

# ADB FINESSE Africa newsletter



special issue  
16 February 2005  
Kyoto protocol in force

Financing Energy Services for Small-Scale Energy Users-ADB FINESSE AFRICA NEWSLETTER 1.9, FEBRUARY 2005

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## 16 February 2005: a remarkable day!

Today, the 16<sup>th</sup> of February 2005 is a remarkable day. Exactly 90 days ago Russia decided to ratify the Kyoto protocol. With Russia ratifying, the countries subscribing to the protocol reached the threshold of representing 55% of the global emissions. Six months after this, the Kyoto protocol becomes into effect.

The Kyoto protocol of the United Nations Framework Convention on Climate Change seeks to address the problem of climate change. While not all the members of the global community are part of this protocol, its coming into force reinforces the need for concerted effort in tackling the threat of climate change to the global economy. Estimates are that economic losses from natural disasters have been doubling every decade from \$53 billion in 1960s to \$480 billion in the 1990s with 80% of these being weather related. As for the developing countries, more is at stake as the very basis of poverty reduction and decades of poverty reduction efforts are under threat. Furthermore, developing countries lack the capacity to respond and adapt to changes in global climate system. In fact climate change poses grim challenges to basics of survival like poverty, food security, health, infrastructure etc.

The coming into force of the Kyoto protocol addresses the link between poverty and climate change as the protocol attempts to mitigate this phenomena and assist developing countries in adapting to the adverse effects of climate change. The emissions reduction target under the Kyoto protocol will slow down climate change. Emissions reduction efforts also spur the development of efficient technologies that can benefit the poor. The Clean Development Mechanism (CDM) of the Kyoto protocol also promotes investment in environmentally friendly technologies in developing countries. Furthermore resources will be made available to assist developing countries to adapt to the adverse effects of climate change.

The African Development Bank intends to support its Regional Member Countries in addressing climate change issues and assisting them to access related international funds. The signing of the agreement with the Global Environment Facility (GEF) that enables the Bank to direct access GEF grant resources will be instrumental in this respect.

We hope you enjoy this special issue of the newsletter. If you have any query, question or remark on the ADB's activities in the field of climate change, please do not hesitate to contact the FINESSE team at the contact data at the left.

**Reminder: FINESSE Africa consultative workshop  
23—25 February 2005, Hotel Africa, Tunis  
More info at: [http://www.afdb.org/psdu/finesse\\_africa\\_program](http://www.afdb.org/psdu/finesse_africa_program)**

## The climate change and poverty nexus in Africa

By A.P. Mhlanga & Y. Vyas

The coming into force of the Kyoto Protocol of the UN Framework Convention on Climate Change (UNFCCC) provides evidence of concerted global efforts to address the threat of climate change. Halving extreme poverty by the year 2015 is meanwhile a globally recognised over-arching sustainable development objective. But are these two challenges compatible and in particular, how does the threat of climate change affect poverty reduction efforts?

### What is climate change?

Climate change is the rise in global temperature largely as a result of the accumulation of greenhouse gases (GHGs) in the atmosphere from human activities or anthropogenic emissions. The major GHGs are carbon dioxide and methane which are mainly emitted into the atmosphere in various energy conversion processes where the energy carrier is fossil fuel based like petroleum products and coal. There are other GHGs as well as other processes that result in emissions of these gases as land-use conversion, industrial processes etc.

### Climate change and poverty

Internationally agreed scientific research proves that climate change is already a reality. Analysis of the potential adverse impacts of climate change now clearly shows the linkages between climate change and poverty. In fact, a scenarios analysis conducted by the Intergovernmental Panel on Climate Change (IPCC), shows that while developing countries have least contributed to GHG emissions, they stand to lose the most from its adverse effects. This is particularly due to the fact that most poor people live in rural areas and their livelihoods depend on natural resources. Agriculture, which is the mainstay of most economies is highly dependent on weather and climate.

Some of the effects of climate change include:

**Increased frequency of droughts and floods**— results in pressure on water resources, food security, human health, infrastructure and constrained development;

**Changes in rainfall patterns and subsequent intensified land use** — exacerbates land degradation and desertification (Western Sahel, North and Southern Africa);

**Sea level rise** — affects coastal settlements, flooding and coastal erosion;

**Decrease in grain yield** — diminishing food security, particularly in small food importing states; and

**Decrease in run-off water in major rivers** — threatens agriculture, hydropower systems and exacerbates cross boundary tensions.

### Impacts on poor people's livelihoods

The poor people are highly vulnerable to climate induced shocks yet they have the least capacity to adapt to change.

The impacts on the poor in particular include:

- Rapid diminishing of ecosystem goods and services;
- Reduced access to safe water due to droughts and floods;
- Threat to agriculture and food security;
- Health—increased incidents of vector-borne diseases, heat waves, landslides and storms;
- Increased involuntary displacement and conflicts as crucial resource become degraded
- Economy wide effects – hampering potential for economic growth and increased cost of rehabilitation diverting funds from long-term development purposes.

In fact, climate change threatens the achievements of the Millennium Development targets related to poverty, hunger, health, gender equity and environmental sustainability.

### Adapting to the imminent

To reduce the impacts of climate change, it is only important that developing countries adapt to the changes in the global climate system. This can be done through:

**Addressing vulnerability in the context of sustainable livelihoods**— this can be done through enhancing and protecting people's social, natural, physical and human capital. Financial capital should be targeted at promoting safety-net mechanisms;

**Promoting equitable growth and adaptation**— mainstreaming climate change into economic planning and budget process, increasing resilience of infrastructure and investment, and enhancing the financial resilience of the poor by spreading risk; and

**Improving governance to mainstream climate issues in poverty reduction**— increasing the role of the civil community in climate change policies and programs and increasing monitoring and assessment of poverty and climate change.

### Way forward

Climate change will undoubtedly have immense impacts on poverty reduction efforts. To minimise the risk of climate change on development the following are proposed:

Mainstreaming climate issues in all sustainable development efforts, including increased utilisation of renewable energy sources;

Continue and strengthen assessment and information collection and analysis;

Engage all stakeholders in developing and implementing low cost adaptation measures;

Increasing the financing of climate change efforts;

Engaging with the UNFCCC process and other independent climate related efforts; and

Ensure synergy with other multilateral environment agreements like UNCCD, UNCBD etc.

## CDM Finance for Renewable Energy Projects

Annika Lundgren Colston (2E Carbon Acces)  
and Eron Bloomgarden (EcoSecurities)

Demand for energy services is rising worldwide. It is expected that developing countries, including countries in Africa, will see increased demand as growth continues in the industrial, commercial and residential sectors. African nations have abundant renewable energy resources, such as hydro, wind, biomass and solar, and therefore the potential for developing renewable energy projects to meet the growing demand is attractive. Unfortunately, there are significant barriers to developing clean energy projects, the largest being access to finance. However, the Clean Development Mechanism (CDM), a flexible mechanism under the Kyoto Protocol, could help in overcoming this barrier if certain conditions are met.

The two main objectives of the Clean Development Mechanism (CDM) are to assist Annex 1 countries to reach their emission reduction targets and to promote sustainable development objectives in non-Annex 1 countries – mainly developing countries. This is achieved when an Annex 1 country purchases Certified Emission Reductions (CERs) from an eligible project in a non Annex 1 country. There is a specific process that must be followed in order for an eligible project to generate CERs. This is illustrated in the diagram below. In summary, a project developer prepares a Project Design Document (PDD), which includes information about the project and a baseline and monitoring plan. The project developer then requests Host Country Approval from the Designated National Authority (DNA). The PDD is then submitted to a Designated Operational Entity (DOE) for validation, a procedure to authenticate the information in the PDD. After the project is validated, the DOE submits the PDD to the CDM Executive Board for registration. Meanwhile, the project developer should begin sourcing a buyer for the emission reductions. Sometime after the project is registered it will begin operating and generating emission reductions. The project developer monitors these reductions according to the monitoring plan. At the end of the year or another suitable time period, the project developer retains another DOE to verify the emission reductions. Once verified, the PDD can request issuance of CERs from the CDM Executive Board. The

template for the Project Design Documentation and other supporting information about starting a CDM project activity can be found on the UNFCCC website at <http://cdm.unfccc.int/>.

The sale of CERs to an Annex 1 buyer can assist a project by adding an additional source of revenue to the project's cash flow. Traditionally, CER revenue is received after the emissions reductions occur, for example if a project reduces \$100,000 worth of emissions in 2005, the revenue will not be available until the end of the first quarter 2006. Therefore, as long as the project operates as expected, the CER revenue is guaranteed and can be used to pay down debt or towards non-specific project costs, such as improving local needs and the environment, which may be required by the government in order to receive licenses or permits. It is rare, but possible, to receive CER revenue up-front, or before emission reductions occur. In this case, CER revenue can be used at the most crucial time of project development and as working capital.

An Emission Reduction Purchase Agreement (ERPA) is a binding contract for the sale of a project's emissions reductions between the owner of the emission reductions and the buyer. Signing an ERPA with a buyer allows the project developer to use the agreement to assist in reaching financial closure since it provides the client with a fixed dollar or euro based source of revenue through 2012. An ERPA is similar to a power purchase agreement for electricity, as it provides the

**CDM Project Development Cycle:**

<u>Task</u>	<u>Responsible Party</u>
Project Design Document	Project Developer
Host Country Approval	Designated National Authority
Validation	Operational Entity
Registration	Executive Board
Project Financing, CER Buyer & Implementation	Project Developer
Monitoring	Project Developer
Verification & Certification	Operational Entity
Issuance of CERs	Executive Board

## CDM Finance for Renewable Energy Projects

### Caribbean wind farm project:

-20 MW electricity output  
 -50,000 t CO<sub>2</sub> emission reductions per year (for 10 years)  
 -Project costs: \$20m (+) US  
 -Carbon value  
   -@\$3 US/tonne CO<sub>2</sub>e = \$1.72m US  
   -@\$5 US/tonne CO<sub>2</sub>e = \$2.87m US

### **Proportion of project costs:**

@ \$3/tonne - **8.6%**  
 @ \$5/tonne - **14.35%**

### SE Asia waste to energy project:

-2 MW electricity output  
 -50,000 t CO<sub>2</sub>e (+) emissions reductions (for 10 years)  
 -Project costs: \$3.5m US,  
 -Carbon value  
   -@\$3 US/tonne CO<sub>2</sub>e = \$1.72m US  
   -@\$5 US/tonne CO<sub>2</sub>e = \$2.87m US

### **-Proportion of project costs:**

@ \$3/tonne - **49.1%**  
 @ \$5/tonne - **82.0%**

project developer with a stable revenue source that can be included in the financial projections for the project.

Different types of CDM projects generate different amounts of emission reductions. Therefore, before pursuing development of the project it is important to consider the value of the CER revenue and the percentage of total project costs that it will cover. The example above shows the effect of the CDM on two projects – a wind project and a waste to energy project. The emission reductions from the wind farm can account for over 14% of the total cost, but the waste-to-energy can be as high as 82%. This is because the waste project is reducing methane, which has 21 times the global warming potential of CO<sub>2</sub>. Wind projects are also very inefficient. Based on general estimates, projects smaller than 3 MW will not generate sufficient revenue to cover the costs of transacting the CDM project. Although the CDM can be an attractive means to secure project finance or additional project revenue, many barriers to developing CDM projects exist. First, as noted above, carbon revenues are generally not sufficient to drive the overall financing of a renewable energy project. CER revenue is best used to enhance the conventional financing package. In addition, there are transaction costs associated with developing a CDM project. Costs can range from \$35,000 to \$250,000 depending on the size and complexity of the project. Often these costs must be paid in advance, at a point when resources are generally scarce. The costs include fees for doing an eligibility assessment, completing the PDD, hiring an Operational Entity to validate the project, registering the project with the CDM Executive Board and monitoring and verifying emission reductions.

A number of regulatory and institutional barriers exist as well such as receiving host country approval, a requirement of all CDM projects. Some countries have not established DNAs and the procedures for approving projects. Host countries must ensure that all projects meet local sustainable develop-

ment criteria, however many countries have not yet defined these criteria. It is advised to begin communications with the local Designated National Authority for CDM projects at the early stages of CDM project development to understand the procedures for receiving approval and learning about the sustainable development criteria.

There have been several capacity building initiatives, such as the CD4CDM ([www.cd4cdm.org](http://www.cd4cdm.org)) program sponsored by UNEP Risoe, aimed at overcoming these hurdles as well as new Facilities and services, such as *2E Carbon Access*. E+CO, the leading supplier of seed finance and business development services, and EcoSecurities, the leading greenhouse gas advisory firm, launched *2E Carbon Access* to assist small-scale project developers to overcome the barriers and access the benefits of the CDM. *2E Carbon Access* is the first facility to offer small-scale enterprises and project developers one-stop access to all the services required to access carbon finance – and it aims to do so using innovative procedures that allow project developers to get past the barriers of up-front payment, complicated procedures and lack of options. For more information, please visit the website at <http://www.2ecarbonaccess.com>.

In conclusion, the CDM is a possible source of finance for renewable energy projects and can help project developers to reach financial closure. For most renewable energy projects, the CER revenue makes up only a small amount of the total projects costs and is generally received after emission reductions have already occurred. While several barriers to developing CDM projects remain, such as high transaction costs, new initiatives have been developed to assist project developers to overcome them. Although the CDM is complex, it provides a new means by which to support the development of renewable energy projects in Africa.

One of the greatest strengths of the African continent is its natural resource endowment. If this resource is managed sustainably it can result in Africa, not only attaining the much required sustainable development, including poverty reduction, but also actively participate in Clean Development Mechanism (CDM) activities. Examples of such natural resources which are in great abundance include hydro, biomass, wind and solar.

For CDM projects to be developed from these resources, it will require in depth resource assessment of potential sites and exploitation mechanisms.

Agriculture biomass is the largest resource available in Africa. Biomass can be used to generate electricity in isolated areas through use of the following technologies:

- \* direct combustion in steam turbines and engines, gasification systems, advanced combustion systems based on reciprocating internal steam engines and condensing extraction turbine (CEST)

Furthermore agriculture biomass can be converted into a variety of fuels, such as ethanol and biodiesel, which can be used as transport fuels.

In view of the relatively inefficient manner most industries use energy in most developing countries, particularly in Africa, application of industry-wide technologies can yield reasonable technical and economic benefits, whilst at the same time enhance environmental integrity. It has been shown that application in industry of the following:

- housekeeping and general maintenance;
- low cost/minor capital measures like combustion efficiency optimisation, recovery and use of exhaust gases, use of high efficiency electric motors and insulation, etc.
- high capital measures like automatic combustion control, improved design features for optimisation of piping sizing, and air intake sizing, and use of variable speed drive motors, automatic load control systems, and process residual

can yield energy savings in the range 10-20%, 20-30%, and 40-50%, respectively.

Despite the existence of many opportunities and options available for industry to adopt to enable move on a sustainable path, Africa still lags behind other countries in the implementation of CDM projects. Out of a total of 50 "Activities Implemented Jointly" (AIJ) projects during the pilot phase, only two projects came to Africa. Recently under the Netherlands

carbon purchase programme CERUPT, out of a total projects of 20 approved, none has been approved for implementation in Africa. Further, out of over 40 baseline methodologies submitted to the CDM Executive Board, out of which eleven have been approved and six have gone as PDDs, only one on land fill from South Africa is under active consideration.

Various barriers inhibiting exploitation of such opportunities in Sub-Sahara Africa have been identified as policy, technical, financial and legal. Some of the policy barriers identified include limited awareness of benefits of CDM and its relationship to business, and CDM objectives and its cycle by government and the private sector. Among others include non-ratification of the Kyoto protocol, and no fully established DNAs.

Some of the technological barriers include limited awareness on the availability of energy saving technologies and processes, and sometimes, non-existence of knowledge of selection of appropriate technologies as potential CDM projects. Limited human resource in the development of bankable business proposals and CDM projects, and its requirements on additionality is another major constraint. Of all the barriers identified, financial issues pose the greatest challenges in particular, low market value of carbon credits (around US\$ 5 per ton) does not encourage industry to participate in CDM projects due to less financial attractiveness, and higher transaction costs. Additionally, lack of financial base from local CDM investors to contribute to equity for project implementation is another major inhibiting factor.

From legal considerations, limited, and sometimes lack of awareness of the Kyoto Protocol, and legal issues in the development of CDM projects at government and private sector levels, have been identified as major barriers.

Some of the barriers identified above can be removed through formulation of a conducive policy framework with supporting awareness and information programmes, and development of capacity to develop sustainable CDM projects. To implement CDM projects requires financial resources to support CDM project development, and project finance. ADB finesse can play a significant role in providing such resources.

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## Energy News

### Climate change will undermine African poverty eradication.

Global warming will have a detrimental effect on human and economic development in Africa according to a new paper by Dr. Anthony Nyong, presented at the Scientific Symposium on Stabilisation of Greenhouse Gases. The impacts of global warming on economic development in Africa, particularly among the poorest people, are highlighted in the paper. The author, Dr. Anthony Nyong, was invited to give the paper by WWF at the Scientific Symposium on Stabilisation of Greenhouse Gases at the Met. Office, Exeter. The paper reveals the detrimental effect global warming will have on human and economic development - by threatening people's health and their ability to deal with illness; people's ability to feed themselves; girls' ability to attend school and undermining people's ability to earn a living. "Every record shows that climate change is happening, both past records and predictive models," said Dr. Anthony Nyong, from the University of Jos, Nigeria. "What is less well discussed or studied is the potential devastating impact of climate change on poverty eradication. The reality is that they go hand in hand and can not be separated."

While the majority of the impact studies have concentrated on extreme events such as floods and droughts in Africa few have focused on the gradual, accumulating impacts of global warming on livelihoods and economic development on the continent. "In Africa, studies have shown that a warming of up to 2°C would bring with it a set of impacts to the continent's rich but fragile ecosystem," said Dr Catarina Cardoso, Head of Climate Change at WWF-UK. **"If global warming is not tackled the viability of millions of people's livelihoods in Africa will be undermined. Without significant new resources, millions of others won't be able to adapt to changes that are already happening."**

[http://www.wwf.org.uk/News/n\\_0000001454.aspx](http://www.wwf.org.uk/News/n_0000001454.aspx)

### Climate change will slow poverty reduction

A report warning of the economic implications of climate change on the world's poor has brought together environmental and development groups, and has been endorsed by Nobel Prize winner Archbishop Desmond Tutu. The report, entitled "Up in Smoke?" was written by Andrew Simms of the New Economics Foundation in Britain, and was launched by RK Pachauri, chairman of the Intergovernmental Panel on Climate Change. It calls for cuts in emissions far beyond Kyoto Protocol targets or risk failure with poverty reduction as part of the millennium development goals. Archbishop Tutu expressed concern **about climate change being "... detrimental to humanity at large and especially to the most vulnerable of the world's communities"**.

[http://www.neweconomics.org/gen/news\\_upinSmoke.aspx](http://www.neweconomics.org/gen/news_upinSmoke.aspx)

### Climate change threatens Africa, UN warns

The developed countries might have created the problem of greenhouse gases in the atmosphere, but all countries, and especially African countries, were going to have to deal with the consequences, politicians and scientists agreed.

**"It will directly impact agriculture, which is what drives development,"** said Louis Verchot, a climate change scientist with the International Centre for Research in Agroforestry (ICRAF).

The meeting painted a grim picture of some of the consequences of changing climates for food security on the continent. In many areas the length of the growing season could be halved by the middle of next century. There also would be more variability in rainfall, which was bad for farmers. Some areas would be prone to droughts, others to floods.

### Editorial Committee

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Mr. Wim Klunne - Principal Renewable Energy Expert - FINESSE.

Mr. Alois P. Mhlanga - Renewable Energy Research Associate - FINESSE.

## Web Resources

ADB FINESSE Africa Program : [http://www.afdb.org/psdu/finesse\\_africa\\_program](http://www.afdb.org/psdu/finesse_africa_program)

United Nations Framework Convention on Climate Change : <http://unfccc.int/2860.php>

Climate change and Agriculture in Africa : [http://www.ceepa.co.za/Climate\\_Change/](http://www.ceepa.co.za/Climate_Change/)

Facts on Climate Change and global warming : [http://www.greenfacts.org/studies/climate\\_change/index.htm](http://www.greenfacts.org/studies/climate_change/index.htm)

Poverty and Climate Change Publication : <http://www.undp.org/energy/docs/poverty-and-climate-change-72dpi-part1.pdf>

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