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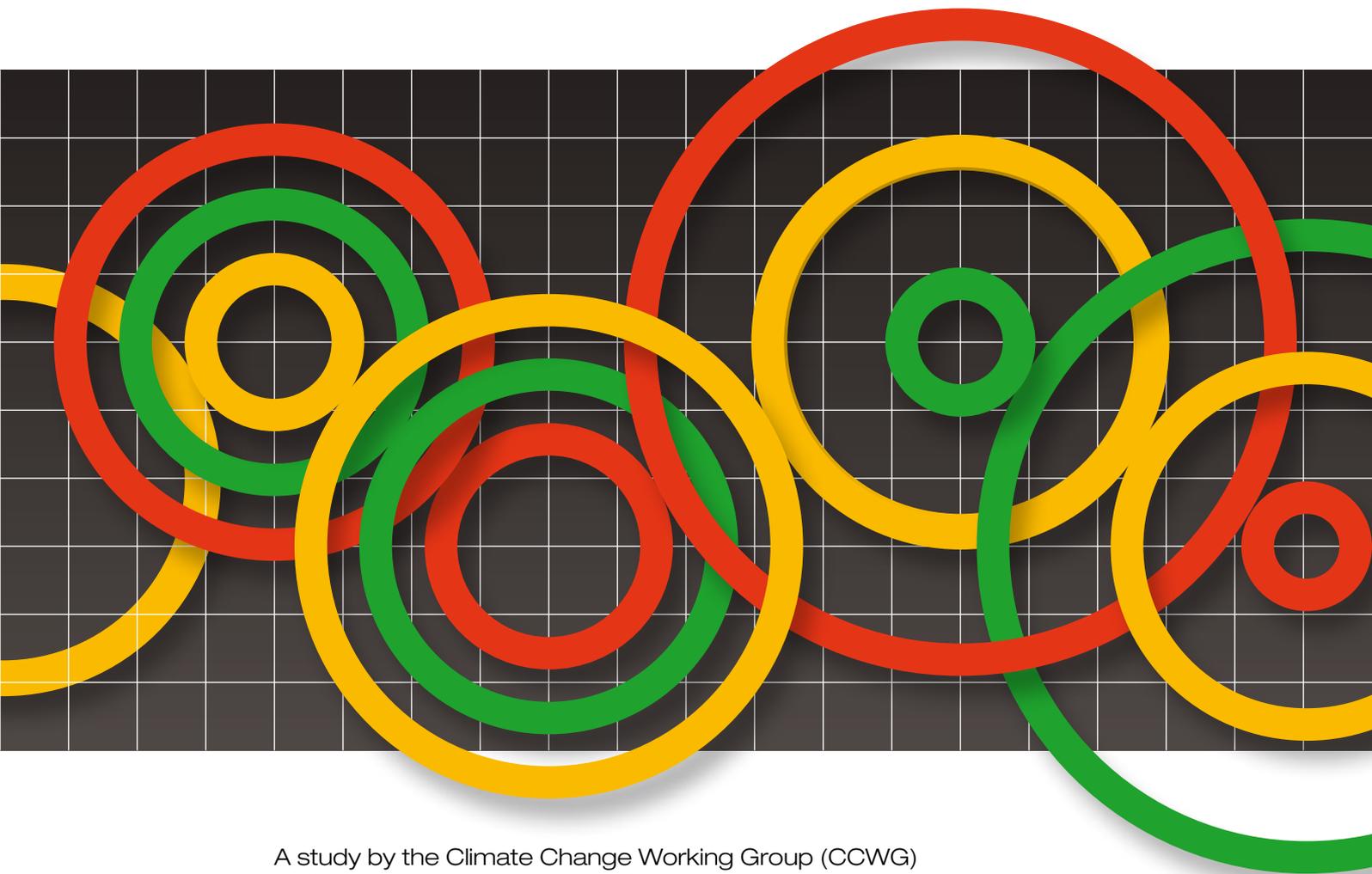
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# And yet it moves.

Success stories and drivers  
of CDM project development  
in sub-Saharan Africa



A study by the Climate Change Working Group (CCWG)  
and African Task Force (ATF) of the  
United Nations Environment Programme Finance Initiative



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# Foreword from the UNEP Finance Initiative Climate Change Working Group (CCWG) and African Task Force (ATF)

Coping with climate change will require large amounts of private and public investment. Private investment into decarbonisation activities is only possible and will only make sense if financial returns can be combined with environmental benefits directly measurable in emission reductions.

Among the mechanisms that have been put in place to directly link decarbonisation performance with financial revenues are the carbon markets which, despite initial difficulties, can be said to have thrived in recent years: traded volumes of 82 billion tonnes of carbon reductions with a value of EUR94 billion in 2009 – an increase in the trading volume of 68 percent – provide the evidence. The carbon markets that we see today represent a historic and encouraging innovation in the way we manage and protect our environmental resources. The notion is to make use of the same powerful market forces that have shaped many of the most thriving economies of the world (enhancing, in many places around the world, standards of living and eradicating poverty in an unprecedented manner) for the protection of one of our most valuable resources: the health of our atmosphere.

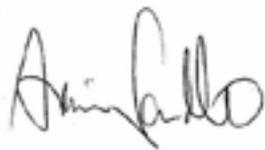
Within the international carbon markets, the Clean Development Mechanism (CDM) defined in the Kyoto Protocol has played a key role in creating links between the carbon markets of industrialised countries with emission reduction efforts in developing countries and emerging economies. This role has been interesting in two respects: firstly, the CDM has been an incentive for countries without formal emission reduction commitments to undertake carbon reduction projects, hence including them in a response to climate change which, to be successful, must be global and must include the large emerging emitters of the new international landscape. Secondly, the CDM offers new possibilities for developing countries to attract commercial investment not only aimed at reducing greenhouse gas emissions (GHG) but which are also supportive of economic development through the creation of jobs, local infrastructure and the generation of growth – in a clean, low-carbon fashion.

Unfortunately, the promise of the CDM has to date only materialised in a handful of countries, leaving out a large number of regions that remain in desperate need of clean private investment, most notably least developed countries and many of the countries in sub-Saharan Africa; these remain clearly under-represented in global carbon markets. Given the attractive but untapped environmental and financial potentials of the CDM in Africa, the UNEP FI Climate Change Working Group (CCWG) in cooperation with the UNEP FI African Task Force (ATF) is bringing the interesting nature and opportunities of the CDM clearly to the attention of the financial services sector in the region. African banks, investors and insurers can be instrumental in exploiting low-carbon projects for not only emission reductions and economic development, but also their very balance sheets and their early positioning in one of the fastest growing and most promising markets of the future.

Past research on this topic has mainly focused on the manifold barriers affecting CDM project development in the continent. However, there are also good reasons for optimism and this study aims to illustrate the “whys” and “hows” behind them with a view to encouraging project developers, local authorities and financial institutions to more actively seize the opportunities readily on offer.

For UNEP FI, this study represents the first and important step of a journey that we would like to embark on with financial institutions based in emerging and developing economies; its destination is a better understanding and a more systematic exploitation of the vast opportunities offered by the international climate change regime to the communities and institutions in those countries where clean investment is most needed.

We hope you will come with us.



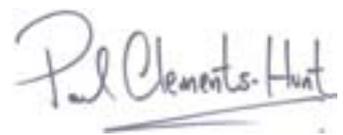
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# Executive summary

The Clean Development Mechanism (CDM) defined in the Kyoto Protocol aims to simultaneously promote GHG reduction activities in developing countries, support socio-economic development locally and foster technology transfer. The cash flows generated through this mechanism are meant to make emissions reduction projects in developing countries financially viable. Traditionally, without CDM support, such projects are often deemed commercially unattractive.

Many countries in sub-Saharan Africa have recently witnessed notable economic growth. But has the CDM met expectations and been instrumental in ensuring African growth takes place in a low-carbon manner? The answer is “no” given that Africa as whole – including the main CDM player on the continent, South Africa – will barely supply 3% of global Certified Emission Reduction (CER)<sup>1</sup> volumes by 2012. What has prevented the CDM from achieving its full potential in the countries of sub-Saharan Africa?

**Firstly**, the number of projects with robust and therefore bankable business plans is very limited.

**Secondly**, it is important to understand that the CDM will only be successful if it succeeds in leveraging private sector finance. Private sector investments will, however, only take place if the overall economic environment in a given country and/or region is attractive, i.e. conducive to investments. The real (and perceived) risks in conducting business in many African countries continue to crucially limit the supply of private capital overall as well as poor CDM activities in particular.

**Thirdly**, additional barriers related to the specifics of the CDM still exist. Their removal is a key condition for the CDM to function. In many instances there is a lack of local capacity – among both public as well as private stakeholders – to develop CDM projects: Project Design Documents (PDD), for instance, still have to be drafted by foreign experts. A further bottleneck is often the lack of capacity and transparency among Designated National Authorities (DNAs): a general lack of transparent rules and processes lead to lengthy and often arbitrary decision making processes (e.g. in the provision of letters of no-objection and letters of approval). Finally, the CDM process – due to its reduced scale in Africa – is further affected by an absence of Designated Operational Entities (DOEs) in the region and a lack of know-how and expertise among international DOEs with regard to local circumstances.

The case studies compiled and analysed in this study show that despite these and other challenges encountered in sub-Saharan Africa, a number of CDM projects have been successfully implemented, generating financial, environmental, and developmental returns. Their success relied on best practice by both public and private sector actors with scope for replication and expansion. The aim of this study is to document generic success drivers key to ensuring the success of CDM projects in Africa. The success drivers identified fall under three broad categories:

1. The institutional framework and policy for the private sector to operate in;
2. The institutional framework and policy for climate change related projects to succeed;
3. Project specific factors.

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1 GHG reductions achieved through the implementation of CDM projects are “securitised” into carbon credits called CERs

### **Institutional framework and policy for the private sector to operate**

- Government efforts to improve the enabling environment for private sector investments are crucial. These include, in particular, the reduction of administrative steps to establish and run businesses; a well functioning legal environment; respect of property rights (including, where applicable, the availability of land titles) as well as a good track record in enforcing contracts.
- Government efforts dedicated to attracting Foreign Direct Investment (FDI) or to induce domestic investment, including the provision of investor guarantees, are instrumental in promoting opportunities.
- The availability of sectoral master plans (renewable energy, forestry, waste management, etc.) provides national strategic orientation as well as additional investor comfort. In terms of renewable energy, government incentives targeted at renewable energy projects, including long term price signals, feed-in tariffs as well as smart subsidies, are needed to ensure sufficiently high project cash flows.

### **Institutional framework and policy for climate change related activities**

- Reliable and transparent decision making processes by the public authorities involved (including clear guidelines and transparent approval processes) within acceptable timeframes are key to making a country an attractive destination for carbon investment and finance.
- The institutional anchorage of DNAs and in particular their proximity to private sector promotion services/agencies is important in order to firmly embed climate change efforts within a broader economic development strategy.
- Additional and effective DNA support can consist in actively connecting and bringing together different CDM stakeholders: local project developers, carbon credit buyers, financiers and project sponsors.
- Capacity building programmes by the international community have proven to be essential in equipping DNAs and other institutions with the know-how and expertise needed to effectively carry out the above functions.

### **Project specific issues**

- Only projects with good business plans and models, including realistic cash flow projections, financing plans and supply/sales contracts are able to attract investors.
- Good management practice as well as a managerial track record of sponsors are seen as key factors of success.
- The alignment of project aims with local development goals has proved to be important as it facilitates early buy-in, support and a “license to operate” from authorities and local communities. This has ensured smooth project inception, implementation and operation in many of the examples analysed in this study.
- Close collaboration and ongoing coordination with DNAs gives clear indications on the CDM process and the project roadmap enabling reliable project planning.
- Business plans featuring multiple revenue sources are perceived as more robust and hence bankable than business plans reliant solely on one revenue stream. Project developers and sponsors can increase the viability and resilience of business plans and projects by integrating several income streams. Renewable energy projects, for instance, typically yield returns from both energy sales as well as the generation of carbon credits.

- In cases where projects remain commercially unviable despite the expected generation of carbon credits, support from public organisations at the national, regional or international level can be conducive in mobilising private sector investors. This support can be in the form of technical assistance, subsidies/grants, guarantees, co-funding and/or other measures.

Despite these success factors, barriers to the implementation of the CDM persist in many instances.

- Difficulties in assessing market potential constitute serious hurdles in the development of reliable business plans: low ability-to-pay among customers as well as unclear tariff structures (including the lack of clear feed-in tariffs and subsidies for all types of renewable energy projects) lead to unreliable sales and cash flow projections.
- The lack of “business-as-usual” emissions data needed for the definition of project baselines often makes it impossible to undertake CDM projects even when ‘easy’ emissions reduction opportunities have been identified.
- More generally, market and price information (e.g. energy, timber markets, etc.) remains unreliable or unavailable.
- Difficulties in mobilising local capital, coupled with exchange rate risks that are difficult to hedge internationally, increase the costs of financing or make it difficult to reach the financial closure of projects.
- The absence of an existing national track record and meaningful pipeline of CDM projects leads to a general lack of local experience (including lack of technical, managerial and financial expertise) as well as an inability to benchmark to other projects. These factors considerably slow down project design and implementation.
- Finally, the persistence of political instability at the national and regional levels and the lack of security as perceived by investors further reduce the overall willingness of private sector actors to invest in the region.

### **Recommendations for policy makers**

- The CDM is intended to leverage private sector investment into low-carbon projects. While the CDM is a strong catalyst in improving project returns, the promise of additional revenues provided through the mechanism is often not perceived as sufficient to compensate for the risks associated with investing in African markets. National policy makers must ensure an enabling environment for businesses to operate is in place. In particular the enforceability of contracts and reliability of regulation must be improved while excessive administrative burdens associated with setting up (and running) businesses reduced.
- Smart and effective risk allocation between the public and the private sector – by means of public finance mechanisms deployed at the international as well as national levels – will lead to increased willingness to invest.
- An essential pre-condition for an effective CDM market is a well-functioning DNA. Decisions must be fast and transparent; too often they are still perceived as arbitrary. Capacity building as well as experience sharing with other DNAs in the region (and beyond) can be instrumental in equipping DNAs with the needed know-how to effectively carry out their tasks. Multilateral and bilateral donor support in capacity building has proven successful but is still needed to consolidate and expand DNA capacity. Furthermore, internationally funded capacity building programmes for other local CDM stakeholders (including project developers, finance providers, insurers) should be systematically rolled out.

- In order to achieve their full potential, DNAs must be embedded within a broader national economic development framework with strong and permanent links to relevant public institutions outside the environmental domain, such as business/investment promotion and fiscal agencies.
- In Africa the large potential of the forestry sector – both in the existing area of land use, land use change and forestry (LULUCF) projects as well as in any upcoming regime for reducing emissions from deforestation and forest degradation (REDD+) – has not been fully realised. This requires clear national forestry frameworks and policies. At the international level, a more effective integration of land-use based activities into the international carbon markets should be ensured. This will specifically require an approach that addresses the issue of non-permanence in an environmentally credible and financially practical manner: only if carbon credits generated by forestry projects are competitive and fully fungible with other credit categories, will the private sector more intensively engage in this area.

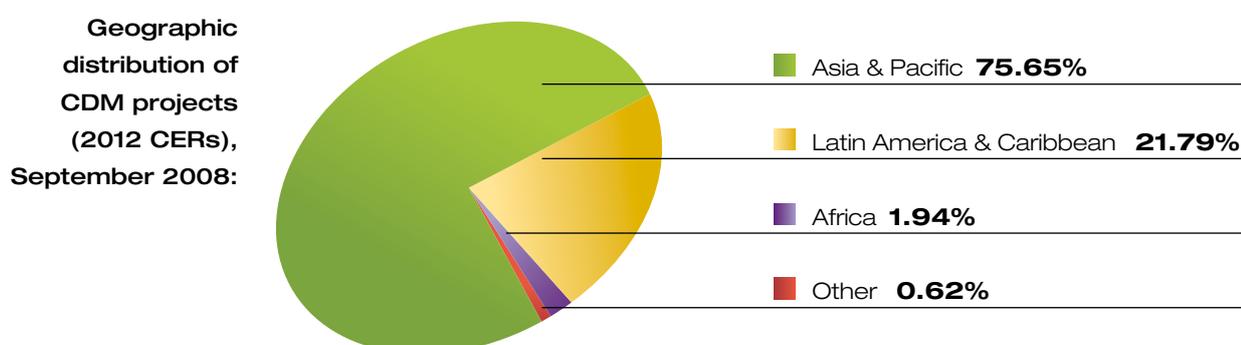
### **Recommendations for investors and finance providers**

- Reducing risks in conducting business in Africa can only be achieved through joint public and private sector efforts. Private sector actors will be more likely to invest if some of the categories of risk levels unacceptable to private operators could be carried by public sector actors (governments, development finance organisations, and bilateral and multilateral aid organisations). Investors should more systematically engage with public institutions on the issue of risk sharing. UNEP FI, in collaboration with a number of partners, already provides a platform for financial institutions to initiate a dialogue with international policy makers on the issue of public finance mechanisms in the areas of climate change mitigation and adaptation (see [www.unepfi.org](http://www.unepfi.org)).
- The inability to mobilise local finance could be bridged by the development of a public finance mechanism: a guarantee vehicle, for instance, that could mitigate the perceived risks of providing finance to entrepreneurs with insufficient collateral or track record. Through providing provision of guarantees to local financial institutions, Emissions Reduction Purchase Agreements (ERPAs) could be used as collateral enabling the mobilisation of local debt finance. Such a vehicle is currently under development with both public and private sector participants. Its structure will accommodate participants in a ‘senior – subordinate’ structure according to their respective risk profiles. The public sector would typically be able to cover a “first loss” tranche, thereby reducing the risk exposure of more senior commercial tranches.
- Investors should more systematically engage with local financial institutions and project developers in awareness raising and capacity building efforts. Local institutions and stakeholders that are aware of the CDM and have the needed know-how will be instrumental in expanding project pipelines and improving deal-flow. UNEP FI will continue to provide carbon finance training to local financial institutions, in Africa as well as other developing regions of the world.
- Investors and lenders can play a role in improving the viability of CDM projects by integrating multiple revenue streams in one project thereby increasing the viability and resilience of the business model. At the same time, it should be ensured that projects align well with local development needs as perceived by public institutions and local communities. This will ensure early buy-in, support and the “license to operate” from relevant stakeholders.

# Introduction

In 2002 UNEP FI launched – via the creation of the African Task Force – its African activities with the aim of supporting and expanding the integration of environmental, social and governance issues into the operations and decision making processes of local financial institutions. This objective includes the promotion of increased private finance and investment into activities that are commercially attractive and have a net positive impact on sustainability parameters. Climate change mitigation activities – ranging from renewable energy, to reforestation/afforestation, to the capture and re-use of GHGs – belong to this category of triple bottom line action; with the inception of the Clean Development Mechanism (CDM) defined by the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), undertaking such activities in developing countries has become a real and attractive option for private sector companies and their financial backers. However, the level of CDM project development and carbon finance deployment in Africa has been disappointing at best (see Figure 1 below).

**Figure 1** Number of registered projects



## Aim of this study

This study presents examples where the CDM has been used in particularly successful ways to mobilise financial resources for carbon-reduction projects, while promoting sustainable development in local communities in different countries of sub-Saharan Africa. These examples of local best practice serve as a repository of aspects that have worked well in the past and consequently serve to encourage financiers, project developers and regulators to continue harnessing CDM potentials in the future. At the same time, this study aims to provide a first and broad introduction to the CDM – from rationale and project types, to commercial banks in the region not yet familiar with it.

## The Clean Development Mechanism and its barriers

According to Article 12 of the Kyoto Protocol, the CDM aims to reduce emissions of GHGs while promoting sustainable development. Under the CDM, an industrialised country invests in projects in a developing country and obtains credits for achieved emission reductions called Certified Emission Reductions (CERs). The CDM is intended to provide specific benefits for developing countries, including transfer of clean technology, FDI, improvement of the local environment and an income stream from the sale of tradable CERs. The CDM, from a private sector perspective, together with mechanisms on voluntary carbon markets, gave birth to the concept of carbon finance which opens additional financing channels to carbon reduction projects in developing countries. It is a unique instrument in terms of both its underlying rationale and its potential to simultaneously deliver a variety of benefits to different stakeholders:

- The promotion of sustainable development by offering an incentive for environmentally conscious direct investment in developing countries (Non-Annex 1 countries)
- The creation of an international carbon market that minimises Kyoto-compliance costs for industrialised countries (Annex 1)
- The inclusion of rapidly emerging economies and developing countries into global climate change mitigation efforts

Some of the project categories that can attract commercial carbon finance via the CDM are:

- Renewable energy
- Energy efficiency – supply side as well as demand side
- Methane capture (i.e. from landfill sites, etc.)
- Transport
- Afforestation and reforestation

CDM-generated CERs can be sold on international carbon markets and some emissions trading schemes, such as the European Emissions Trading Scheme (EU ETS). The amount of carbon credits generated (1 credit corresponds to 1 ton of CO<sub>2</sub>-equivalent) is calculated as the difference between the project's GHG emissions relative to a business-as-usual baseline (the baseline represents the amount, over time, of GHGs that would have been emitted in the absence of the CDM project). See Box 1.

The CDM has already delivered a substantial amount of emission reductions worldwide. So far 1785 projects have been registered and the UNFCCC expects these projects to deliver some 1.6 billion tonnes of emission reductions by the end of 2012. Yet many barriers to the implementation of CDM projects persist and African countries have been among the least well served. A study by the Organisation for Economic Cooperation and Development (OECD 2007) identifies four main types of barriers to the development of CDM projects:

- 1. Non-CDM-specific barriers at the national level**, such as the institutional and policy framework within which companies and projects operate (e.g. restrictions on private generation of electricity, as well as the overall environment for private investment and business viability)
- 2. CDM-specific barriers at the national level**, such as the lack of CDM awareness among potential project owners or financiers as well as the insufficient capability of domestic regulators
- 3. Barriers at the project level**, such as the lack of possibilities for projects to receive finance or the existence of too many risks making projects unviable
- 4. Barriers at the international level**, such as rules of investor/buyer countries entailing the ineligibility of credits from certain types of CDM projects as well as in practical CDM modalities as defined under the UNFCCC.

Besides these barriers – common to most CDM project development globally – a number of barriers are specific to certain types of macro-economic landscapes and geographies. A recent *Climate Strategies* discussion paper explores some of the potential barriers typically encountered in least developed countries (LDCs). Usually the attractiveness of the host country in terms of emission reduction potential, the institutional setting of the country to host CDM projects, the general attractiveness to private investment, as well as the familiarity of investors with local circumstances, play a role in making CDM project development viable. In LDCs, all of these score badly. Furthermore, projects in LDCs are often small and, as such, commercially not very attractive due to the high share of transaction costs involved.

## Box 1 **CDM: The fundamentals**

Registering a project under the CDM is a long and complex process, requiring a number of additional steps compared to conventional projects (see Box 2). A range of new organisations, both at the international and the national levels, has to be involved (e.g. Designated National Authorities and Designated Operational Entities), and a project design document must be developed including a baseline methodology and a monitoring plan. For a CDM project financier or insurer it is important to note that the transaction costs for the additional CDM procedures are often between \$50,000 and \$250,000 depending on the project type and size. Based on recent experience, it takes approximately 1 to 3 years to get from the project design stage to the actual registration of the project.

To ensure the environmental integrity of the CDM, the concept of additionality was developed. Additionality was defined under the Marrakech Accords (2001) as the following:

*“A CDM project activity is additional if anthropogenic emissions of Greenhouse Gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity” (CDM Modalities of Marrakech Accords).*

As part of a project’s additionality assessment, the project developer must pass either the investment analysis or the so-called barrier analysis. Here, the project developer must give evidence that without the CDM the project was not the most plausible economic option or that specific project implementation barriers can be overcome through registration as a CDM project.

## Box 2 **Comparison of conventional and CDM project cycles**

<b>Conventional project cycle</b>	<b>CDM project cycle: Additional steps compared to conventional projects</b>
1. Feasibility assessments, e.g. <ul style="list-style-type: none"> <li>■ project design</li> <li>■ environmental, technical, financial feasibility</li> <li>■ identify partners</li> </ul>	Assessment of <ul style="list-style-type: none"> <li>■ possible CER delivery</li> <li>■ how to monitor emissions</li> <li>■ CER market value</li> <li>■ whether the project qualifies as CDM</li> <li>■ project methodology</li> </ul>
2. Project structuring phase, e.g. <ul style="list-style-type: none"> <li>■ government permits</li> <li>■ environmental permits</li> <li>■ arranging finance</li> </ul>	<ul style="list-style-type: none"> <li>■ drafting of project design document (PDD)</li> <li>■ validation of baseline &amp; monitoring plan</li> <li>■ approval of host country</li> <li>■ Carbon Reduction Purchase Agreement</li> <li>■ registration of the project at the EB</li> </ul>
3. Implementation phase, e.g. <ul style="list-style-type: none"> <li>■ construct or upgrade plant</li> </ul>	<ul style="list-style-type: none"> <li>■ install monitoring facilities</li> </ul>
4. Operational phase, e.g. <ul style="list-style-type: none"> <li>■ deliver services</li> </ul>	<ul style="list-style-type: none"> <li>■ monitoring and verification and/or certification of emission reductions</li> </ul>

## A turn-around in sight?

While the CDM market is still dominated by Asian transactions and particularly those in China (72% of all transactions), it seems that against the odds, Africa is finally emerging, accounting for 7% of transactions in 2010<sup>2</sup>. A number of countries in sub-Saharan Africa entered the project pipeline for the first time in 2008 and 2009. Although they account for a small share of the primary CDM market, some countries in Africa (Kenya, Uganda and Nigeria) reported sharp increases in transaction volumes. All Africa projects jointly, so far, have contracts for the supply of 50 MtCO<sub>2</sub>e (megatonnes of CO<sub>2</sub> equivalent), with more than 20 MtCO<sub>2</sub>e transacted in 2007 alone. While this clearly constitutes a positive development, there is still a widely shared perception that Africa's ability to tap into the CDM market remains below its overall potential.

**Figure 2**  
Number of CDM projects in Africa: a turn-around in sight?

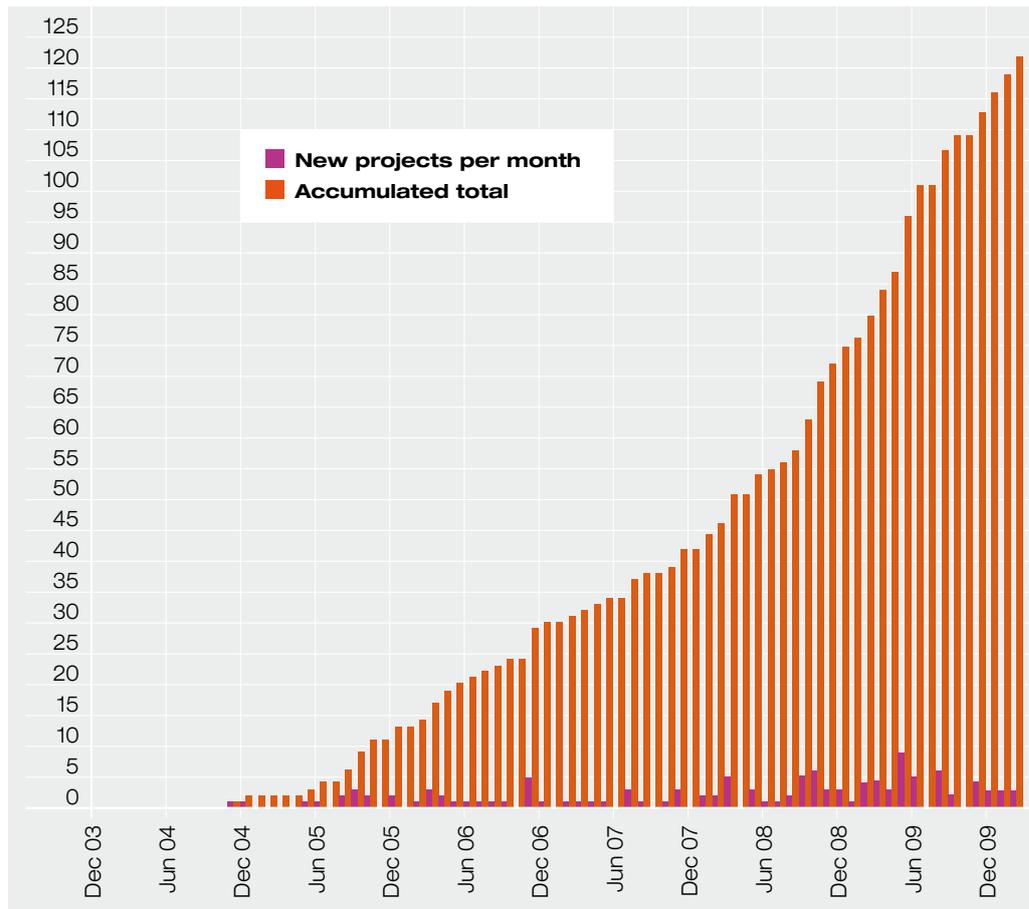


Figure 2 above, as well as the case studies analysed in this study, shows that despite adverse circumstances in many African countries, CDM project development is possible. The main aim of this study is to help identify and visualise the success drivers of CDM project development in Africa. This indicative evidence repository should encourage local authorities, project developers and finance providers to more systematically exploit the environmental and financial potentials offered by the CDM in Africa.

It is encouraging that the demand from industrialised countries for CERs sourced in Africa is expected to be strong under any future climate regime. The EU for instance, has already taken a first step in providing explicit regulatory support for CDM demand from LDCs. The EU climate package adopted by the Council in April 2009 specifies two measures guaranteeing demand channels for LDC-sourced carbon credits: firstly and in the context of the European Emissions Trading Scheme (EU ETS), if a post-Kyoto international agreement is not reached under the UNFCCC, carbon credits from new projects will only be able to enter the scheme if they come from

<sup>2</sup> Source: State and Trends of the Carbon Market – World Bank (2010)

LDCs or from other developing countries with which the EU would have concluded a bilateral agreement. Secondly, all EU member states will be allowed to use a certain amount of CERs for their governmental compliance obligations from any CDM country; however, certain member states benefit from an additional CER quota, provided that these credits come exclusively from LDCs.

Furthermore, in the negotiations of the Bali Roadmap – currently underway and expected to lead to a new global deal in 2011 or 2012 – various proposals have been made on how to make CDM projects in LDC's more attractive. These include streamlining and speeding up the current form of CDM functioning, the introduction of standardised multi-project baselines, the advancing of funds for the development of CDM projects for countries hosting fewer than 10 CDM projects, more flexibility for the calculation of grid emission factors in countries with limited data availability, as well as the introduction of simplified modalities for demonstrating the additionality of small-scale renewable energy and energy efficiency projects. In fact, substantial progress in some of these areas was achieved at the Conference of the Parties 16 in Cancun, Mexico: among other items, it was decided that standardised baselines for the calculation of emission reduction and removals and/or the determination of additionality will be possible, and that a lending scheme will be established to cover transaction costs of CDM projects in countries with less than 10 projects.

### Typology of CDM success drivers

The success drivers – identified and described on the basis of the case studies in this study – fall into two broad categories:

1. At the policy level – success drivers underpinned by the **overall legislative institutional and regulatory frameworks for private sector (including CDM) investment** in a given country (**category 1**), and
2. At the project level – success drivers related **specifically to the development of CDM projects (category 2)**.

Under **category 1**, the case studies consider the following country-level characteristics and their importance:

- Overall investment climate, including the general ease of doing business
- Existence of a regulatory framework promoting private investment in relevant sectors
- Institutional framework related to the CDM, including:
  - General capacity related to the CDM process
  - Existence of an efficient and competent DNA and swift project approval procedure

Under **category 2**, the success factors in the following dimensions – and with regards to the following stakeholders – are examined:

- **The project development dimension**, i.e. what makes the CDM activity interesting for project developers and a commercially attractive undertaking despite encountered barriers
- **The carbon finance dimension**, i.e. how are financial risks shared among different parties; are public finance or other types of mechanisms used to enhance the robustness of the financial plan; and can future expected revenue streams from the generation of CERs be monetised
- **Public sector role**, i.e. what is the role of national/regional entities in facilitating the specific project; how are institutional gaps and barriers overcome
- **Sustainable development dimension**, i.e. how does the project contribute to sustainable development locally and what is the role of third party stakeholders in project design and implementation

The projects selected for this study are:

- Project 1: **Landfill Gas Recovery and Electricity Generation** at Mtoni landfill **in Tanzania**
- Project 2: West Nile **Rural Electrification in Uganda**
- Project 3: 35 MW Bagasse-based **Co-generation in Kenya**
- Project 4: **Pan Ocean Gas Utilisation in Nigeria**
- Project 5: Ibi Batéké **Carbon Sink Plantation (IBCSP) in Democratic Republic of Congo**

The analysis of the case studies is based on the evaluation of country level conditions, such as overall economic situation, investment climate and the CDM framework, project level characteristics including the objectives of the project, barriers to investment, carbon finance arrangements and the role of public finance, as well as sustainable development benefits of the project. The key success factors are then identified on the basis of the analysis of country data and project documents, as well as on the basis of interviews with project participants and DNAs.

# Case studies and lessons learnt

## 1. Landfill gas recovery and electricity generation at Mtoni landfill in Tanzania

This case study focuses on a CDM project implemented at the Mtoni landfill site in Tanzania. The purpose of the project is to capture and burn biogas emitted from the landfill site. Biogas is composed primarily of methane, and as methane is 21 times more potent a GHG than CO<sub>2</sub>, capturing and flaring the biogas reduces the amount of GHGs emitted providing an opportunity to generate carbon credits (CERs). Furthermore, there is potential, in a second phase of the project, to generate biogas-fired electricity. This study identifies the key drivers instrumental in setting up this CDM project as well as the barriers encountered.

### 1.1 Country assessment

#### 1.1.1 Investment climate

Tanzania is a low income country with a per capita income of USD400 per year. Its economy primarily depends on agriculture, which accounts for about half of GDP, delivers 85% of exports, and employs 80% of the workforce. Tanzania has implemented a comprehensive trading reform programme that has improved macroeconomic performance and stability. For the last three years, growth rates have been in the order of 7%. Recent banking reforms have helped increase private sector growth and investment.

Compared to other LDCs, Tanzania has an impressive track record in attracting FDI, receiving USD1billion in FDI during the 1995 to 2000 period. This provides evidence of both available investment opportunities as well as the successful restructuring of the investment regime in recent years.<sup>3</sup>

In an effort to further promote growth and development of the private sector, the government is running the Business Environment Strengthening for Tanzania (BEST) programme. It aims to improve the enabling environment for private sector development by reducing the administrative and regulatory burden of doing business and improving governmental and judicial service delivery.

#### Foreign Direct Investment

Investment in Tanzania is governed by the Investment Act 1997, which established the Tanzanian Investment Centre (TIC) to attract and facilitate investment. All government departments and agencies are required by law to fully cooperate with the TIC. Senior officials from all relevant government agencies are permanently stationed and operate within TIC's premises, processing applications for different permits and approvals.

Moreover, Tanzania has double-taxation agreements with nine countries<sup>4</sup> and has signed bilateral investment treaties with ten countries.<sup>5</sup> The TIC grants Certificates of Incentives<sup>6</sup> to all investors and provides guarantees to cover risks related to the ownership of properties, the dispensation of assets, the repatriation of income and other matters.

<sup>3</sup> UNCTAD, World Investment Report 2006.

<sup>4</sup> Canada, Denmark, Finland, India, Italy, Norway, South Africa, Sweden and Zambia.

<sup>5</sup> Denmark, Egypt, Finland, Germany, Italy, the Republic of Korea, the Netherlands, Sweden, Switzerland and the United Kingdom.

<sup>6</sup> Incentives Guarantees Available To Holders Of TIC Certificates Of Incentives

**Table 1**

**Summary of success drivers and persisting barriers associated with the landfill gas recovery and electricity generation at Mtoni landfill in Tanzania**

<b>Success drivers</b>	<b>CATEGORY 1 – Overall legislative, institutional and/or regulatory frameworks for private sector (including CDM) investment</b>
	A dedicated government effort to improving the enabling conditions for private sector investment and entrepreneurship: the BEST programme reduces the administrative burden on business and enhances public service provision to the private sector.
	A powerful government agency (TIC) is in place specifically dedicated to attracting increased flows of FDI into the country through the provision, among other measures, of investor guarantees covering diverse risks.
	Good track record and reputation with regards to the enforcement of contracts.
	Early development of climate change institutions and targeted capacity building, resulting in substantial support from multilateral and bilateral donors and programmes such as UNEP Risoe’s CD4CDM and the regional CDM capacity building led by UNDP; existence of a dynamic DNA actively promoting the CDM among private sector players and with permanent connections to other relevant entities, such as the TIC.
	An attractive set of regulatory incentives specifically targeted at renewable energy projects and the creation of a robust institutional framework especially to small-scale projects.
	<b>CATEGORY 2 – Drivers related specifically to the development of CDM projects</b>
	<u>The project development dimension</u> Good alignment of project aims with sustainable development priorities defined at the national level, addressing a perceived local need; this ensured on-going support by local communities and government authorities.
	<u>Public sector role</u> Early buy-in from and close cooperation with a competent and efficient DNA; availability of public sector co-funding; the existence of clear national guidelines and procedures for the approval of CDM projects.
	<u>Sustainable development dimension</u> Early involvement of and consultation with local communities; good alignment of the project with sustainable development priorities defined on the national level addressing a perceived local need; this ensured on-going support by local communities and government authorities.
<b>Persisting barriers</b>	Lack of information to determine business-as-usual baselines, for instance with regards to average grid emissions data.
	Grid/market access difficulties for innovative renewable energy projects.

**General assessment of ability to conduct business**

Tanzania has put in place an extensive set of policies and procedures that promote trade, commerce, employment and resource utilisation. While the country is officially open to all foreign investment, there are still some procedural barriers that must be overcome by the successful investor. In a regional comparison on the enforcement of contracts, Tanzania is ranked highly.<sup>7</sup>

There are incentives available through a reduction in or exclusion from tax or duty payments to investors in lead or priority sectors: for foreign investors, in the case of investments above USD300,000, and for local investors in the case of investments above USD100,000.

7 Source: World Bank – Doing Business - 2009

## 1.1.2 Clean Development Mechanism framework

### Institutional capacity

Tanzania signed the UNFCCC in 1992 and ratified it in 1996. It became a Party to the Kyoto Protocol in 1997 and ratified it in 2002. Compared to many other African countries, Tanzania has made considerable efforts in CDM-related awareness raising and capacity building. This made Tanzania one of the first countries in Africa to establish a DNA for the CDM in 2004. Efforts by the government and local stakeholders to stimulate implementation of CDM projects have received substantial support from multilateral and bilateral donors.

The UNEP Risoe Centre, for instance, launched the CCD4CDM in Tanzania in 2007. The CD4CDM has particularly sought to:

(a) improve Tanzania's institutional preparedness for hosting CDM projects, including the ability of the DNA to efficiently approve CDM projects in line with the country's sustainable development priorities;

(b) build capacity of local experts in key sectors regarding the identification, design and implementation of CDM projects. It has also aimed to build the capacity of relevant institutions in appraising, funding, and promoting CDM investments as well as to promote Tanzania as a CDM investment destination.

Tanzania is also a beneficiary of the Regional CDM Capacity Building project led by UNDP which operates in six other countries: Democratic Republic of Congo, Ethiopia, Kenya, Mauritius, Mozambique and Zambia. The project, which is jointly financed by Finland, Spain and Sweden, aims to enhance the capacity of the private sector to access carbon finance. It also reviews existing institutional frameworks and identifies CDM-related capacity gaps. A major feature of the UNDP approach is the facilitation of cost-effective delivery of capacity building services and the promotion of South-South technical cooperation between project participating countries.

Through various CDM awareness workshops, training seminars, e-learning courses and specific interventions such as the CD4CDM programme, the Renewable Energy and Energy Efficiency Partnership (REEEP) programme and the Austrian CDM capacity building programme for Africa, Tanzania has been able to stimulate CDM project activities in various areas.

### Renewable energy framework

Biomass, which comprises fuel-wood and charcoal from both natural forests and plantations, accounts for 93% of total energy consumption in Tanzania. More than 80% of the population has no access to "modern" energy sources.

In recent years the government has undertaken a number of measures to expand access to energy and installation of renewable-energy capacity. It has simplified procedures for investing in solar, wind and micro-hydro projects including the introduction of a 100% depreciation allowance in the first year of operation, and exemptions from excise duty, sales tax as well as concessionary customs duty on the first import of materials used in renewable energy projects.

In addition, the government – through the Ministry of Energy and Minerals – is establishing a legal and institutional framework for the development of small renewable energy projects. The framework includes the introduction of Standardised Power Purchase Agreements (SPPA) and a standard tariff methodology, both of which became applicable between developers and buyers in 2009. Eligible small power projects are those of capacity ranging from 100kW to 10MW.

### Designated National Authority (DNA)

Since its establishment in 2004, the DNA has been involved actively in promoting public and private sector involvement in capacity building and awareness programmes, as well as in the

development of CDM projects, including the implementation of the CD4CDM project. It conducts carbon market promotion initiatives at the national level through the TIC and encourages the support of CDM activities by various government entities, such as the Ministry of Natural Resources and Tourism, the Ministry of Energy and Minerals as well as the Ministry of Trade, Industry and Marketing.

The DNA has set up a legal framework for adaptation and mitigation activities based on the provisions of the Environmental Management Act (2004) and the Environmental Impact Assessment Regulations 2005. Also in place are the CDM Investor's Guide and the Handbook for CDM in Tanzania, both of which have been prepared by the DNA.

## 1.2 **Project description**

### 1.2.1 **Project scope and objective**

The purpose of the project is to capture and flare biogas from a landfill site and, in a second phase of the project, use it for electricity generation for the national grid.

The primary component of biogas emitted by landfills is methane ( $\geq 50\%$ ), with a global warming potential 21 times higher than that of  $\text{CO}_2$ . The project enables the destruction of part of the methane emissions originating from the decomposition of organic waste deposited in the Mtoni landfill site near Dar Es Salaam through the installation, operation and maintenance of a landfill gas extraction and flaring system. By burning the methane contained in the biogas, it is destroyed resulting in emissions reductions.

The project also envisages, as part of the second phase, the generation of electricity for the national grid. However, at this stage the project sponsors do not intend to generate emissions reduction credits for any "displaced" energy, given the lack of reliable data on average Tanzanian grid emissions. The lack of information on the country grid emissions factor, needed for the establishment of CDM project baselines, is one important barrier to CDM investment in many African countries.

The project's estimated emission reductions amount to more than 2 million tonnes of  $\text{CO}_2\text{e}$  for a fixed crediting period of 10 years, starting on 1st July 2007.

At the time of implementation of the Mtoni landfill project, TANESCO, the Tanzanian Electricity Company, was not purchasing electricity from landfill biogas. A guaranteed income could therefore not be expected from the sale of electricity through such projects.

### 1.2.2 **Project development dimension**

#### **Key success factors**

- According to DNA representatives, at the time of project design and inception, waste management was considered a priority in local development. In addition to reducing GHG emissions, there was a need to solve a local problem on the ground. The project idea coincided with local needs and priorities.
- Close collaboration between the DNA and the project participants further contributed to the project's success. The DNA was closely involved in the negotiations over the project as a mediator. In addition, the national focal point for the CDM in Tanzania at the time was a member of the CDM Executive Board and very knowledgeable about CDM procedures and processes.
- The investor, a consortium of Italian companies, was very experienced in the development of CDM projects, having implemented a number of projects in Latin America.

### 1.2.3 **Carbon finance dimension**

The capital costs of the project amounted to EUR 1.6 million.

The main parties involved in the project included: the Dar Es Salaam City Council (project owner) and the Consorzio Stabile Globus (CSG) from Italy (project developer and sponsor), responsible for the construction and management of the landfill gas extraction. The Dar Es Salaam City Council will continue to own and manage the landfill.

#### **Mobilisation of third party financing for the CDM activity**

No third party financing has been attracted to the project, which was fully funded by the project participants, including a public institution: the City Council of Dar Es Salaam.

#### **Sharing of financial risks among different parties**

Most of the financing for the project came from the investor, with a small share contributed by the City Council. The financial participation and project co-ownership of the local government not only reduced the need for upfront financing but helped to clearly align public and private interests ensuring future government support in the successful implementation and operation of the project. Such government participation can be an effective mitigant of both conventional as well as CDM-specific risks.

#### **Role of public financing mechanisms**

Co-funding was provided by the City Council of Dar Es Salaam.

#### **Role of CER cash flows in overall financing plan**

Although the project envisages the generation of electricity for the national grid, no such power revenues could be expected up-front, as TANESCO, the Tanzanian electricity distributor, was not buying electricity produced by landfill biogas at the time of project inception. Therefore, the project's sole revenue stream will be that generated by the cash-flows expected from the sale of CERs.

### 1.2.4 **Public sector role**

#### **Role of national / local government agencies**

Close involvement of the government both as a project owner through the City Council and through the DNA has been key for the success of the project. In addition, the existence of clear national guidelines and transparent procedures for the approval of CDM projects has played an important role. The large number of CDM capacity building programmes implemented in Tanzania with government support also contributed to the country's rapid engagement in the CDM. Tanzania was among the first countries in Africa to register a CDM project.

#### **Availability of public finance mechanisms at national level**

No public finance mechanisms for CDM projects have been identified at the time of writing. Availability of tax incentives to investors, noted above, as well as the new framework for supporting small renewable energy projects could become important factors facilitating project finance for CDM projects in the future. Obviously, public ownership of the project as well as the financial contribution towards its implementation can be seen as ad-hoc forms of public finance mechanisms.

## 1.2.5 Sustainable development outcomes

### Project impact on local communities

The project will increase the development potential of the area surrounding the landfill, eliminate odorous emissions and mitigate health problems, improving the quality of life of local residents.

Safe and effective extraction of biogas produced by the site will significantly reduce the risk of fire and explosion.

In addition, the project will have a positive impact on the local economy, employing local workers and using local materials whenever possible. Furthermore, the Dar Es Salaam City Council, a public authority, will benefit from technology and know-how transfer. The Dar Es Salaam City Council will receive additional funding from the sale of carbon credits as agreed in the MOU drawn up with the project sponsors, CSG.

Electricity generated and fed into the local grid, eventually as part of the second phase in the project, will serve as a source of energy supply contributing to reduced risk of power shortages.

### Involvement of third party stakeholders

As the Mtoni landfill site is located near the densely populated area of Mtoni, the City Council decided that meetings would be held between council members and residents surrounding the Mtoni site. During the meetings, council members described the project to residents who raised issues and comments. Comments received showed that all stakeholders agreed with the project and felt that the project would be beneficial to both local communities and for broader environmental protection. In addition, the project was seen as a source of pride for both city residents and council officials.

## 1.3 Lessons learnt

The success of the project is due to a combination of factors at country level and at project level. Efforts of the government to promote general development of the private sector and to improve the investment climate, the existence and competence of the DNA, as well as the implementation with international support of several capacity building programmes have played an important role in promoting the CDM in Tanzania and facilitating the implementation of the Mtoni landfill project.

Project participants fully funded the project with City Council minority participation. The combination of private capital associated with a public goal and support from both local and national authorities as well as the involvement of community stakeholders from the outset, ensured smooth project implementation.

## 2. West Nile electrification in Uganda

Energy insecurity is a major issue in Uganda. As a landlocked country, Uganda is dependent on neighbouring countries for fuel supplies. Regional instability and related border closures result in energy insecurity. Furthermore, civil wars in the 1970s and 1980s degraded Uganda's energy infrastructure. The objectives of the West Nile Electrification Project (WNEP) are to simultaneously promote socio-economic development by increasing energy security, to reduce the region's dependency on neighbouring countries as well as to reduce energy-related CO<sub>2</sub> emissions.

The project will install and operate a hydroelectric power plant on the river Nile, and install and operate a heavy fuel oil generator (less GHG intensive than the current energy supply from diesel and petrol generator sets), to serve as an additional power source. The project is expected to deliver 760,000 tonnes of CO<sub>2</sub>e reductions over its lifetime. This study examines the key drivers and frameworks that enabled the set up of this project.

### 2.1 Country assessment

Despite dramatic economic growth in Uganda over the past fifteen years, both its dependency on neighbouring countries and regional instability continue to lead to economic insecurity.

Energy insecurity also remains a major issue for the government to address. This is particularly the case regarding fuel supplies where, as a landlocked country, Uganda depends on petroleum supplies transiting through neighbouring countries where unexpected border closures can disrupt supplies.

#### 2.1.1 Investment climate

##### Foreign Direct Investment

Uganda pursues a pro-active FDI policy and has succeeded in attracting international investors, mainly driven by the country's pro-market policies in the telecommunications and manufacturing sectors. The government of Uganda has pursued a policy of improving the investment climate by reducing bureaucracy, streamlining the legal framework, fighting corruption and stabilising the economy. This strategy is intended to increase Uganda's competitiveness for FDI and to establish Multi-Facility Economic Zones with streamlined (extra-territorial) procedures. As a result of these actions, Uganda was able to attract more FDI than most other countries in the region<sup>8</sup>.

Perceived high technology risks in the areas of power generation, transmission and distribution systems as well as past nationalisation of private sector assets, however, continue to affect the country's attractiveness to private sector investors. Barriers to investment in rural areas are particularly high. As a result of perceived risks and barriers, foreign investors financing rural power supply in Uganda will typically require a return on equity of around 30-35%<sup>9</sup>.

##### General assessment of ability to conduct business

Civil wars in Uganda in the 1970 and 1980s degraded the electricity infrastructure and undermined investor confidence. While the West Nile has enjoyed political stability under the current government, it remains vulnerable to disruptions in the North affecting traffic and transport in and out of the West Nile.

The World Bank's "Doing Business 2009" report rates Uganda 117th regarding the overall enforcement of contracts, 111th in terms of ease of doing business and 84th for ease of getting credit among the 183 countries analysed in the report.

8 Source: Africa-business.com

9 Source: project PDD

**Table 2**

**Summary of success drivers and persisting barriers associated with the West Nile Electrification Project in Uganda**

<b>Success drivers</b>	<b>CATEGORY 1 – Overall legislative, institutional and/or regulatory frameworks for private sector (including CDM) investment</b>
	The attraction of FDI as a national priority with a comprehensive implementation strategy in place including the reduction of bureaucracy, streamlining legal frameworks and anti-corruption measures as well as the establishment of Multi-Facility Economic Zones with streamlined (extra-territorial) procedures.
	Early development of climate change institutions beyond the DNA and targeted capacity building efforts; the Uganda Carbon Bureau for instance provides practical advice and support to project developers, carbon credit buyers, financiers and other stakeholders to improve their understanding of climate change and the carbon markets.
	Permanent links between the DNA and important and relevant institutions such as the Uganda Investment Authority (UIA).
	Through the Energy for Rural Transformation (ERT) programme, emissions baselines in the power generation sector have been determined; these are essential for the development of any energy-related CDM project. Such important data is still missing in many other countries in the region and continent.
	<b>CATEGORY 2 – Drivers related specifically to the development of CDM projects</b>
	<u>The project development dimension</u> Good alignment of project aims with sustainable development priorities defined at national level, addressing a local need perceived as urgent: the lack of clean and reliable electricity.
	<u>Public sector role</u> At international level, the project has profited from the simplified modalities and procedures for small-scale CDM projects. The pioneering role of the World Bank Prototype Carbon Fund, given the prohibitively high risk-return expectations of purely private investors, in monetising future CER generation for up-front financing. Financial support from a national public finance mechanism – the Ugandan Rural Electrification Fund which provides smart subsidies to support up-front capital expenditure as well as performance-based subsidies for the expansion of grid connections.
	<u>The carbon finance dimension</u> The public-private sharing of risks between the sponsor company and international donors acting as investors through the World Bank Prototype Carbon Fund, which was instrumental in monetising future CER into upfront project financing.
	<u>The sustainable development dimension</u> The establishment of partnerships with local NGOs and an intensive consultation process with local communities enabled local buy-in from the project outset.
<b>Persisting barriers</b>	Significant investment risks and barriers, particularly in rural areas, can only be justified with investment returns on equity of more than 30% per year.
	Lack of local experience and expertise in the development and operation of carbon reduction projects, including renewable energy activities.
	High up-front investment needs, lack of an accessible financial market and customers' low ability-to-pay are some of the barriers to capacity development in renewable energy; development banks and public finance mechanisms can play a role in overcoming these initial hurdles before purely commercial transactions are possible.
	In addition to emissions baselines, market data on local energy demand is crucial for the planning of renewable energy projects and is often unavailable or unreliable.
	Vulnerability of the Ugandan currency to external factors (ODA, world market coffee price, etc.); significant inflationary pressure; dependency of local economy on volatile cash crops revenues.
	Problematic external security situation: conflicts in neighbouring countries as well as internal security situation still of concern; possible political interference with business decisions: new regulatory system is untested.

## 2.1.2 Clean Development Mechanism framework

### Institutional capacity

Uganda has participated in capacity building activities under the World Bank, UNEP and the Start-Up CDM in African, Caribbean and Pacific Countries programme (CDM SUSAC) allowing the development of capacities among the relevant sectoral institutions and the creation of specialised agencies dealing with the CDM.

The Uganda Carbon Bureau was created to provide practical advice and support to project developers, carbon credit buyers, financiers and local stakeholders to improve their understanding of climate change and the carbon markets. The Bureau has knowledge about CDM activities in Uganda and works closely with the DNA, the Uganda Investment Authority (UIA) and the Carbon Emissions Reduction Association, of which it is a member.

The UIA was established by an Act of Parliament, the Investment Code, 1991, to promote, facilitate and monitor investment in Uganda and to provide advisory services to government on policies affecting investment conditions.

These two agencies are closely involved in building the national CDM infrastructure and promoting involvement of relevant stakeholders in CDM projects in Uganda.

### Renewable energy framework

Off-grid electricity in rural Uganda is supplied mainly by diesel and petrol generator-sets. With the support of the international donor community, a few off-grid renewable energy sources have been developed, with a total capacity of less than 1MW nationally. Private hydropower investments have been considered in Uganda only in the past few years, but none has reached financial closure. Hydropower projects are typically financed either by governments or international NGOs.

### Baseline for CDM projects

As part of the World Bank's Energy for Rural Transformation (ERT) lending programme, implemented jointly by the World Bank and the Ugandan government, a large number of interviews have been conducted, extensive field visits organised, and a comprehensive survey of the installed engines and diesel generator sets in the West Nile region undertaken. This effort has allowed the determination of the average energy efficiency of power generation and distribution systems and to calculate emissions baselines needed for the development of energy-related CDM projects.

## 2.2 Project description

### 2.2.1 Project scope and objective

The overall objectives of the WNEP are to promote socio-economic development in rural Uganda and to reduce energy-related CO<sub>2</sub> emissions. The project will install and operate a 3.5MW (2 units of 1.75MW) hydroelectric power plant and install and operate a heavy fuel oil (HFO)-fired 1.5 MW generator. The generator will serve as a base-load plant during the construction phase and as a peaking plant once the hydroelectric plant becomes operational.

The hydroelectric plant delivers energy to a mini-grid, displacing fossil fuel-fired generation. The HFO-fired generator under the second component of the project generates at a higher efficiency rate than the diesel engines and small-size diesel/petrol generators that currently supply power in the project area. The project also upgrades and extends the distribution networks to neighbouring municipalities, connecting 4,000 additional customers to the grid.

The project was registered under the simplified modalities and procedures for small-scale CDM projects, with one component as a grid-connected renewable electricity generation activity, and

the other as a supply-side energy efficiency improvement effort. Over its lifetime (21-year period), the project is expected to generate GHG reductions of more than 760,000 tonnes of CO<sub>2</sub>e.

## 2.2.2 Project development dimension

### Barriers of scope or barriers to investment

Although the West Nile is one of the most rapidly growing regions in Uganda, it lacks banking and other financial and economic infrastructure. Most of the businesses are in the informal sector with almost no ties to formal credit or finance.

While there has been interest in developing hydropower as part of electrification efforts in the West Nile region, existing barriers such as high up-front investment, lack of an accessible capital market and customers' low ability-to-pay have prevented this from happening. The risk premium paid for energy infrastructure investments is reflected in high discount rates, further reducing prospects for power investments in the region.

The project has experienced significant delays in its implementation since 2001 and had to be redesigned due to an unanticipated low level of power demand in the region. The table below (extracted from the PDD) summarises the barriers to be overcome.

**Table 3** Summary of barriers to energy infrastructure investment in the West Nile region<sup>10</sup>

Barrier type	Extension of Main Grid to West Nile
<b>Investment barriers (high)</b>	Low investor confidence due to civil war and expropriations under previous governments (until 1986); supply risk: land-locked Uganda depends on imports via road through Kenya.
<b>Economic barriers (high)</b>	Lack of banking, financial and economic infrastructure; high costs in West Nile region due to poor transport links; dependency of local economy on volatile cash crops revenues.
<b>Political barriers (high)</b>	Problematic external security situation: conflicts in neighbouring countries could spill over into Uganda; internal security situation still of concern in Northern Uganda; possible political interference with business decisions: new regulatory system is untested.
<b>Inflation and foreign exchange barriers (high)</b>	Vulnerability of Ugandan currency to external factors (ODA, world market coffee price, etc.); significant inflationary pressure.

## 2.2.3 Carbon finance dimension

### Mobilisation of third party financing for the CDM activity

The WNEP project was developed with the assistance of the government of Uganda through the World Bank ERT programme, which provides a subsidy for the project. ERT aims at supporting the development of the rural energy sector while protecting the environment through the implementation of CO<sub>2</sub>-neutral hydropower.

### Sharing of financial risks among different parties

The financing and the risks were shared between the West Nile Rural Electrification Company (WENRECo), and the governments of Finland and the Netherlands, through their direct participation in and investment contributions to the World Bank-managed Prototype Carbon Fund (PCF).

<sup>10</sup> Source: WNEP PDD

In light of high project costs and risks, and to make the project sufficiently attractive to an independent power producer (IPP), the project received financial assistance in the form of grants.

### **Role of public financing mechanisms**

Public co-funding has played an important role in making the project viable. The government of Uganda, through the Rural Electrification Fund (REF), established as a component of the ERT programme, contributed to the underlying project financing. The REF is a financial mechanism that provides subsidies for initial capital investments for the development of commercially viable energy activities. The WNEP received a “smart subsidy” from the REF to help cover the capital investment cost of the 33/11kW substation, the internal combustion unit, as well as the hydro plant, and will continue to receive a subsidy for each new grid connection on an on-going basis.

Project construction and the operation of the facility are driven by the private sponsor: WENRECo, which will build, operate and own the project. The CERs will be purchased by the PCF.

### **Role of CER cash flows in overall financing plan**

From the outset the WNEP was identified as a potential CDM project and was financially viable only taking into account carbon finance revenues from the sale of CERs.

### **Project additionality issues**

Existence of the prior World Bank study on the average energy efficiency of prevailing energy production (installed engines and diesel generator-sets) in the West Nile region was critical for allowing the project to calculate the baseline and to determine additionality and the amount of emission reductions to be produced by the project.

## **2.2.4 Public sector role**

### **Role of national/local government agencies**

Due to the preventive barriers discussed above, the WNEP would not have been implemented without government support, both financial (via the ERT) and institutional (through capacity building).

### **Availability of public finance mechanisms at national level**

The ERT programme as well as the REF have great potential to facilitate further CDM project development in the area of renewable energy and rural electrification.

### **Improvement potential**

Putting in place public support programmes, similar to the ERT, in other sectors of the Ugandan economy, would facilitate new private investment, including through CDM projects.

## **2.2.5 Sustainable development outcomes**

### **Project impact on local communities**

The project will contribute to removing the main constraint to the economic development of the West Nile Region by improving availability and reliability of electricity supply. This should give a boost to the development of modern agriculture, in particular of agro-processing (e.g. coffee processing, cotton ginning, tea processing, edible oil extraction and grain milling).

### **Involvement of third party stakeholder**

The World Bank contracted ActionAid (Uganda) as the lead NGO to undertake the Social Intermediation exercise for the project. ActionAid in turn contracted Community Empowerment for Rural Development (CEFORD) to carry out the assessment in the neighbouring towns. For each of the towns consultations were held with local council executives, government civil servants, business community representatives, private companies and randomly selected individuals.

Consultations showed the urgent need for access to power, regardless of the source. Stakeholders wanted to be involved in the planning, implementation and management of the project through partnerships with private investors, and to also benefit from implementation activities such as the supply of labour, materials, food and equity capital. Some wanted to become shareholders in the project.

### **2.3 Lessons learnt**

Investment barriers in the Ugandan energy sector remain high, making return expectations of investors prohibitive and purely commercial investments unlikely. Smart subsidies provided through public programmes – backed by international assistance – as well as the monetisation of future carbon revenues for upfront financing made the project commercially viable.

The installation of similar support funds by governments and/or the international community in other countries could give a major boost to CDM development and clean investment in Africa.

### 3. Bagasse-based cogeneration by Mumias Sugar Company in Kenya

The purpose of the “Mumias Cogeneration Project” at Kenya’s Mumias sugar mill is to produce renewable energy through the combustion of biomass – “bagasse” – which is produced by the factory. From an emission reductions standpoint, combusting bagasse to produce electricity has the dual benefits of (a) producing renewable energy; and (b) avoiding methane emissions which would result from landfilling the bagasse. The project generates enough electricity to power the factory and feeds a significant excess into the national grid. The project is expected to deliver 1.3 million tonnes of CO<sub>2</sub> emission reductions (CERs) over its lifetime.

**Table 4 Summary of success drivers and persisting barriers associated with the Bagasse-based cogeneration project by Mumias Sugar Company in Kenya**

<b>Success drivers</b>	<b>CATEGORY 1 – Overall legislative, institutional and/or regulatory framework for private sector (including CDM) investment</b>
	Early creation of climate change institutions and first-mover in the participation in donor-funded capacity building; efforts by the DNA to more actively reach out to relevant CDM stakeholders, including carbon investors, through communication efforts such as, for instance, the publication of a CDM Investor Guide.
	A system of feed-in tariffs for renewable energy projects has been put in place by Kenyan authorities. Even though some gaps remain, Kenya is among the first African countries to establish such a large-scale incentive.
	<b>CATEGORY 2 – Drivers related specifically to the development of CDM projects</b>
	<p><u>The project development dimension</u></p> <p>Good alignment of project aims with sustainable development priorities defined at national level, addressing a local need perceived as urgent: the lack of clean and reliable electricity, as well as air and water discharge quality improvements.</p> <p>Multiple revenue streams of projects can contribute to the commercial attractiveness of the activity as well as to increase its resilience with regard to CDM project-cycle risks. Revenue streams are: (1) electricity sales to the grid; (2) internal cost reductions as a result of a reduced need for fossil fuel inputs; and (3) carbon revenues from 3 different sources of emission reductions: renewable energy generation, decreased methane emissions from biomass landfilling and energy efficiency improvements.</p>
<b>Persisting barriers</b>	<p><u>The carbon finance dimension</u></p> <p>Securing a solvent buyer of future CERs, in this case the Japan Carbon Fund (JCF), was key to monetising future CER revenues for upfront financing as well as rendering the project less risky from the outset. In its role as CER purchaser, the JCF also funded some of the CDM-specific costs of the project, such as those related to the preparation of the Project Idea Note (PIN) and the Project Design Document (PDD).</p>
	Market access difficulties for renewable energy activities as a result of lacking, incomplete or unclear tariff structures or insufficient feed-in tariffs.
	<p>Climatic changes will increasingly impact on the availability of biomass for power generation projects.</p> <p>Lack of local experience with similar projects in the past leading to a lack of technological, managerial and financial expertise and know-how.</p>

#### 3.1 Country assessment

A Grand Coalition Government was formed in 2007 and sworn-in in April 2008. The government continues to address short term issues of national reconciliation and resettlement of displaced people. Long term issues including judicial, electoral and land reforms have progressed, although at a slower pace.

### 3.1.1 Investment climate

#### Foreign Direct Investment

Kenya faces significant challenges related to the weakening of the exchange rate, pressure on the current account balance due to weak exports, decline in tourism and lower investor confidence. Interest rates, however, remain stable.

At the same time, Kenya experienced one of the world's biggest increases in FDI during 2008.<sup>11</sup> The largest investment was in the financial services sector at USD155 million, an increase from USD51.7 million in 2007.<sup>12</sup>

#### General assessment of ability to conduct business<sup>13</sup>

Kenya is generally considered as the Eastern Africa business hub with good international transport and, more recently, high speed internet connections. Kenya is ranked 107th in the overall enforcement of contracts among 183 countries globally. In terms of access to credit, Kenya scores highly in the African context. On the overall ease of doing business, Kenya is ranked 82nd out of 183 globally.

### 3.1.2 Clean Development Mechanism framework

#### Institutional capacity

Kenya participated in several capacity building programmes starting early in the process at the end of 1990s. These included a project by UNIDO's Developing National Capacity to Implement CDM projects in Africa Programme and the Danish Development and Climate Programme. Kenya is also one of the six African countries to participate in the UNDP CDM Capacity Development in Southern/Eastern Africa project.

These and other capacity building programmes have contributed to developing a good understanding and the institutional basis for the implementation of the CDM in Kenya. They have also raised awareness of opportunities presented by the CDM among potential project sponsors and investors.

#### Renewable energy framework

Since 2006 Kenya has been implementing the Energy Sector Environment Programme (KEEP) launched by six state corporations. It will promote efficient energy use and environmental protection. In 2008, the Kenyan government launched a blueprint addressing both the promotion of renewable energy activities as well as the conservation of non-renewable energy sources.

When this particular CDM project was designed, there was no policy in Kenya on the price that the national energy company should pay for power from co-generation sources, which made it difficult to project future revenues. In practice, a lower price was offered for co-generated power than for conventional fossil fuel generated electricity, creating an environmentally perverse subsidy. Favourable feed-in tariffs for wind power, biomass energy and small hydropower generation were introduced, however, in March 2008 by the Ministry of Energy. This new policy is expected to further promote investments in renewable energy projects in Kenya, including via the CDM.

In 2009, Kenya announced new plans to actively promote renewable energy and energy efficiency investments. This includes free distribution of one million energy-saving light bulbs in exchange for ordinary bulbs as well as subsidising the price of solar water heaters for public institutions, firms and households. Firms investing in local production of energy-saving devices

11 Source: FDI Intelligence

12 Kenya leads FDI growth in 2008, February 14, 2009

13 Source: World Bank – Doing Business - 2009

whose production commences locally within one year will also be offered interest free, long-term government loans.

Kenya plans to produce an additional 2,000MW of electricity generation in the next three years through geothermal, wind, solar, biogas and solid waste development.

### **Designated National Authority**

The DNA office in Kenya is located at the National Environment Management Authority (NEMA) headquarters in Nairobi. NEMA is the principal government institution responsible for the implementation of environmental policy.

In addition to the conventional tasks of DNAs – such as the development of criteria for DCM project evaluation and approval – the Kenyan DNA fulfils the following service-orientated functions:

- Promoting CDM projects to international investors
- Linking the CDM Executive Board and the DOE with project developers
- Developing CDM Investor Guides and a transparent National Approval Procedure for CDM projects

### **Number of pipeline projects in the country**

Kenya currently has 15 projects at the validation stage in the CDM pipeline. In addition, one project received negative validation and one was terminated at the validation stage. Projects currently under validation cover a variety of sectors including biomass energy (2), hydro (2), geothermal (2), cement (1) and reforestation (8). By the number of CDM projects currently in the pipeline, Kenya is among the leaders on the African continent, second only to South Africa.<sup>14</sup>

## **3.2 Project description**

### **3.2.1 Project scope and objective**

The objective of the Mumias Cogeneration Project is to provide a cleaner alternative to fossil-fuel generation in meeting growing electricity demands. The project generates 35MW of electricity, of which 10MW are for consumption by the factory itself while 25MW are exported to the national grid.

The technology employed for the project is based on a conventional steam power cycle involving direct combustion of biomass (bagasse) in a boiler to raise steam, which is then expanded through a condensing extraction turbine to generate electricity. Some of the steam generated is used in one of the production processes of the sugar plant; the power generated is used internally and the excess fed into the national grid.

The project consists of installing cogeneration capacity to use sugarcane-bagasse as a power resource on-site. The second phase of the project will subsequently involve energy efficiency improvement measures. During this second phase, all current steam turbine drives in the factory will be replaced by electric motors and the old boilers will be refurbished and economisers fitted. This is expected to result in another 20MW of energy being exported into the national grid.

The project will therefore reduce GHG emissions from the following sources:

- Displacing grid electricity with GHG-neutral biomass electricity. This component of the project activity is expected to achieve GHG emission reductions of more than 1.2 million tonnes of CO<sub>2</sub>e over a 10-year period (2008-2018).
- Reducing methane emissions by using the bagasse to generate electricity rather than landfilling.

14 UNEP Risoe CDM/JI Pipeline Analysis and Database, June 1st 2009.

This component is expected to achieve GHG emission reductions of more than 50,000 tonnes of CO<sub>2</sub>e over the same 10-year period.

- As a result of the second project phase, potential CER generation will be based on energy efficiency improvements.

Therefore, overall GHG emissions reductions expected from the project amount to almost 1.3 million tonnes of CO<sub>2</sub>e over the period (2008-2018).

### 3.2.2 Project development dimension

#### Barriers to investment

No other cogeneration projects in the sugar-alcohol sector had been implemented in Kenya prior to this project, mainly due to economic, political and institutional barriers.

The sugar industry relies heavily on rain for cane growth, with prolonged droughts reducing the supply of sugarcane, increasing the incidence of fires and leading to a reduction in bagasse availability for power generation. Lack of proven experience in the financing of such projects constitutes an additional hurdle and leads – if financing is available at all – to prohibitively high interest rates.

Another barrier has been the lack of clear regulation providing grid-access and price-certainty to renewable energy generators. This latter barrier has recently been addressed by Kenyan authorities; however, the situation for energy cogeneration remains unclear.

### 3.2.3 Carbon finance dimension

#### Mobilisation of third party financing for the CDM activity

The Mumias Sugar Company Limited (MSC) has secured equity and commercial loan financing for the project.

#### Sharing of financial risks among different parties

MSC, a limited liability company listed on the Nairobi Stock Exchange since 2001, is the project sponsor and operator. Company ownership is split between the government of Kenya (34%), the farmers (30%) and other stakeholders. MSC also funded the CDM registration process.

The Japan Carbon Fund (JCF) acts as the purchaser of CERs. In addition, some of the CDM transaction costs (PIN and PDD preparation and validation) have been funded by the JCF.

#### Role of CER cash flows in overall financing plan

According to project owner estimates, CER income was expected to increase the project's internal rate of return (IRR) by 2%. While this increase is not very significant, the expected CER income was critical for securing underlying financing for the project.

### 3.2.4 Public sector role

No public funding was available for the CDM project (as noted earlier, the government, however, holds a 34% stake in the company). Planned schemes for supporting renewable energy in Kenya and providing feed-in-tariffs will further catalyse renewable energy investments by closing this gap.

### 3.2.5 Sustainable development outcomes

#### Project impact on local communities

Energy resource diversification is an issue of strategic importance for the economic development of Kenya, where more than 50% of energy capacity is hydro-based and therefore dependent on weather patterns and water storage levels. Against this context, the project stabilises the supply of renewable energy during dry seasons regardless of potential fossil fuel price increases, even though increasingly pronounced droughts may lower the yields of sugarcane-bagasse in the future. As a result, more energy is available to close the country's current energy supply deficit. The project may furthermore serve as a local precedent and, as such, spur further rural electrification in neighbouring communities, based on a locally-produced biomass resource.

Environmental benefits include the elimination of the occasional release of ash and related carbon particles into the neighbouring river which supports many local livelihoods. The elimination of particulate matter in the boiler exhaust, which will be fitted with an electrostatic precipitator, will result in improved air quality in the area.

Moreover, project construction and operation have been instrumental in developing new local skills in co-generation and will act as a clean technology demonstration project for other sugar companies in the country.

#### Involvement of third party stakeholders

The project owners conducted a stakeholder meeting involving central and local government agencies, local NGO representatives, cane farmers, cane transporters, the power purchaser and all members of the District Environmental Committee to discuss the project and to receive feedback.

All stakeholders agreed that the project had substantial benefits and should proceed. Broader community benefits, such as affirmative and preferential employment of locals, better pay for sugar cane farmers and provision of some of the generated electricity to the local community, especially markets and other public spaces, were also requested. Project owners promised to provide better compensation to farmers and to give preference to the local community in employing unskilled labour for the project. Distribution of power to local community and shopping centres, however, were outside the jurisdiction of the project owner.

### 3.3 Lessons learnt

According to government stakeholders (DNA and other civil servants), key project success factors were of technological and managerial nature.

The technology used in the project was not only new to Kenya but also an innovation for the entire region. There was no other sugar company in Eastern Africa at the time using high steam pressure technology to generate electricity for export to the grid. The successful completion of this project activity is likely to contribute to the adoption of similar co-generation technologies by firms in the sugar and other industry sectors in Kenya and beyond.

Project owners were very successful in planning and managing the project. They implemented a new technology ahead of other players and used a new financing tool through the CDM. This has contributed to the positive perception of the project and smooth registration process with the national authorities.

Capacity building provided through the involvement of international agencies as well as an environment conducive for business led to a strong CDM pipeline and to economies of scale in handling CDM projects. The early involvement of community representatives in project design led to strong support from all stakeholders.

## 4. Pan Ocean gas utilisation in Nigeria

This study examines a CDM project at Ovade-Ogharefe oil field in Nigeria which aims to eliminate the practice of flaring – or burning – unwanted natural gas, released during the extraction of oil. Gas is flared to release pressure from oil well equipment to maintain the right equilibrium and protect against explosions. However, the flaring and venting of natural gas in oil wells is a significant source of greenhouse gas emissions, and Nigeria has the second largest gas flaring operations in the world. Furthermore, the gas flared represents an unused natural resource. Utilising gas, instead of flaring it, should clearly be in the interest of all stakeholders and substantially reduce GHG emissions. This study identifies the key drivers instrumental in setting up the gas utilisation CDM project at Ovade-Ogharefe as well as the barriers encountered.

### 4.1 Country assessment

#### 4.1.1 Investment climate

Nigeria has made some important economic reforms over the last five years. Streamlined processing procedures at government level ensure that public money cannot be disbursed for investment spending unless procurement procedures are respected. Fiscal reform has also started to be implemented at state level. Nigeria's economy depends heavily on the oil and gas sector, which contributes 99% of export revenues, 85% of government revenues, but recently only about 18% of GDP as oil output has declined due to unrest in the Niger Delta region.

#### Foreign Direct Investment

The Government actively promotes FDI into the country, including implementation of the IMF-monitored liberalisation of the economy with the objective of attracting more foreign investors to the manufacturing sector. Steps in this direction also include a number of incentives for foreign ownership of companies (neither import nor export licenses are required, and up to 100% foreign ownership is allowed), the creation of Export Processing Zones as well as the participation in a number of regional integration schemes. Incentives for investors also include tax relief, legislative provisions on taxes and the full ability to repatriate foreign capital. Additional concessions are furthermore available for local value-added, labour-intensive or export-oriented activities that involve significant training. Nigeria's investment law ensures appropriate treatment and protection of foreign investment. It has provisions for capital asset depreciation allowances, and provides against nationalisation, expropriation and the compulsory purchase of company assets.

#### General assessment of ability to conduct business

A bank consolidation programme was implemented in 2004/2005, strengthening the financial sector and enhancing its ability to provide credit to the private sector. These steps have broadly contributed to shielding the Nigerian financial sector from the global financial crisis.

The World Bank rates Nigeria 118th on the ease of doing business in the world, 90th in the overall enforcement of contracts and 84th on the ease of getting credit among 183 countries analysed in the report.<sup>15</sup>

Bank lending is the principal available source for corporate borrowing. The prime rate in Nigeria at the time of project design, according to the PDD, was 16.5%. In May 2009 this rate went up to 19.5%.<sup>16</sup> Accounting for risk premiums in the commercial lending sector could lead to rates well above 20%.

15 Source: World Bank – Doing Business - 2009

16 Source: Nigerian Central Bank

**Table 5 Summary of success drivers and persisting barriers associated with the Pan Ocean gas utilisation project in Nigeria**

Success drivers	<b>CATEGORY 1 – Overall legislative, institutional and/or regulatory frameworks for private sector (including CDM) investment</b>
	The Nigerian Government actively promotes FDI into the country. Foreign companies are not required to hold import or export licences and up to 100% foreign ownership is permitted.
	Incentives for investors include tax relief, legislative provisions on taxes and repatriation of foreign capital. Nigeria’s investment law ensures appropriate treatment and protection of foreign investment.
	The Nigerian DNA, the “Special Climate Change Unit”, delivers a clear and quick approval procedure for CDM projects. It currently takes less than one month to obtain national project approval.
	<u>CDM capacity building and awareness raising</u> Nigeria participated in UNIDO’s “Developing National Capacity to Implement CDM projects in Africa” programme. The World Bank and the International Finance Corporation (IFC) assisted Nigeria in pursuing CDM projects in the oil industry through the Global Gas Flaring Reduction programme (GGFR), a public-private partnership aimed at increasing utilisation of gas that would otherwise be flared.
	<b>CATEGORY 2 – Drivers related specifically to the development of CDM projects</b>
	<u>Public sector role</u> CDM capacity building and awareness raising activities helped stakeholders recognise the potential of this project.
	Financial incentives offered by the Nigerian government specifically for gas projects helped improve the viability of this project. Incentives include: lower tax levels for gas utilisation projects; tax holidays; exemption from custom duties and VAT; investment capital allowances.
	<u>The carbon finance dimension</u> Projected carbon finance flows increased the project’s internal rate of return (IRR) from 5.4% to 11.2%, therefore ensuring financial viability for investors.
	Sharing financial risks: the project is being implemented and financed by a joint venture of Nigerian companies.
<u>Sustainable development dimension</u> The project will also generate jobs in the construction sector.	
	Gas captured in this project is used for electricity generation in the region and will therefore support the economic sustainability and growth of the country.
Persisting barriers	Conflict in oil exploiting regions occasionally leads to infrastructure failures, such as the destruction of oil pipelines.
	The power industry also suffers from serious maintenance and adverse external events causing disruption to both the supply of electricity and the ability of electrical facilities to take gas under contract.

### Regulatory framework in relation to gas utilisation

In terms of annual gas flared, Nigeria is second only to Russia.<sup>17</sup> The government of Nigeria has adopted several decrees on reducing gas flaring and introduced a fine. Poor enforcement and the low level of the fine compared to alternatives (high cost of investment), however, only led to very low levels of reduction. Furthermore, the government decrees on flaring have not been put into formal enforceable laws. As a result, more than 40% of gas is still being flared. According to the World Bank, flaring contributed 36% to Nigeria’s national GHG emissions in 1990 and 24% in 2000.

17 Source: World Bank

The government, however, has provided new incentives to promote investment in the economic utilisation of flared gas. These include:

- Lower tax level for gas projects (taxed at 30% vs 85% for oil projects)
- Capital expenditures for gas projects chargeable under the Petroleum Profits Tax
- A tax holiday of up to 7 years
- Exemption from custom duties and VAT on gas-related development equipment
- Investment capital allowances of 15%
- Interest deductibility on loans
- Tax free dividends during tax holidays.

This provides a very good example of how policies focusing on resource efficiency can foster investment in projects that mitigate climate change.

#### 4.1.2 **Clean Development Mechanism framework**

##### **Overall in-country institutional capacity**

In 1999-2001 Nigeria participated in UNIDO's "Developing National Capacity to Implement CDM projects in Africa" programme. This programme strengthened Nigeria's institutional capacity to deal with CDM issues. Furthermore, the World Bank and the IFC assisted Nigeria in pursuing CDM projects in the oil industry through the GGFR, a public-private partnership aimed at increasing utilisation of gas that would otherwise be flared.

##### **Designated National Authority**

Nigeria ratified the Kyoto Protocol in 2004. It then established a Presidential Implementation Committee on the CDM. The Special Climate Change Unit (SCCU) is responsible for monitoring climate change related issues, developing and implementing plans for climate change adaptation and mitigation. The SCCU acts as the Nigerian DNA and establishes a clear procedure for approval of CDM projects. It currently takes less than one month to obtain national project approval, a fast process compared to other countries in the region.

##### **Number of pipeline projects in the country**

There are two registered CDM projects in Nigeria both of which are in oil field flaring reduction. In addition, there are five CDM projects in the pipeline at validation stage, covering cement, landfill composting, the introduction of efficient cooking stoves, hydro plant and oil field flaring reduction<sup>18</sup>.

#### 4.2 **Project description**

##### 4.2.1 **Project scope and objective**

The purpose of the project is to eliminate gas flaring at the Ovade-Ogharefe oil field operated by Pan Ocean Oil Corporation in a joint venture with Nigerian National Petroleum Corporation (NNPC). The project captures and processes natural gas that would otherwise be flared. The amount of flared gas is expected to increase in the future due to further development of the oil field.

The gas treated as part of the project is injected into an existing gas transmission line for sale to an IPP while the extracted liquid natural gas (LNG) is transported and sold to the national and international market. The project is designed to reduce flaring by around 98% at the Ovade-Ogharefe field.

18 Source: UNEP Risoe

## 4.2.2 Project development dimension

### Key success factors

One of the key success factors of the project is the belief of the project partners in its long-term upside potential. Financial incentives offered by the government to the gas project improved overall project economics. Moreover, the expectation of a regulation banning gas flaring may have been an additional incentive for the project owner.

The expected additional revenue flow from the sale of the CERs helped make the project financially viable. The existence of a clear and transparent national approval procedure for CDM projects in Nigeria helped achieve a swifter project registration.

### Barriers to investment

Troubles in the oil exploiting regions – occasionally leading to infrastructure failures – pose significant risks to the project's successful operation. For two years from February 2006, the Ovade-Ogharefe oil field was not in operation due to the destruction of part of the Shell oil pipeline system in the Niger Delta. According to the project's PDD, nearly one third of Nigeria's oil production was shut down due to adverse external events.

The electricity industry also suffers from serious maintenance and adverse external events causing disruption to both the supply of electricity and the ability of the electrical facilities to take the gas under contract. The CDM project became operational in October 2010 and the project lifetime is estimated at 20 years.

## 4.2.3 Carbon finance dimension

### Mobilisation of third party financing for the CDM activity

According to the PDD the project participant is intending to access commercial loans to partially finance the project.

### Sharing of financial risks among different parties

The project is being implemented and financed by a joint venture of Nigerian companies. No Annex 1 party was involved in the project's financing. CER sale is planned once the project has been registered and advanced into the implementation. Carbon Limits (Norway) was responsible for the preparation of the PDD.

### Role of public financing mechanisms

While no direct public funding has been contributed to the project, the project benefits from the financial incentives put in place for gas utilisation projects by the government of Nigeria, as described above. Tax savings – and not being subject to flaring fines – are particularly significant.

### Role of CER cash flows in overall financing plan

Projected carbon finance flows increased the IRR from 5.4% to 11.2%, thereby ensuring financial viability for investors.

### Project additionality issues

The potential introduction of national legislation in Nigeria on flare reduction may affect eligibility of such projects for CDM.

#### 4.2.4 **Public sector role**

The public sector has had an indirect, yet very important role in the success of the project. In particular, capacity building and awareness-raising on CDM issues through various earlier mentioned programmes were key in identifying opportunities for project activities. Existence of a clear and quick national approval procedure for CDM projects facilitated expedient registration of the project. Finally, financial incentives put in place by the government were important in improving the project's economics.

#### 4.2.5 **Sustainable development outcomes**

##### **Project impact on local communities**

The project contributes to the sustainable development of Nigeria through the reduction of flaring and local air pollution and other environmental impacts associated with the combustion of natural gas. Apart from the significant reduction in CO<sub>2</sub> emissions, the project will also result in lower emissions of NO<sub>x</sub>, VOCs, and particulates, leading to improved local health conditions. The project will also generate jobs in the construction sector. Once in operation, it expects to add 35-45 skilled positions and about 150 unskilled positions. These jobs will continue over the estimated 20-year lifetime of the project. In addition the gas captured in this project is used for electricity generation in the region and thus supports the economic sustainability and growth of the country.

##### **Involvement of third party stakeholder**

The Pan Ocean's Community Relations Department held a number of meetings with representatives of local communities, deliberating on Pan Ocean's plan to establish a gas gathering project. Locals were also briefed on the likely benefits from this investment in terms of job creation and ancillary benefits. The community was supportive of the project but requested an MOU ensuring local employment. Local stakeholders submitted a letter endorsing the project.

#### 4.3 **Lessons learnt**

Capacity building programmes implemented with the support of international donors drew the oil industry's attention to opportunities arising from the CDM. This led to the implementation of measures that would have long-term economic and sustainable development benefits for the industry. Project ideas developed in the course of these programmes have formed the basis for the initial CDM pipeline in Nigeria. The expectation that gas flaring would be banned in the future, coupled with the financial incentives offered by the government to the gas projects served as additional incentive for implementation of the CDM project. The correlation between the expected outcome of the CDM project and the long-term development priorities was a crucial success factor. A functioning DNA with an efficient and clear project approval procedure greatly facilitated the development of the CDM in the country.

## 5. Ibi Batéké carbon sink plantation in the Democratic Republic of Congo

The purpose of the Ibi Batéké carbon sink plantation project is to create a carbon sink by replanting and preserving an area of tropical forest, which has been damaged by local communities for subsistence farming and to source fuel wood and to create a sustainable fuel wood supply for local populations by replanting an unproductive Savannah area, which would ordinarily be burnt many times a year. The project therefore delivers CO<sub>2</sub>e emissions reductions on two levels: (1) carbon sequestration through afforestation; (2) and the production of biomass which will serve as a renewable energy source displacing conventional, CO<sub>2</sub>-intensive power generation. The project is expected to deliver 2.4 million tonnes of CO<sub>2</sub>e emission reductions through carbon sequestration over its lifetime.

**Table 6 Summary of success drivers and persisting challenges associated with the Ibi Batéké carbon sink plantation in the Democratic Republic of Congo**

Success drivers	<b>CATEGORY 1 – Overall legislative, institutional and/or regulatory frameworks for private sector (including CDM) investment</b>
	Participation in capacity building programmes provided by the international community.
	Availability of a sustainable forestry management master plan developed with the assistance of the World Bank.
	Existence of an efficient land registry service allows for the establishment of land titles without major delays.
	<b>CATEGORY 2 – Drivers related specifically to the development of CDM projects</b>
	<u>The project development dimension</u>
	Multiple revenue streams of projects can contribute to the commercial attractiveness of the activity as well as to increase its resilience with regard to CDM project-cycle risks. Here revenue streams are: (1) generation of CERs based on carbon sequestration through afforestation; (2) generation of CERs-based on biomass-fired power generation; (3) sustainable production of charcoal; (4) production of paper pulp fibres and biofuel cellulose.
	Good alignment of project aims with sustainable development priorities addressing a local problem: fuel wood bottlenecks as a consequence of increased deforestation, regular savannah fires.
	Project driven by a local organisation, NOVACEL, as part of a wider and long-term integrated rural development pilot programme including agricultural, livestock and forest activities. The project is well embedded in wider economic development efforts.
	At the same time: involvement of internationally experienced management from international companies coupled with technical assistance from the UNEP CASCADE programme.
	<u>The carbon finance dimension</u>
	The presence of a public vehicle among the early investors led to a second ERPA with an entirely private sector investor.
	Effective risk allocation among stakeholders of different nature: private financiers, ERPA purchasers and socially-motivated private investors.
“Temporary” CERs/VCUs account for 55.6% of project income.	
<u>Sustainable development dimension</u>	
Strong buy-in from local communities in light of the perceived benefits: the creation of local jobs; a new sustainable source of fuel-wood/charcoal; deforestation pressure is taken from remaining natural forest galleries.	
Persisting challenges	The DRC is one of the most difficult environments globally to undertake business, taking on average 155 days to start a business there. The country is also recovering from recent wars, and the global financial crisis has had a negative impact on the prices of the DRC’s key mineral exports.

## 5.1 Country assessment

### 5.1.1 Investment climate

The DRC is ranked last out of 181 countries globally, according to the World Bank, in terms of ease of starting a business; it takes on average 155 days to start a business there. The government has now established separate judicial, legislative and executive institutions, in an effort to support the country's recovery from recent wars. In 2008, real GDP growth rate was approximately 8%. This performance was mainly driven by renewed activities in the mining sector, the source of most export income. The global financial crisis has had a negative impact on the prices of the DRC's key mineral exports.

In 2005, the United Nations Human Development Index ranked the DRC of 168th out of 177 countries.

### 5.1.2 Forestry afforestation/reforestation framework

#### Forest in the DRC

At 2,267,600km<sup>2</sup>, the DRC is the 3rd largest country in Africa. According to The Woods Hole Research Centre, almost half of the country – 1.1 million km<sup>2</sup> – is covered with dense humid tropical forest, which stores 17 billion tonnes of CO<sub>2</sub>. This represents the largest forest estate in Africa and the second largest tropical forest in the world.

In 2008 the DRC refined its definition of “forest” and communicated to the UNFCCC Secretariat. Forests in the DRC are defined as land with a:

- minimum tree cover of 30%;
- minimum area of 0.5 hectares;
- minimum tree height of 3 metres.

#### Existence of policy

A sustainable forestry management master plan has been developed with the assistance of the World Bank.

### 5.1.3 Clean Development Mechanism framework

#### Overall in-country institutional capacity

The DRC ratified the Kyoto Protocol in March 2005. Since then several multi- and bi-lateral capacity building measures have taken place. This included in 2007-2009, the UNDP-UNEP partnership on Climate Change, funded by Finland, Sweden and Spain. This partnership conducted a regional capacity building project for sub-Saharan Africa, including the DRC. The project constitutes the first phase of a two-phase programme to be implemented over the next four years.

#### Designated National Authority

The DNA has been established and is located at the Ministry of Environment, Nature Conservation and Tourism.

#### Baseline for CDM projects

The DNA of the DRC has published minimum values for tree crown cover for afforestation and reforestation projects, making it possible to implement CDM projects in these sectors.

## Number of pipeline projects in the country

CDM projects are only slowly emerging. There are four CDM projects currently at validation stage covering the reforestation, biomass energy and afforestation sectors and one CDM project currently at the request registration stage. One further project has failed validation.

## 5.2 Project description

### 5.2.1 Project scope and objective

- The project is an afforestation project, converting natural grassy savannahs, subject to man-made fires, into an abundant and sustainable fuel wood supply for charcoal production.
- The project is located on the Batéké plateau, stretching over both sides of the Congo River. This area is composed 90% of herbaceous or shrubby savannah, burnt many times per year, and 10% of forest gallery deforested by local populations for their subsistence farming (maize, cassava) and to produce charcoal.
- The project's aim is to replant damaged areas of forest using native trees so as to develop a forestry-based carbon sink while converting unproductive savannah into a source of renewable biomass. The project will facilitate the plantation of eight million trees over 8,000 ha.
- As a result, carbon sequestration from the atmosphere is combined with a reduction in GHG emissions from an energy switch effort to non-fossil fuel. To complete these objectives, the IBCSP will establish 4,120 ha of fast growing forest plantations on grass savannahs with few scattered shrubs.
- It is expected that the project will generate biomass that can ultimately meet expected international demand for paper pulp fibres and bio fuel cellulose.

### 5.2.2 Project development dimension

#### Key success factors

- The project is developed by NOVACEL, whose founders are natives of the Batéké region and have been present on the plateau for several generations. The IBCSP project is part of an integrated rural development pilot programme that NOVACEL has been carrying out since 1985. NOVACEL operates a strategy of integrated development, integrating agricultural, livestock and forest production with the agro-industrial production of commodities such as cassava flour, corn flour or charcoal, building strong involvement and engagement of local communities in the process.
- The backing of the project through seasoned managers from Suez and UMICORE gives additional credibility to the project and allows it to tap additional financing sources.
- Ability to demonstrate to international and local participants that there is effective daily project monitoring.
- The Congolese DNA is actively following the development of the project and supporting its management.
- Efficient land registry service that allows for the establishment of land titles without major delays.

#### Barriers to investment

Project developer Olivier Mushete feels that “the main obstacle with this type of project is to convince investors and donors of long term profitability”. This has led the project sponsor to approach financial partners with different risk/reward profiles including: UMICORE, SUEZ and high net worth individuals, while additional technical assistance support was provided via UNEP's own CASCADE programme.

### 5.2.3 Carbon finance dimension

The total sequestration from the project is estimated at 2.4 million tonnes CO<sub>2</sub> over 30 years. By 2012 around 0.5 million tonnes of CO<sub>2</sub> are expected to be sequestered; and by 2017 over 1 million tonnes. The most likely scenario without the project (baseline situation) is the continuation of the present fire and biomass re-growth cycle of savannahs (a natural process but one that is worsened by human interaction).

#### Mobilisation of third party financing for the CDM activity

The BioCarbon Fund managed by the World Bank signed an ERPA for the purchase of 50% of the expected volume amounting to 400,000 temporary CERs up until 2017, while the remaining 50% was contracted by Orbeo for the purchase of Voluntary Carbon Units (VCUs). The presence of the BioCarbon Fund among the early investors led to this unique parallel ERPA in the land use space via an entirely private sector investor.

#### Sharing of financial risks among different parties

- UNEP covered some of the financial resources needed to make this project an early success as it allowed coverage of risks the private sector was not willing to take.
- UMICORE, the materials technology group with strong mining interests, and Suez, the diversified energy group, each invested EUR250,000 in the project via the provision of 7 year soft loans.
- Additional financing was mobilised through the participation of two high net worth individuals, participating with EUR250,000 and EUR300,000 respectively.

#### Role of public financing mechanisms

The Country Assistance Framework for the DRC<sup>19</sup> led by the World Bank specifically refers to the importance of developing financing models that reward carbon. The sustainable management of the forestry sector is directly linked to the generation of carbon credits.

#### Role of CER cash flows in overall financing plan

Temporary CERs/VCUs account for 55.6% of project income, the remainder is generated through sales of cassava (42.5%) and wood (5.4%).

### 5.2.4 Public sector role

#### Role of national/local government agencies

The project developer managed to involve both the Congolese central government through the applicable ministries and as well as local chiefs.

#### Availability of public finance mechanisms at national level

No national public finance sources were available to either support project development or guarantee mobilisation of potential loans.

#### Improvement potential

The DNA's team would need further strengthening if it is to handle more projects simultaneously. Long delays were experienced in dealing with the World Bank.

<sup>19</sup> The Country Assistance Framework (CAF) for the DRC is a common strategic approach to recovery and development assistance agreed by a broad group of international partners in the post-electoral period from 2007 to 2010 (a "big tent"). The CAF has also been described as a framework for "big ideas" through which 17 international partners mobilised to identify key priorities for peace consolidation and recovery in the DRC.

### 5.2.5 Sustainable development outcomes

#### Project impact on local communities

The forest, along with the resources and jobs, generated by the project will provide a major boost to the local economy. Indeed planting, maintaining and harvesting acacias, eucalyptus, pines and other native species will create many direct jobs. It is estimated that 55-60 permanent jobs, and from 40 up to 400 temporary jobs over 4-6 months a year – the equivalent of 210-225 full time positions – will be created by the project. In addition, it is expected that approximately 30 charcoal makers will earn their livelihoods from the forest. Basic education, vocational training and primary health coverage will also be provided by the project.

#### Additional environmental impact

The project, by generating income for local communities and producing charcoal from the plantation, will reduce the deforestation of the remaining forest galleries, which have generally been used to make charcoal. It will also avoid bush fires and all the associated negative impacts. In the long term, plantations managed in a sustainable way will also provide shelter to wildlife.

#### Involvement of third party stakeholder

Villagers will be trained in forest management.

### 5.3. Lessons learnt

While Land Use, Land Use Change and Forestry (LULUCF) activities are deemed particularly difficult to implement in the African context, a combination of strong public sector commitment to the sector (including a strong involvement of the DNA and functioning land registry services), early private sector financiers and ERPAs backed by strong buyers (from both the public and the private sectors) made this project an early success and an example both in Africa and beyond.

# Conclusions

This study shows that the single most important precondition for any project to be successful is the availability of an environment that is conducive to business to operate in. Risks – real or perceived – in emerging economies and particularly in least-developed countries drive the costs and availability of private capital which is essential in achieving scale in the CDM.

The success of the African CDM projects covered in this report depended to a great extent on several circumstances:

- 1) The early availability of well-functioning institutional structures such as Designated National Authorities and, in particular, of clear rules regarding the granting of approvals to the projects within pre-determined timelines.
- 2) Capacity building programmes in aspects related to the CDM proved particularly useful in ensuring awareness building of in-country CDM opportunities and the CDM process.
- 3) Additional financial incentives were rarely available, yet government support for the broader sector (energy, waste management, forestry, etc.) within which projects were evaluated was critical.
- 4) For renewable energy projects, the availability of price signals for the purchase of energy was particularly important.
- 5) A favourable business environment was key in catalysing additional finance through the CDM and more generally in ensuring investor interest in CDM related sectors in all of the countries considered in this report.

Shortcomings in attracting private sector investments and the inability to cover certain risk exposures were temporarily bridged through international development agency/international development finance institutions and at times through the provision of smart subsidies, such as payments provided per achieved additional connections under a universal service agreement. Project success was invariably closely linked to the quality of project management. The provision of capacity building and training through national, international public sector institutions and/or NGOs was an important factor in the performance of projects and the overall success. Stakeholder consultations ensured early buy-in from involved parties and a strong commitment to projects. Successful projects also lead to replication and to additional requests for the development of CDM projects within these countries and the broader region.

# Recommendations

## For policy makers

- The CDM is intended to leverage private sector investment into low-carbon projects. While the CDM is a strong catalyst to improve project returns, the promise of additional revenues provided through the mechanism is often not perceived as sufficient to compensate for the risks associated with investing in African markets. National policy makers must ensure that the overall enabling environment for businesses to operate is in place. In particular the enforceability of contracts and reliability of regulation must be improved while excessive administrative burdens associated with setting up (and running) businesses reduced.
- Effective risk allocation between the public and the private sector – by means of public finance mechanisms deployed at the international as well as national levels for instance – will lead to increased willingness to invest.
- An essential precondition for an effective CDM market is a well-functioning DNA. Decisions must be fast and transparent; too often they are still perceived as arbitrary. Capacity building as well as experience-sharing with other DNAs in the region (and beyond) can be instrumental in equipping DNAs with the needed knowhow to effectively carry out their tasks. Multilateral and bilateral donor support in capacity building has proven successful but is still needed to consolidate and expand DNA capacity. Furthermore, internationally funded capacity building programmes to other local CDM stakeholders (including project developers, finance providers, insurers) should be systematically rolled out.
- In order to achieve their full potential, DNAs must be embedded within a broader national economic development framework with strong and permanent links to relevant public institutions outside the environmental domain, such as business/investment promotion and fiscal agencies.
- In Africa the large potential of the forestry sector – both in the existing area of Land Use, Land Use Change and Forestry (LULUCF) projects as well as in any upcoming regime for reducing emissions from deforestation and forest degradation (REDD+) – has not been fully realised. This requires clear national forestry frameworks and policies. At international level, a more effective integration of land-use based activities into the international carbon markets should be ensured. This will specifically require an approach that addresses the issue of non-permanence in an environmentally credible and financially practical manner: only if carbon credits generated by forestry projects are competitive and fully fungible with other credit categories, will the private sector engage more intensively in this area.

## For investors and finance providers

- Reducing risks in conducting business in Africa can only be achieved through joint public and private sector efforts. Private sector actors will be more likely to invest if some of the risk levels unacceptable to private operators could be covered by public sector actors (governments, development finance organisations, bilateral and multilateral aid organisations). Investors should more systematically engage with public institutions on the issue of risk sharing. UNEP FI, in collaboration with a number of partners, already provides a platform for financial institutions to initiate a dialogue with international policy makers on the issue of public finance mechanisms in the areas of climate change mitigation and adaptation (see [www.unepfi.org](http://www.unepfi.org)).

- The inability to mobilise local finance could be bridged by the development of a public finance mechanism: a guarantee vehicle, for instance, that could mitigate the perceived risks of providing finance to entrepreneurs that lack either sufficient collateral or a proven track record. Through the delivery of guarantees to local financial institutions, emissions reduction purchase agreements (ERPAs) could be used as collaterals enabling the mobilisation of local debt finance. Such a vehicle is currently under development with both public and private sector participants. Its structure will accommodate participants in a “senior-subordinate” structure according to their respective risk profiles. The public sector would typically be able to cover a “first loss” tranche, thereby reducing the risk exposure of more senior commercial tranches.
- Investors should more systematically engage with local financial institutions and project developers in awareness raising and capacity building efforts. Local institutions and stakeholders that are aware of the CDM and have the needed knowhow will be instrumental in expanding project pipelines and improving deal-flow. UNEP FI will, therefore, continue to provide carbon finance training to local financial institutions, both in Africa as well as other developing regions of the world.
- Investors and lenders play a role in improving the viability of CDM projects by integrating multiple revenue streams thereby increasing the viability and resilience of the business model. At the same time, it should be ensured that projects align well with local development needs as perceived by public institutions and local communities. This will ensure early buy-in, support and the “license to operate” from relevant stakeholders.

# Background reading

Castro, Paula; Michaelowa, Axel (2009): *Would Preferential Access to the EU ETS be sufficient to overcome current barriers to CDM projects in LDCs?*, Climate Strategies Discussion Paper.

Ellis, Jane; Kamel, Sami (2007): *Overcoming barriers to Clean Development Mechanism projects*, Organisation for Economic Co-operation and Development (OECD).

## Acronyms

ATF	Africa Task Force
BEST	Business Environment Strengthening for Tanzania
CBFF	Congo Basin Forest Fund
CBFP	Congo Basin Forest Partnership
CCPC	Climate Change Policy Committee
CCWG	Climate Change Working Group
CDM	Clean Development Mechanism
CD4CDM	Capacity Development for the Clean Development Mechanism
CEFORD	Community Empowerment for Rural Development
CER	Certified Emission Rights
CEEST	Centre for Energy, Environment, Science and Technology
CH <sub>4</sub>	Methane
CIF	Climate Investment Fund
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CSG	Consorzio Stabile Globus
DNA	Designated National Authority
DOE	Designated Operational Entity
DRC	Democratic Republic of Congo
EPMS	Environment Protection and Management Services
ERPA	Emission Reduction Purchase Agreement
ERT	Energy for Rural Transformation
EUR	European Union Euro
FDI	Foreign Direct Investment
FIT	Feed in Tariffs
(GC) <sub>2</sub>	Global Carbon Guarantee Consortium
GDP	Gross Domestic Product

GEF	Global Environmental Facility
GGFR	Global Gas Flaring Reduction programme
GHG	Greenhouse Gas
HFO	Heavy Fuel Oil
IBCSP	Ibi Batéké Carbon Sink Project
IFC	International Finance Corporation
IMF	International Monetary Fund
IPP	Independent Power Producer
IRR	Internal Rate of Return
JCF	Japan Carbon Fund
KEEP	Kenya Energy Sector Environment Programme
Km	Kilometre
kW	Kilowatt
LDC	Least Developed Country
LIC	Low Income Countries
LNG	liquid natural gas
MDB	Multilateral Development Banks
MOU	Memorandum of Understanding
MSC	Mumias Sugar Company Limited
Mt	Million tonnes
MW	Megawatt
MWh	Megawatt/hour
NEMA	National Environment Management Authority
NGO	Non Governmental Organisation
NNPC	Nigerian National Petroleum Corporation
NOx	Nitrogen Oxides
PCF	Prototype Carbon Fund
PDD	Project Design Document
PIN	Project Identification Note
POA	Programme of Activities
PPA	Power Purchasing Agreement
RE	Renewable Energy
REDD	Reducing Emissions from Deforestation and Degradation
REEEP	Renewable Energy & Energy Efficiency Partnership
REF	Rural Electrification Fund

SCCU	Special Climate Change Unit
SPPA	Standardised Power Purchase Agreement
SREP	Scaling-up Renewable Energy Programme
TA	Technical Assistance
tCER	temporary CER
TFC	Trust Fund Committee
TIC	Tanzanian Investment Centre
UIA	Uganda Investment Authority
UK	United Kingdom of Great Britain and Northern Ireland
UNDP	United Nations Development Programme
UNEP FI	United Nations Environmental Programme – Finance Initiative
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
VAT	Value Added Tax
VCU	Voluntary Carbon Unit
VER	Verified Emission Reductions
VOC	Volatile Organic Compound
WB	World Bank (International Bank for Reconstruction and Development)
WNEP	West Nile Electrification Project
WENRECo	West Nile Rural Electrification Company

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