take up 81.02% of the Asian and the Pacific CDM share. The second largest piece of the pie is taken up by Latin America and the Caribbean with 483 CDM projects and the larger portion in this regard is taken up by Brazil (179 CDM projects – 37.06%) followed by Mexico (124 CDM projects – 25.67%). Both Brazil and Mexico take up an estimated 62.73% of the CDM project share in Latin America and the Caribbean. Africa comes in third with 48 CDM projects and Eastern Europe last in fourth position with 13 CDM projects. In Africa, South Africa has 17 CDM projects (35.42%) followed by Egypt with 6 (12.5%). The next

significant share of CDM projects is accounted for by Morocco with 5 projects and Nigeria with 4 projects.

The carbon market has been on an upward trend since 2004. The value of the carbon market rose from US\$0.7 billion in 2004 to US\$144 billion in 2009 (Kosoy and Ambrosi 2010). The full picture in terms of trends is shown in Figure 5. The trend captured in Figure 5 includes the primary and secondary CDM carbon credits, those from the EU ETS, other allowances and other project based credits.

Figure 5: Carbon market trends (2004-2009)

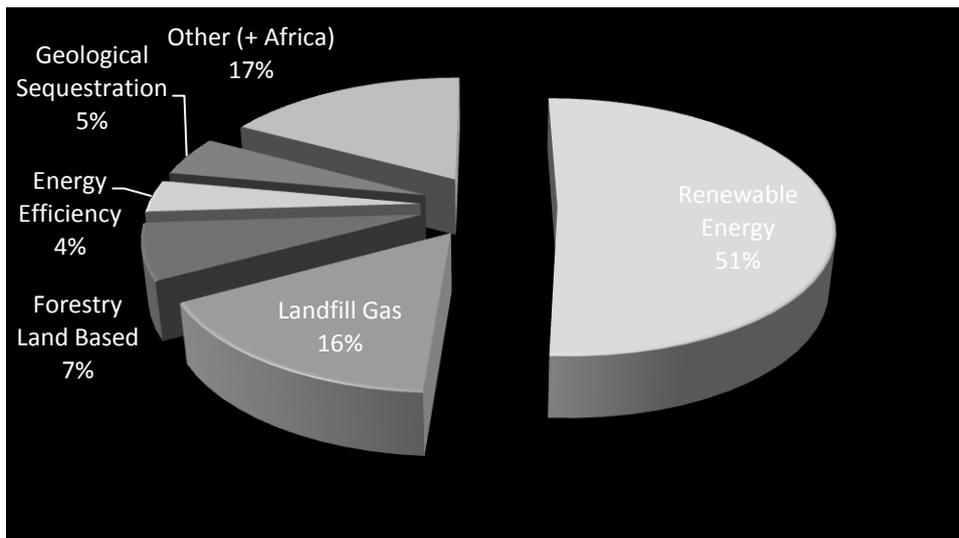


Source: Author, after Kosoy and Ambrosi (2010)

Markit (2010) provides valuable statistics concerning the voluntary carbon market. The data used by Markit was drawn from a recent and comprehensive global survey of the voluntary carbon market by Ecosystem Marketplace and New Carbon finance. In terms of volumes and values, Markit indicates that an estimated 54 million tonnes of carbon dioxide equivalent (CO₂e) were traded over-the-counter (not on exchange) in 2008. This was in comparison to a figure of 43.1 million tonnes of CO₂e in 2007. The over-the-counter trade was worth US\$396 million in 2008 compared to US\$263 million in 2007.

If the voluntary credits traded on the Chicago Climate Exchange are included, the volume of the market for 2008 rises to 123.4 million tonnes of Co₂e with a market value of US\$705 million. Details in terms of percentage by project type are shown in Figure 6 in terms of project location, the majority were in Asia (45%), followed by North America (28%) and Middle East (15%). The remaining 12% were in other continents including Africa.

Figure 6: Voluntary market 2008 by project type



Source: Authors after Markit (2010: 8)

CARBON ASSETS IN AFRICA

The uncertainty clouding the post-Kyoto Protocol architecture means hopes of having more CDM projects on the African continent continue to be dashed. This is in addition to the fact that the continent has always been host to the least CDM projects compared to other regions. When one considers the capital outlay needed for a typical CDM project, answers begin to emerge as to why Africa could still remain an unfavourable destination given our risky investment climate. A typical CDM project costs between US\$50,000 to 150,000 in up-front development expenses (Rau and Toker, 2008). In addition, developing a new methodology could set one back an additional US\$50,000 to US\$200,000. The transaction costs are usually the same for small and huge projects and as such, carbon asset developers favour huge projects such as those in Asia (especially China and India) as well as Brazil. In Africa, only South Africa competes favourably. Rau and Toker (2008) observe that a CDM project recovering waste heat and gas at a steel plant could generate up to 200,000 carbon credits

(200,000 metric tonnes of CO₂e) a year worth up to about US\$5 million. Carbon audits costs for verification purposes could cost up to US\$10,000 annually (Ibid). Carbon assets are sold to banks, brokers or investments funds that re-sell them to companies that need them.

Africa's breakthrough in terms of future carbon assets came from the Copenhagen Climate Change Summit in 2009. The Copenhagen Accord did not only recognise the role that carbon assets from the REDD-plus (REDD+) play in GHG emissions mitigation, it also established the Green Climate Fund that will also finance REDD+ assets (UNFCCC 2009). The challenge for Africa into the future is how we will manage REDD+ as our asset and not mortgage our forests to multinational corporations, agents and multilateral development banks like the World Bank that are financing some of the REDD and REDD+ projects.

There is already further movement to incorporate REDD assets into 'cap-and-trade' systems, with the Californian Government having announced in 2010 that it will incorporate REDD assets from Brazil and Mexican projects into their proposed 'cap-and-trade' system (Bamberger 2010). Another rush for REDD and REDD+ assets in Africa is definitely on the cards and our governments must take note. The REDD and REDD+ are also likely to take centre stage in Cancun, Mexico during the UNFCCC COP16 meeting in December 2010.

The world hopes that COP17 taking place in Durban, South Africa in December 2011 will eventually make a breakthrough in terms of the successor to the Kyoto Protocol. Until then, the world will be kept in greater suspense regarding the future of some carbon assets. The African and other developing country governments, especially the G77+China have made it clear that they will be looking for progress in terms of the pledges for the Copenhagen Green Climate Funds in Mexico. They believe a commitment towards this fund by the developed countries will be a good measure of their good will in terms of future climate engagements.

Linked to the Copenhagen Green Climate fund is the Fast Start Climate Finance (FSCF). The FSCF pledged to mobilise an estimated US\$30 billion between 2010 and 2012 and thereafter, US\$100 billion annually by 2010 (UNFCCC 2009). A summary in terms of the Copenhagen Green Climate Fund pledges is provided in Table 2. From Table 2, it emerges that the developed countries that pledged to finance the FSCF are making good progress on their pledges. As of 19 September 2010 there were only seven countries on the radar from the

details provided by the Fast Start Climate Finance website established jointly with major UN agencies including UNEP, UNDP and the UNFCCC.

Table 2: Fast Start Climate Finance pledges and committed amounts

<i>Country Total pledged</i>		<i>Total committed</i>		<i>Programmes</i>	
		As of 19/09/10	As of 28/11/10	As of 19/10/10	As of 28/11/10
Australia	AUD 599 million	-	-	-	5
Belgium	EUR 150 million	-	EUR 42,0 million	-	-
Canada	CAD 400 million	-	-	-	-
Denmark	DKK 1 200 million	DKK 308 million	DKK 308,0 million	-	-
European Union	EUR 150 million	EUR 50 million	EUR 50,0 million	-	8
Finland	EUR 110 million	-	-	-	7
France	EUR 1 260 million	EUR 1 260 million	EUR 1 260,0 million	-	-
Germany	EUR 1 260 million	-	EUR 291,9 million	7	51
Luxemburg	EUR 9 million	-	EUR 9 million	-	-
Malta	EUR 1 million	-	EUR 1 million	-	2
Netherlands	EUR 310 million	EUR 310 million	EUR 310,0 million	7	7
Norway	-	USD 357 million	USD 357,0 million	11	7
Portugal	EUR 36 million	-	EUR 12,0 million	-	-
Slovenia	EUR 8 million	-	-	-	2
Spain	EUR 375 million	-	-	-	6
Sweden	EUR 800 million	-	-	-	17
Switzerland	CHF 140 million	-	-	-	-
United Kingdom	GBP 1 500 million	GBP 511 million	GBP 511,0 million	7	7
USA	-	-	USD 1 700,0 million	-	-

Source: Authors, after <http://www.faststartfinance.org> (Accessed 19/09/10 and 28/11/10)

A revisit to the website about two and a half months later on 28 November 2010 showed a much improved scenario with 12 more countries having come onboard. A number of countries have honoured their full pledges and these include Denmark, the EU, Finland, France, Luxemburg, Malta and the Netherlands. The USA did not pledge but committed US\$1.7 billion into the FSCF. This is good news for Africa and the future REDD carbon assets.

CONCLUSION

This paper considered carbon as an asset and the various forms it takes. Among the carbon assets discussed of particular value to Africa were the Clean Development Mechanism

(CDM) from the Kyoto Protocol mechanism and the future of Reducing Emissions from Deforestation and Forest Degradation (REDD). The CDM is seen as an asset under threat and one that Africa has not benefited in the past and is not likely to benefit from in the near future. At the time of concluding this paper, the CDM project pipeline had a deficit of more than 25% if one considers the 2008-2012 period that was set by the UNFCCC. This is in sharp contrast to the fact that Africa as a continent was as of 24 November 2010 hosting only 2% of the 4,200 CDM projects in the pipeline. These statistics are against a backdrop of a contested post-Kyoto Protocol framework which has resulted in a huge slowdown in CDM project investments globally. In the short to medium term, CDM investment has also been affected by the global financial crisis with many developed countries (allocated carbon emissions caps - Annex 1) still battling in debt. Africa's major hope and possible breakthrough in terms of carbon assets and involvement in the carbon market lies in the REDD. However, African and other developing country governments are strongly warned to take a precautionary principle as we engage in REDD.

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