Carbon Markets and Africa: A Quick Fact Sheet for Journalists

What is Climate Change?

Climate change typically refers to the threat to our ecosystems and climatic conditions stemming from the release of greenhouse gases (GHGs) into the upper atmosphere. Most of these releases are now considered by a majority of the scientific community to be produced by human activities such as emissions from the burning of fossil fuels.

The threat of climate change is the direct physical effects of climate change on human activities, such as scarcity of inputs due to decreased agricultural production, adverse weather conditions disrupting pipelines, reduced water supply due to droughts, or destruction of fixed assets due to flooding.

Response to Climate Change Threat

The measures adopted by others in response to the threat of climate change — whether international, national, or local in origin — range from international treaties such as the Kyoto Protocol, to market measures such as increases in insurance premiums, to national government regulations forcing businesses to reduce their emissions of GHGs.

What Qualifies as a Greenhouse Gas (GHG)

1. ***Carbon Dioxide (CO2***): Mostly from the combustion of fossil fuels (electricity generation, industry, transport), comprising 70% of the total greenhouse effect.
2. ***Methane (CH4):*** Emitted during waste management and agriculture, comprising 20% of the total greenhouse effect. Methane has an impact on global warming 21 times that of CO2.
3. ***Nitrous Oxide (N2O):*** From burning fossil fuels, industrial processes and fertiliser production in particular, comprising 6% of the total greenhouse effect. Nitrous oxide has an impact on global warming 311 times that of CO2.

Climate Change as an Economic Opportunity in Africa

Movements toward greening the global economy and decoupling resource use from economic growth present new opportunities for African economies. Countries, companies and communities across the globe are looking to put in place the policies needed to catalyze a transition to a Green Economy—an economy that can realize development for all but in a way that keeps humanity's footprint within planetary boundaries while delivering significant social benefits from eradicating poverty to generating

decent jobs. As the continent arguably most affected by climate change, it is heartening to see that there is an opportunity, by tapping into Africa's abundant natural or renewable sources for more sustainable energy, to derive economic and developmental benefit from the global drivers behind it. By placing a market value on activities that can reduce GHG emissions, the carbon market is increasingly being used as a tool to finance this transformation.

Climate change is a driver for change through which new value can be realised for businesses or institutions in Africa—thus benefitting local economies and people. For those that contribute to climate change through the direct or indirect emission of GHGs, they can act to reduce these emissions and pay for the costs in part by generating emissions reduction credits that are tradable assets. Reducing the carbon footprint for businesses is of course part of good corporate citizenship, but if non-obligatory reductions can be monetized at the same time, it is more likely that such actions can be realized more quickly and scaled-up. Likewise, for small-scale activities implemented by SMEs, such as decentralized waste management, carbon credits can provide additional revenue streams far into the future, thereby increasing the viability and sustainability of business models.

To what end?

Carbon market vehicles can be a mechanism to channel new investment into Energy Security in Africa. They can also help African countries to meet their voluntary greenhouse gas reduction targets as well as their national renewable energy targets.

At the moment:

- Investments in the energy sector have chronically fallen short.
    - *IMF (2009): 3.0% of Africa's GDP needs to be invested in the power sector to achieve energy security.*
- High levels of load shedding and blackouts come at huge economic cost.
    - *Power deficits in Nigeria cost the economy approximately $1 billion per annum.*
- Continued reliance on temporary – often "dirty" energy supply contributes to high average, long-term costs and carbon footprint.
    - *Reliance on diesel and coal remains high in majority of African countries - despite abundant renewable resources*
    - *Still, at least eight African countries have adopted national renewable energy targets and several have enacted laws and regulations allowing for concessional "feed in tariffs" to promote greater use of renewable energy.*
- Diversification.
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What is the Carbon Market?

What is currently termed the "carbon market" is, in reality, a diverse set of systems that are regulated in different jurisdictions for trading green house gas pollution rights. These rights – called allowances or permits — are the commodity that is globally traded and give the bearer the right to emit an equivalent amount of CO2 emissions. Carbon credits are similar to permits, but are fundamentally different in that they are generated over time, (i.e., once a project gets implemented and the reductions are audited). In many markets, these carbon credits can be used in lieu of allowances for compliance to targets that have been placed on industrial facilities or sovereign countries.

Although the Secretariat of the United Nations Climate Change Framework Convention on Climate Change (UNFCCC) is responsible for maintaining a global registry or clearing house for many types of carbon units, various regulatory bodies at the national and regional level (e.g., the EU) oversee and monitor transactions in this market. Similarly, while there are a number of major exchanges where carbon allowances and credits trade in real time, there is no central exchange, nor a single unitary carbon market price. Rather, prices are determined in different market segments as a function of supply and demand as with other traded commodities. A surrogate benchmark price for carbon is typically an allowance in the European Trading Scheme, as this is the largest market segment by volume and monetary value. Carbon credits traded under the Clean Development Mechanism of the Kyoto Protocol generally trade at a discount to the European allowance price.

In principle there are four main market segments:

1) The Clean Development Mechanism (CDM), is a project-based, offset system that came into effect under the Kyoto Protocol. It has the objective of reducing the global cost of GHG mitigation by opening up the market for those countries with legally binding emission reduction targets to gains from trade with countries that do not have legally binding targets, while simultaneously rewarding new voluntary actions in those developing countries that reduce emissions. Thus, carbon credits can be purchased from projects developed in non-industrialised nations (non-Annex 1) by industrialised (Annex 1) countries. Importantly, carbon credits cannot be generated for emission reduction activities as a result of laws or legislation, nor can they typically be generated from the result of designing and implementing new domestic policy measures.

The CDM has helped to attract and leverage new sources of both foreign and domestic investment to help developing countries green their industries and infrastructure. As an additional source of revenue, carbon credits can, in some cases, improve the bankability of various projects, principally in the energy, waste, and infrastructure sectors. To a lesser degree, the CDM has also been used by some countries to promote sustainable forestry and agricultural activities.

2) Joint Implementation (JI), which permits the same activity as above, but only between Annex 1 countries.

Both of these mechanisms allow industrialised countries to achieve their targets by purchasing carbon credits outside of their country's borders. However, only CDM allows them to purchase credits from developing countries.

3) Emissions trading concerns the trading of allowance rights to emit GHGs, which can only happen between industrialised country governments, as they buy and sell the rights to pollute up to their own limits or assigned amounts.

4) The Voluntary carbon market, which follows a similar project cycle to the JI and CDM, with the main difference that the credits are not uniformly issued or regulated by the UN, and are typically sold in volumes that appeal to retail clients seeking a smaller number of reductions to offset their footprints.

Carbon Unit Types

The units traded on the carbon market all equate to 1 ton carbon dioxide equivalent emissions (tCO2e). This unit is identified according to the eligibility of the unit for use under various compliance regimes:

- An ***Allocated Allowance Unit (AAU)*** is the unit required by Annex One governments to comply with their Kyoto targets
- An ***Emissions Reduction Unit (ERU)*** is the credit generated under a JI (Joint Implementation) project, located in an Annex One country;
- A ***Certified Emission Reduction (CER)*** is the credit generated under a CDM project, located in a non-Annex 1 country;
- A ***Verified Emissions Reduction (VER)*** is a project credit not certified for Kyoto compliance but verified according to the sales contract, that is created by emission reductions activities carried out on a "voluntary" basis, to meet corporate or individual greening goals independent of Kyoto.
- In addition, there are ***units specific to national or regional schemes*** such as the European Union Allowance (EUA) which is traded under the EU Emissions Trading Scheme.

What is the Gold Standard?

An assessment system called the "Gold Standard" has been introduced to evaluate the sustainability credentials of CDM and JI projects. It is a voluntary methodology and quality label for both Kyoto and voluntary markets. In theory, projects meeting the standard can command a higher price for credits.

We focus on **CDM** as it is most relevant for the African continent.

Requirements for CDM Approval

- ✓ **Host country**: meets EIA or other local permit requirements, demonstrates positive sustainable

development benefits, as defined by host country

- ✓ **UN**: voluntary (i.e., no legal mandate) and proven GHG emissions reduced from baseline following carbon auditing processes & UNFCCC approved methodologies
- ✓ **Auditor**: Validates project as "additional" i.e. *not common practice* and investment or technological barriers that can be overcome through additional carbon revenue

General CDM Market Trends

The CDM market reached new milestones in 2011, with almost 4,000 projects registered and 1200 projects already issuing credits. On average, just over 25 million carbon credits are issued each month, representing a two-fold increase over last year. Overall, UNEP Risø forecasts about 1.2 billion UN-certified carbon credits to be generated before 2013. **UNEP Risø estimates that roughly US $ 190 billion has been invested in registered CDM projects globally.**

Figure: Geographical Distribution of CDM Projects

Region	***Number of CDM projects***	***Percentage (%)***
Africa	234	2.9%
Asia & Pacific	6580	81.0%
Europe and Central Asia	89	1.1%
Latin America	1138	14.0%
Middle East	87	1.0%

The CDM project cycle has been criticized by private and public stakeholders in Africa for being too "complicated" and lengthy. This has represented a serious deterrent to attracting domestic investment in African projects. Various reforms have been undertaken over time, however, to streamline the process and to create more predictable outcomes in the approval process. This positive trend is reflected in the Figure below.

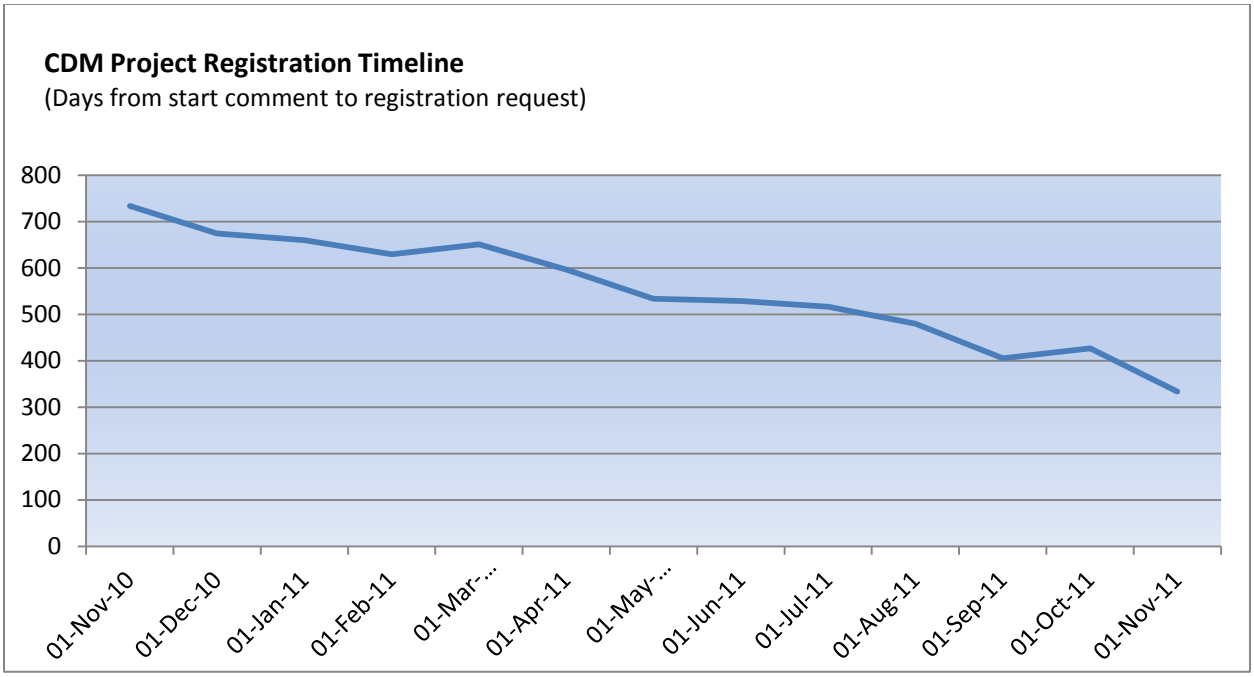

Figure: Decreasing trend of average length of time required for CDM project registration
Source: UNEP Risø Center

Overall, new investment in the CDM has been diminishing as a result of market uncertainties linked to future supply and demand scenarios for carbon credits. The global economic contraction, coupled with warm winters in the USA and Northern Europe, has contributed to softened demand in the short term. In addition to lack of clarity over specific levels of emission reduction targets to be adopted by the major emitting economies after the end of the first commitment period under the Kyoto Protocol, legislation that has been passed in the European Union has cast a long shadow over the viability of the CDM post 2012. Specifically, a European Commission directive spells out that it will only allow carbon credits issued from CDM projects located in a least developed country (LDC) to be imported by European companies, unless they are from projects registered before the end of 2012.[1] However, the window of opportunity for non-LDC countries in Africa to mount new CDM projects is fast closing.

This general market trend is not, however, holding up for Africa, where the total cumulative investment in the last 18 months has considerably dwarfed that in preceding years.

[1] A project's registration date is back-dated to the day on which it requested registration, if no further review is required.

Annual and Cumulative Investment in Registered CDM Projects by Region

Host country	Reg. projects	All years	2004	2005	2006	2007	2008	2009	2010	2011	2012
		Investment in million US$									
China	1879	123337		70	1625	6340	12024	21581	35382	45565	750
India	805	36530	5	117	1491	4317	1401	4485	7124	16904	685
Latin America	584	12745	22	502	3411	1870	1784	1422	639	3079	17
Rest of Asia	529	9340		93	2171	481	433	1117	2094	2786	166
Africa	83	4496		134	572	329	77	723	844	1793	24
Middle-East	42	2085			3	678	79	525	31	770	
Europe and Central Asia	40	1699		7	131	6	6	86	58	818	587
Total	3962	190231	27	923	9403	14020	15805	29940	46171	71715	2229

CDM Projects in Africa

- After years of steady if slow growth, there are clear signs that the African carbon market is starting to take off.
- There are 234 projects either registered or under validation in Africa.
- Over US $4.5 billion has been invested in registered African CDM projects to date.
- At the same time, the timely issuance of credits from already registered projects has been lagging in Africa. This may be related to capacity limitations and financing gaps to get CDM projects to financial close.
- Four out of every fifth multi-country CDM “program of activity” is hosted in Africa.

Programmatic CDM is clearly seen as a very attractive option by African countries and project developers. The number of PoAs in Africa is now more than a quarter of the total PoAs. This is a much higher share than African countries have for regular CDM projects. Eight regional PoAs with high sustainable development impacts have been submitted in Africa.

Title of project	*PoA boundary*	*Project type*
Improved Cook Stoves for East Africa (ICSEA)	Burundi, Kenya, Rwanda, Sudan, Tanzania, Uganda	Cook stoves
Promoting Efficient Stove Dissemination and Use in West Africa	Senegal, Gambia, Burkina Faso, Togo	Cook stoves
Energy Efficient Commercial Lighting Programme of Activities South Africa, Botswana and Rwanda	South Africa, Botswana, Rwanda	Lighting in service
Southern African Solar Electrical Energy Programme (SASEE)	Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe	Solar PV
Southern Africa Solar Thermal Energy (SASTE) Programme	Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe	Solar water heating
Southern African Renewable Energy (SARE) Programme	Botswana, Lesotho, Mozambique, Namibia, Swaziland, South Africa, Zambia, Zimbabwe	Hydro, wind, solar, geothermal, tidal
CarbonSoft Open Source PoA: LED Lighting Distribution in East Africa	Ethiopia, Uganda, Rwanda, Kenya, Zambia, Malawi, Mozambique, Madagascar, Zimbabwe	Lighting (households)
International water purification programme	Uganda - Global	Water purification
CDM Africa Small Scale Hydro PoA for Southern Africa	Angola, Botswana, Democratic Republic of the Congo, Lesotho, Madagascar, Mauritius, Malawi, Mozambique, Namibia, Seychelles, Swaziland, United Republic of Tanzania, South Africa, Zambia and Zimbabwe	Hydro
Project to replace fossil fuel based lighting with Solar LED lamps in East Africa	Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda	Lighting (households)
African Clean Energy Switch – Biogas (ACES-Biogas)	Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda	Domestic manure
Côte d'Ivoire and Cameroon Efficient Cookstoves Program	Côte d'Ivoire and Cameroon	Stoves
Sustainable Promotion of East African Renewables (SPEAR)	Burundi, Kenya, Sudan, Tanzania, Uganda	Run of river, New dam, Wind, Geothermal electricity, Solar PV and Solar thermal power
ENERCAP SunLighting™ Africa – Programme to replace kerosene lamps with micro PV LED systems in the Sub-Sahara region	Angola, Burkina Faso, Benin, Democratic Republic of the Congo, Côte d`Ivoire, Cameroon, Ethiopia, Gabon, Ghana, Guinea, Kenya, Mauritania, Niger, Nigeria, Senegal, Chad, Togo	Solar PV
Southern African Solar LED Programme	South Africa, Mozambique, Zimbabwe, Botswana, Namibia, Zambia, Malawi and Angola	Lighting (households)
Fuel switch for Thermal Energy Production Programme	South Africa, Zimbabwe	Biomass energy
Programme for Grid Connected Renewable Energy in the Mediterranean Region	Algeria, Egypt, Jordan, Lebanon, Mauritania, Morocco, Tunisia	Wind, Solar PV, Solar Thermal

Promotion of Energy Efficient Cook Stoves within Southern African Development Community (SADC)	Angola, Botswana, Democratic Republic of the Congo, Lesotho, Madagascar, Mauritius, Malawi, Mozambique, Namibia, Seychelles, Swaziland, United Republic of Tanzania, South Africa, Zambia, Zimbabwe	Stoves

Number of CDM projects in African countries and types of CDM projects in Africa

Country	*Number of CDM projects (rejected projects excluded)*	*CERs issued*	*CERs expected by the end of 2012 by project developer*
1. South Africa	71	2,869,142	22,534,801
2. Kenya	24	0	2,461,139
3. Egypt	22	7,820,744	16,118,836
4. Morocco	18	330,099	4,003,337
5. Nigeria	15	581,679	28,670,191
6. Uganda	14	0	2,185,781
7. Tanzania	9	56,463	1,790,996
8. Tunisia	6	0	4,499,071
9. Angola	5	0	17,049,554
10. Senegal	5	0	512,597
11. Congo DR	4	0	1,016,616
12. Côte d'Ivoire	4	0	1,263,151
13. Ghana	4	0	921,000
14. Madagascar	4	0	142,438
15. Rwanda	4	0	135,140
16. Cameroon	3	0	522,496
17. Algeria	2	0	202,895
18. Ethiopia	2	0	305,753
19. Mauritius	2	0	230,630
20. Sudan	2	0	367,052
21. Zambia	2	43,702	386,845
22. Cape Verde	1	0	39,342
23. Lesotho	1	0	78,932
24. Liberia	1	0	187,270

25.	Libya	1	0	573,442
26.	Mali	1	0	94,141
27.	Mozambique	1	0	62,814
28.	Namibia	1	0	0
29.	Niger	1	0	213,657
30.	Sierra Leone	1	0	0
31.	Swaziland	1	0	199,295
32.	Togo	1	0	5,022
33.	Zimbabwe	1	0	0
Total		**234**	**11,702,000**	**106,774,000**
Total LDCs		**58**	**100,165**	**24,534,608**

The tables show that while South Africa is hosting the most CDM projects in Africa, Nigeria is expected to generate the largest number of CERs. Wind, landfill gas and biomass energy are the predominant project types in Africa.

Types of CDM projects in Africa	***Number of projects***
Wind	37
Landfill gas	30
Biomass energy	28
Hydro	19
Reforestation	17
EE own generation	15
Fossil fuel switch	14
EE households	11
N2O	11
Fugitive	11
Solar	11
Methane avoidance	9
EE industry	8
Afforestation	3
Cement	3
EE supply side	3
Geothermal	2
Coal bed/mine methane	1
EE service	1

For further information: www.cdmpipeline.org

Related fast facts

1. About 1.5 billion people across the globe still live without electricity and 3 billion still cook and heat with primitive fuels like wood or charcoal – UN, *Sustainable Energy for All*
2. In 2009, $162 billion was invested in renewable energy projects, of which $44 billion was spent in China, India and Brazil collectively, and just $7.5 billion on the many poorer countries.
3. The majority of villages in Africa rely on kerosene lamps and candles for their lighting. These cost the average household US$40–80 each year and they emit pollutants that pose serious health risks and can cause house fires. – *SciDev Net*
4. By 2020, climate change is projected to expose an estimated 75 million people in Africa to increased water demand. – *UNICEF – Climate Change and Children Report*
5. In Africa's Sahara Desert, 450 terrawatts (TW) of solar energy could be collected per annum, with solar cells of 15 percent efficiency. This exceeds global production of energy, which is now around 13 TW (renewable and non-renewable energy). Replacing fossil fuel would only require 1% of the earth's deserts to convert the same amount of energy – *Renewable Power News*
6. A large wind turbine can generate sufficient electricity to supply 300 households. – *Interesting Energy fact*
7. Worldwide, water is the most commonly used renewable energy resource, providing enough power to meet the needs of 28.3 million consumers – *Energy Facts*
8. Hydropower turbines can achieve efficiency of 95 % and more. – *Interesting Energy Fact*
9. Young children, along with the elderly, are at highest risk from heat stress. Research in São Paulo found that for every degree increase above 20°C, there was a 2.6 per cent increase in overall mortality in children under 15 – *Human Settlement Discussion Paper: Climate Change and Urban Children*
10. Africa requires US$22-31 billion per year by 2015, and $52-68 billion per year by 2030 to meet the climate change challenge. Countries have pledged under the Copenhagen and Cancun agreements new/additional fast-track resources of $30 billion annually by 2012.