



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

Mitigating Climate Change, Investing in Development

Fostering the CDM in Least Developed Countries



IMPRINT

- Published by:** Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU)
Division KI I 4 • 11055 Berlin • Germany
Email: KI14@bmu.bund.de • Website: www.bmu.de/english
- Edited by:** BMU, Dr. Silke Karcher, Head of EU Affairs and Bilateral Cooperation "Environment and Energy"
Email: silke.karcher@bmu.bund.de
- Subject editors:** Wuppertal Institut für Klima, Umwelt, Energie GmbH (Wuppertal Institute for Climate, Environment and Energy),
Research Group 2: Energy, Transport and Climate Policy
- Project Coordination:** Christof Arens
- Authors:** (in the order of appearance in the brochure): Christof Arens / Wuppertal Institute, Monika Rammelt / GIZ,
Saskia Winter and Rainer Sünnen / KfW, Matthias Krey / perspectives climate change, James Vener / UNEP,
Dr. Daniel Blank and Joachim Schnurr / GFA ENVEST, Nicolas Müller / perspectives climate change, Nahla Sabet /
The Gold Standard, as well as Martin Burian / GFA ENVEST and Johnson Maviya / SAPP CC.
- Design:** Selbach Design, Bonn
- Printed by:** Druckerei Kliewer
- Photo credits:** p. 1: Nic Bothma/CDM Project 0079/UNFCCC, myclimate, Siemens Press Picture
p. 5: private
p. 11: estherhavens.com / theadventureproject.org
p. 13: E+ Carbon
p. 16: Jörg Böthling/KfW Photo Archives
p. 19: Siemens press pictures
p. 21: Adam Bacher
p. 22: Afovert
p. 25: David Manniaux/wikimedia.org
p. 26: Chris Kirchhoff, medioclubsouthafrica.com
p. 30: Relief International
p. 31: myclimate
- Date:** May 2012
- First Print:** 1,000 copies

Contents

Preface	4
Tapping the Potentials, Overcoming Barriers	6
Strengthening local CDM Capacities – the CDM Initiative in Uganda	10
Increasing the Utilisation of the Programmatic CDM	13
Finance PoAs, Develop the Carbon Market	16
PoA Working Group: Continuous Contribution to the Advancement of the Programmatic Approach	18
Banking on Africa’s Green Economy: the African Carbon Asset Development Facility (ACAD)	20
A Low Emission Development Path for the African Power Sector – The Sugar Industry as Energy Provider	23
Leapfrogging to Modern Energy Access: Accounting for Suppressed Demand in CDM Methodologies	26
Paving the Way for the Compliance Market: the Gold Standard Programme for Underrepresented Regions	29
Unlocking CDM Development in Southern Africa – Developing a Regional Grid Emission Factor	32
ABBREVIATIONS AND ACRONYMS	35

Preface

The Clean Development Mechanism (CDM) was established within the Kyoto Protocol framework for a threefold purpose: in order to promote mitigation projects and sustainable development in developing countries, increase cost efficiency of climate policy by addressing economic potentials outside the industrialized countries, and enhance private sector commitment in climate action.

Short of being perfect – as might be expected of a new instrument – the CDM has proven successful: by May 2012, almost 4000 projects were registered under the CDM. The CDM has also created a global currency for emission reductions – and a worldwide consciousness that mitigation is worth money, and thus worth putting creativity and investment in to tap the potentials.

Carbon markets have played – and more importantly will have to play – an important role in financing mitigation.

However, the regional distribution of CDM projects has been highly unbalanced in the past: only 2% of all projects registered with the CDM Executive Board are located on the African continent. Least Developed Countries (LDCs) in Africa unsurprisingly remain even more neglected than the continent as a whole, as across continents, all countries within this classification represent only 1% of registered projects.

This imbalance implies that the countries most in need of sustainable development have so far hardly benefitted from CDM. This is despite the fact that the demand for certificates from projects in Africa, which are often linked to high environmental and social benefits, remains significant in both compliance and voluntary carbon markets. The problems are on the supply side: although mitigation potentials in African LDCs are significantly lower than for example in emerging economies, research has revealed considerable CDM potential in a range of sectors. Barriers for CDM projects are therefore mainly political and economic risks; a lack of access to finance as well as methodological and procedural challenges for both private and public actors.

A range of initiatives and activities has been established in order to mitigate these barriers for CDM implementation. At the international level, the climate community has established frameworks and work programmes, such as the Nairobi Framework which aims at reducing the regional imbalance of the CDM. A key step was also the introduction of Programmes of Activities (PoA) in 2007 which allow to aggregate programme activities under one umbrella. This not only lowers transaction costs, but PoAs are also better suited to African or LDC realities with typically small per-unit emissions. This is also reflected in the fact that 17% of all registered PoAs are located in LDCs.

The CDM Executive Board has contributed to lowering the entry barriers in these countries by simplifying methodologies and procedures. It also introduced concepts which better reflect the specific features of least developed countries, such as suppressed demand. The process of standardizing baselines is another central piece of this work. Hopes and expectations are that these standardizations lower transaction and administrative costs per project.

The EU, with its Climate and Energy Package, has laid out a future for demand for CER certificates from projects in LDCs registered even beyond 2012 – while certificates from other countries must be registered before 2013 to be eligible for use in the EU Emissions Trading System (EU-ETS). This offers a natural competitive advantage for the LDC country group. Yet, it must be noted that we are in need of a binding, comprehensive and ambitious international climate agreement in order to secure long-term demand in the international carbon market.

The German government has been supporting the CDM since the beginning. In particular, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) has been an active player in fostering the international carbon market since the early times of the CDM. Hence, both within BMU's CDM-/JI-Initiative and within the International Climate Initiative (ICI), the carbon markets have played an important role. In addition, the International Climate Initiative is a valid example on how carbon and climate finance can be combined. It uses

revenues from the auctioning of emissions rights in Germany for implementing climate projects in partner countries. Today, we are proud to hear that the Ministry is considered a key player in the field by the carbon market community.

By enhancing capacities and access to finance, as well as supporting activities for overcoming methodological and procedural challenges, we intend to improve the conditions for CDM projects in African LDCs. Capacity building is at the core of a GIZ implemented programme in Uganda, technical support for PoA development the primary goal of the KfW PoA Support Centre. Overcoming barriers for PoA development is also the rationale for the PoA Working Group established by BMU. The Gold Standard Foundation develops tools and instruments to lower the entry barriers for underrepresented countries and regions in the CDM. Generally, finding appropriate methodological instruments for the African continent is key: renowned experts have for example focused on integrating the concept of suppressed demand into the CDM. Concrete methodological work also comprises calculating a Grid Emission Factor for the South African Power Pool to be submitted as a standardised baseline to the EB. We aim at tackling the financial barriers for the CDM in Africa by supporting the African Carbon Asset Development Facility, which focuses on projects' bankability, investor outreach, and cooperation with financial institutions. Complementary, a new foundation "Future of the Carbon Market" was set up to fill the gap of often-needed seed-funding for PoAs. Innovative research projects build the groundwork of our activities and help identify and outline potentials for private sector engagement.

This brochure is meant to provide you with an overview of the broad range of activities we initiated in order to strengthen the CDM in African Least Developed Countries. It also aims at elaborating on the rationale for our efforts and to be a valuable source of information with respect to key processes, development, and actors on the CDM in Africa. We hope that you enjoy reading and that you find this compilation useful for approaching the CDM in Africa.



Berlin, May 2012

A handwritten signature in blue ink that reads "Silke Karcher".

*Dr. Silke Karcher,
Head of EU Affairs and Bilateral Cooperation
"Environment and Energy"*

Tapping the Potentials, Overcoming Barriers

Research on CDM in African Least Developed Countries Shows Opportunities and Analyses Ways to Overcome Obstacles

CDM project development in Africa and especially in African LDCs is hampered by a number of barriers. These include structural and institutional issues such as the low level of industrialisation and energy consumption, unfavourable investment conditions, and the lack of a stable, enabling legal framework. Further, effectiveness of the CDM-related institutions plays a major role: an effective Designated National Authority (DNA) for a smooth approval process, a clear and consistent CDM policy, and the existence of a reliable skills base in energy project development. In order to assess these and further questions, BMU has commissioned a research project entitled “Integrating Africa’s least developed countries into the global carbon market.”

Assessing the Potential

One of the key questions regarding the CDM on the African continent relates to the potential for climate change mitigation activities. To identify the CDM potential of the region, the research team analysed

selected sectors in eleven African LDCs: Burkina Faso, Democratic Republic of the Congo (DRC), Ethiopia, Malawi, Mali, Mozambique, Rwanda, Senegal, Tanzania, Uganda, and Zambia. The assessment combines findings from existing literature with new calculations. Details on this study and the others subsequently mentioned in this article can be accessed at www.jiko-bmu.de/996.

As for the CDM potentials, the researchers analysed the sectors renewable energy use, end-use energy efficiency, municipal solid waste, and industrial production processes. Potentials for avoided deforestation and afforestation / reforestation activities were excluded as these project types are not eligible in the European Emissions Trading Scheme (EU-ETS). These restrictions, however, do not cover the energetic use of biomass from, for example, forest or wood residues. The sector potential findings are shown in **Figure 1**. The total technical abatement potential of all analysed sectors amounts to 128.6 million Certified Emission Reductions (CERs) per year.

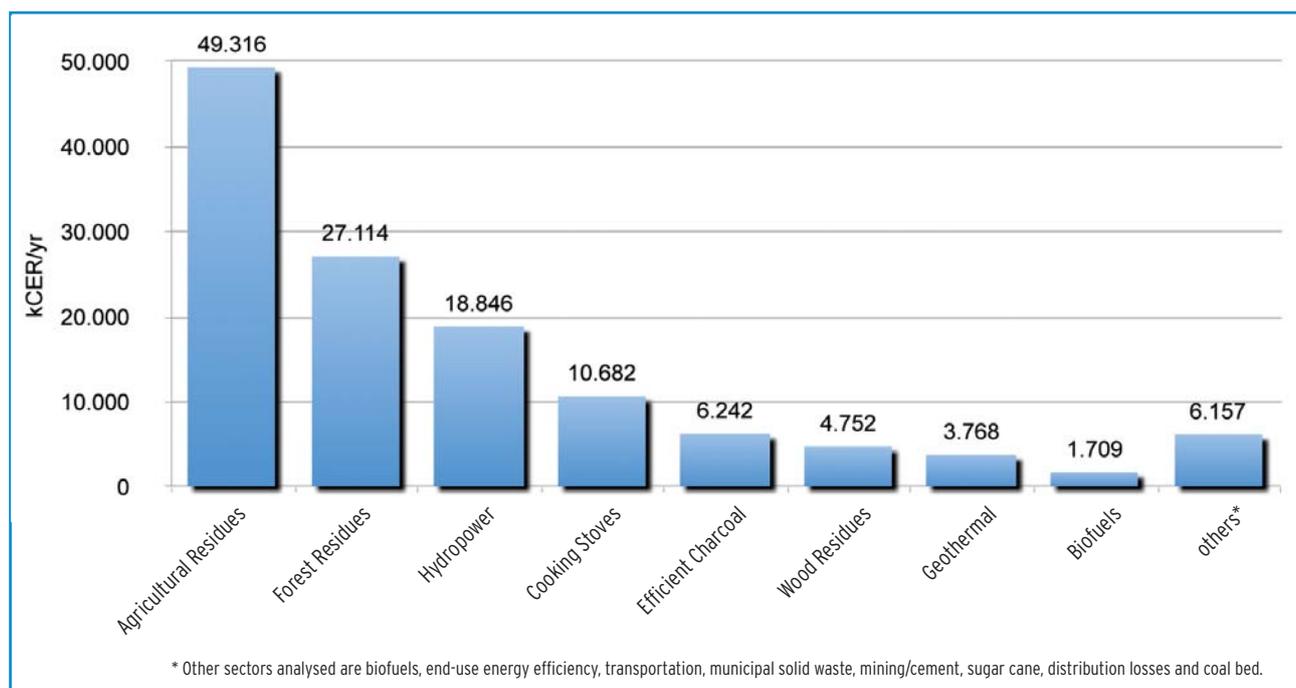


Figure 1: Technical CDM potential in selected sectors in 11 sub-Saharan LDCs (in kCERs/yr)
Source: Arens et al. 2011

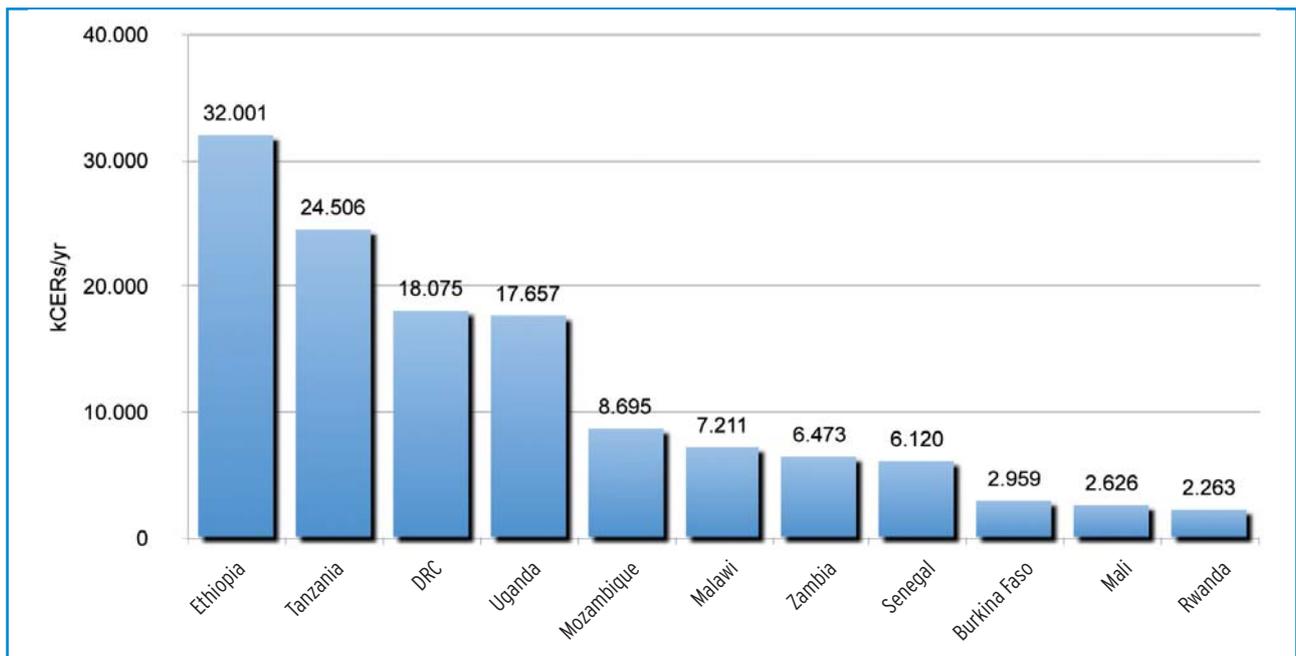


Figure 2: CDM potential in selected sub-Saharan LDCs by country
Source: Arens et al. 2011

The largest potential in the analysed sectors was found in projects using biomass residues from agriculture, forests and wood production. Agricultural residues are, for example, waste materials left in the fields after harvesting as well as by-products, both of which can be used for energy generation, cp. *A Low Emission Development Path for the African Power Sector* elsewhere in this brochure. For this sector, the study revealed a huge CDM potential of up to 894 projects and 9,606 MW installed capacity in the study region (based on the average size of all registered projects in terms of MW installed capacity). Among the considered countries, Ethiopia and Tanzania have the highest potential for using agricultural residues for energy production in CDM projects. For the eleven countries covered by the study, a potential of 49 million CERs/yr was identified in this sector. The analysis of the forest and wood residue sector also revealed high CDM project potentials amounting to up to 31.8 million CERs/yr.

Further promising project potential is seen in the distribution of improved cooking stoves, with an overall potential of 10.6 million CERs/yr (the greatest potential being in DRC, Tanzania and Uganda), and in the switch to efficient charcoal production. Considerable potential for implementing this project type can be found in Tanzania, Uganda and Zambia, amounting to an average of 1 million CERs. There is also considerable potential for developing hydropower projects in the region; however, this project category depends on future climate variability and comes along with social and environmental risks.

With regard to the geographical distribution of the potential, the study revealed the largest CDM project and CER generation potential to be in Ethiopia and Tanzania, followed by DRC and Uganda. **Figure 2** illustrates the distribution of the project opportunities across the 11 countries analysed.

Overcoming Barriers

To tap the region's CDM potential, a number of further obstacles have to be overcome. These comprise, on the one hand, structural and institutional issues on a general level, such as investment climate and a functioning infrastructure. On the other hand, the CDM framework comes into play, such as personnel, institutions and procedures for processing CDM projects. In order to assess and compare these conditions in the considered countries, the study team developed a set of ten criteria grouped in five categories, ranging from the basic CDM structures, the overall investment climate and the countries' climate policy framework (facilitating the development of CDM projects) to political preferences such as the contribution to the sustainable development of certain project types and sectors. The complete set of criteria can be obtained from Burian et al. 2011, see www.jiko-bmu.de/996.

In order to assess, for example, the investment climate of the countries under consideration, five different economic indicators were assessed, covering interest rates, corruption indexes and risk ratings, complemented by indicators displaying the business

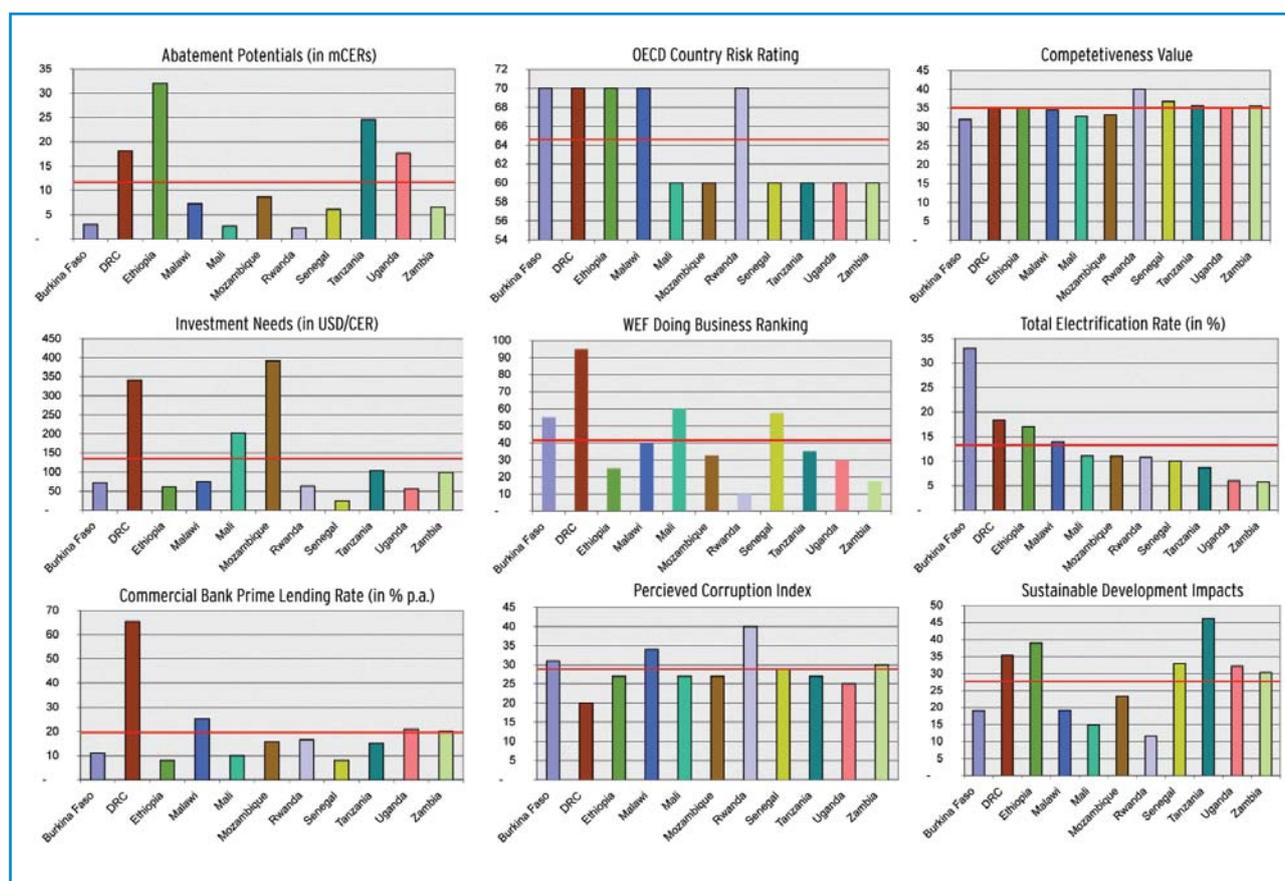


Figure 3: Comparing investment climate, technical readiness and sustainable development impacts of CDM projects.
Source: Burian et al. 2011

conditions (“doing business index”) and competitiveness aspects. The combination of these indicators paints a comprehensive picture of the countries’ investment conditions, as the different parameters complement each other. Some of the indicators are based on a larger subset of indicators, which further completes the picture.

The analysis shows that Rwanda offers the best financing and doing business conditions, mainly due to the comparably moderate lending rate of 10,11% and the best Doing Business-, Corruption- and Competitiveness Index (Table 1). Rwanda is followed by Senegal, Zambia, Tanzania and Ethiopia scoring nearly identically. These countries are characterised by good doing business index values and moderate

Table 1: Financing- and Doing Business Indicators

Country	Prime Lending Rate (in % p.a.)	Country Risk Rating ³	Doing Business ⁴	Corruption Value ⁵	Competitiveness Value ⁶
Burkina Faso	9,60 ²	7	22	3,1	3,2
DRC	12,02 ¹	7	38	2,0	N.A.
Ethiopia	1,00 ¹	7	10	2,7	3,5
Malawi	17,25 ¹	7	16	3,4	3,5
Mali	7,50 ¹	6	24	2,7	3,3
Mozambique	2,68 ¹	6	13	2,7	3,3
Rwanda	10,11 ¹	7	4	4,0	4,0
Senegal	6,80 ²	6	23	2,9	3,7
Tanzania	7,83 ¹	6	14	2,7	3,6
Uganda	11,56 ¹	6	12	2,5	3,5
Zambia	11,56 ¹	6	7	3,0	3,6

Sources: 1: CIA, 2011, 2: BEACO, 2010, 3: OECD, 2011, 4: IFC and WB, 2010, 5: Transparency International 2010, 6: WEF, 2010.

Please note: All prime lending rates have been corrected by the countries’ inflation, so that the prime lending rate shows the ‘real’ lending rate.

Table 2: Comparing CDM Infrastructure and Climate Policies

Country	Operational CDM Structures			(Pro active) Role in CDM project development		National Interest in Climate Change Issues	
	DNA available (Yes/No)	Existing CDM Projects (Yes/No)	Binding Timeline for LoA Approval (Yes/No)	DNA Website (Yes/No)	CDM promotion entity (Yes/No)	NAMA submission (Yes/No)	National Climate Policy Existing (Yes/No)
Burkina Faso	Yes	No	No	Yes	No	No	being developed
DRC	Yes	Yes	N/a	Yes	N/a	No	N/a
Ethiopia	Yes	Yes	No	No	No	Yes	being developed
Malawi	Yes	No	No	No	No	No	being developed
Mali	Yes	Yes	N/a	Yes	N/a	No	N/a
Mozambique	Yes	Yes	N/a	Yes	N/a	No	N/a
Rwanda	Yes	Yes	N/a	Yes	N/a	No	N/a
Senegal	Yes	Yes	No	Yes	No	No	Yes
Tanzania	Yes	Yes	Yes	No	No	No	Yes *
Uganda	Yes	Yes	No	No	Yes	No	being developed
Zambia	Yes	Yes	Yes	Yes	Yes	No	being developed

Source: Burian et al. 2011

corruption values. Mozambique, Uganda, Mali, Burkina Faso and Malawi are in the middle, while DRC features the most unfavorable conditions with its high interest rate and a very poor doing business score.

As for the other criteria, such as technical infrastructure and the contribution to sustainable development, similar analyses were carried out. The results of the potentials analysis described above were also taken into account. The results are displayed in **Figure 3**.

The results of the analysis were evaluated by combining qualitative and quantitative indicators. For example, abatement potential was assessed in million Certified Emission Reductions (CERs) per country per year (i.e. quantitative). Criteria such as CDM framework, operational CDM structures as well as the broader context of the countries' climate policy ("national interest in climate change") were evaluated by Yes or No, Better or Worse (i.e. qualitative). Qualitative results were converted into an ordinal ranking. The results were aggregated by applying an equal weighting, see **Table 2**.

It turns out that all countries have installed the basic infrastructure to process CDM projects in the form of a designated authority, the DNA. However, two countries have not yet approved CDM projects. Looking at the complete set 'operational CDM structures', one can see that Tanzania and Zambia fulfill all three criteria, while Burkina Faso and Malawi show the worst results: these two countries have a DNA, but they have neither approved a single CDM project so far,

nor have they introduced a structured process for issuing a Letter of Approval (LoA). Two thirds of the countries have set up a dedicated CDM website which is permanently available. Uganda and Zambia are the only countries with separate CDM promotion agencies. Among the countries considered in this report, only Ethiopia has submitted a NAMA (as of December 2011). As for the countries' climate change policy, most of the countries have not defined a comprehensive mitigation strategy yet. However, in many countries a process of developing a national climate policy framework exists. Ethiopia has set itself the goal to become carbon neutral by 2025.

These results will help to understand and to improve CDM framework conditions in African host countries. Within the context of this research project, further work will be carried out to look closer at some of the findings, both in the form of in-depth country studies and sector-specific analyses. This work will help to identify areas for further strengthening local capacities, to improve framework conditions and, eventually, to fully tap the CDM potential of the African continent.

Further information

This research project is supported by BMU and carried out jointly by Wuppertal Institute for Climate, Environment and Energy and GFA ENVEST. Find out more about the project at www.jiko-bmu.de/996

Contact

Christof Arens, Wuppertal Institute
Email: christof.arenst@wupperinst.org

Strengthening local CDM capacities – the CDM Initiative in Uganda

On behalf of BMU, GIZ has been active in supporting the CDM market in Uganda since late 2010. Based on the results of a scoping study on the status of the carbon market in Uganda in November 2010, the GIZ Uganda CDM unit supports the Carbon Foundation for East Africa, a nonprofit organization affiliated with the Uganda Carbon Bureau, one of the key project developers in the region. The 2010 scoping study came to the conclusion that a considerable number of interventions aiming at capacity development in Uganda had been implemented in the past or were currently being planned at the time. Nonetheless, a critical mass of bankable projects was still missing, mainly due to still persisting insufficient capacities, the lack of experienced project developers as well as strong coordinating entities for successful management of PoAs. Moreover, the Designated National Authority (DNA) in Uganda is in a restructuring phase and currently building up capacities, other governmental institutions lack technical and financial capacities.

Following one of the key recommendations of the scoping study, which was implemented by a consultancy team comprising national and international expertise, the CDM Country Unit Uganda decided to support an already existing PoA idea in mid 2011 – the PoA for improved cooking stoves as developed by Uganda Carbon Bureau/Carbon Foundation for East Africa. The PoA aims at creating an umbrella for different types of stove producers all over the East African region by developing a fair trade model for CER commercialization as well as management and monitoring trainings for stove producers. The experience generated by developing this PoA will be made available to a wider public and other project developers in the region through open sourcing of materials and training sessions.

The landscape of project development has been changing rapidly since then. Whereas in late 2010, only two major developers were active in Uganda, more than five are now operative in the country (among them Impact Carbon, South Pole and Carbon Africa).

The Carbon Foundation for East Africa and Uganda Carbon Bureau

The Carbon Foundation of East Africa (CAFEA) is a registered legal body in the form of a company limited by guarantee. It was created in 2010 to act as a conduit for funds from sponsors for climate change activities of an educational and not-for-profit “public service nature”. Its objectives include inter alia, “to acquire information and knowledge to ensure that opportunities for East Africa to benefit from the international carbon finance markets are made freely available”.

The founders of CAFEA are leading individuals in their respective fields, including the previous chairperson of the Parliamentary Forum on Climate Change, a senior member of Uganda’s DNA/Climate Change Unit, the Director of Environment in the Ministry of Water & Environment, and private sector individuals: a female Uganda lawyer with environmental interests, a previous head of the Private Sector Foundation Uganda now working at the Commonwealth Secretariat in London, Uganda’s leading ISO certifier, plus the chairman of the Uganda Carbon Bureau (UCB). UCB provides managerial and secretarial support for CAFEA. In addition, it provides assistance to project developers’ standalone CDM and voluntary projects. It also operates a carbon neutral service for Uganda-based clients, and provides considerable pro bono information on climate change and the carbon markets.

CAFEA’s main work is to raise awareness and to develop capacities for dealing with climate change and access to carbon markets. CAFEA is committed to sharing learning experiences with other PoA developers, and in working with local and international groups to raise awareness about the benefits of the PoA approach. The publication of additional guides and training materials forms part of this. Regional DNA offices have been offered the opportunity to second staff to work on regional PoAs in Uganda to gain work experience. Similarly, a training programme for staff of the East African Development Bank (EADB) has been initiated with a similar purpose.



Climate change mitigation with built-in social benefit. By using energy-efficient cooking stoves fewer greenhouse gases are emitted, local biomass resources are spared and health risks from open fires are reduced.

CAFEA's aim requires that PoA lessons are learned and shared within the East Africa region based upon the daily realities of developing PoAs under challenging local conditions, and in devising solutions to those challenges. UCB is committed to local capacity building by using CAFEA as an important resource to achieve this, and has the patience and skills to ensure that this vital complement to CDM knowledge is also provided. Although basic CDM guides have been published by a range of organisations (UNEP-Risoe, KfW PoA Support Centre, etc), CAFEA/UCB is entering uncharted waters with its unique approach to the management of its fairtrade open-source coordinating/managing entity (CME). This work will be of direct benefit to other PoAs that are being developed, and will feature in all the staff training and

development activities that both UCB and CAFEA are involved in with their various partners.

The Interventions of BMU's CDM Country Unit Uganda

BMU's CDM Initiative supports CAFEA with a EUR 140,000 grant for the further development of the PoA Improved Cooking Stoves for East Africa (ICSEA). ICSEA is a pioneering multicountry PoA. The UN-FCCC Climate Change Secretariat is using ICSEA to encourage others to develop multicountry PoAs. At the 2011 Africa Carbon Forum, and the following DNA Forum, ICSEA was showcased and applauded by the UNFCCC.

The BMU grant allows CAFEA to extend its capacity with best practice techniques in the following areas that will allow ICSEA to operate efficiently once it is registered. These areas are important to all involved in PoAs in Uganda:

1. Extension of CDM AMS-II.G methodology to cover pyrolysis cook stoves
2. Development of legal templates and forms for the ICSEA PoA
3. Development of monitoring methods, consultancy on sampling, statistical support on PoA monitoring
4. Database hardware and software for PoA monitoring
5. Development of an approach to commercialise CERs based on fair-trade principles
6. PoA training for interested stakeholders and distribution of publications
7. Employment of a general manager and a monitoring specialist for the CME

The support to CAFEA will end in June 2012 and, hopefully, with the successful registration of the ICSEA PoA.

Expanding Support

The CDM Unit Uganda is currently looking into expanding the scope of its support to the carbon market in Uganda and the wider region. The interventions will cover four major areas: policy advice and capacity building with major political decision makers, technical support for project identification and development, cooperation with financial institutions, assessment of windows of opportunities in other countries of the wider East African region.

Policy Advice

The Country Unit will initially assess the needs of the Ugandan DNA, based on already existing support to the entity. The project will furthermore work closely with the „Interministerial Climate Change Policy Committee“ to increase CDM-specific knowledge in various different policy sectors. The Committee comprises members from various different line ministries who meet regularly to exchange on topics relevant to climate change. Cooperation with this committee

also aims at increasing knowledge on new market mechanisms within the relevant line ministries in Uganda. Thirdly, the project will support the Ugandan DNA in developing standardised baselines for suitable sectors. The sectors are yet to be defined.

Technical Support for Project Identification and Development

The project aims at strengthening the involvement of the private sector in carbon project development in Uganda. To that end, it is planning to place 1-3 so-called CDM Scouts in suitable Ugandan entities (such as Private Sector Foundation, Uganda Investment Authority, Uganda Electricity Credit Capitalization Company). These scouts will identify suitable project ideas and support the project developers technically. Furthermore, they will create links to potential credit buyers. If needed, the project will assess twinning options between Ugandan project developers and registered projects in other countries to foster knowledge exchange. Additionally, the project is planning to initiate exchange among regional CMEs.

Cooperation with Financial Institutions

In order to increase the willingness of regional financial institutions to support CDM project development, the project will train suitable loan officers in specifics of carbon projects and increase an understanding for prospective carbon project proposals.

Regional Expansion

The project will assess the needs for carbon market development in neighbouring countries and prepare the ground for feasibility studies in Tanzania, Rwanda, Zambia to assess options for BMU involvement in these countries.

Further information

This activity is supported by BMU as part of its CDM/JI-Initiative. More information on the country-specific activities of the initiative can be found at www.jiko-bmu.de/951

Contact

Monika Rammelt, GIZ
 Email: monika.rammelt@giz.de
 Ina Hommers, GIZ
 Email: ina.hommers@giz.de

Increasing the Utilisation of the Programmatic CDM

The PoA Support Centre Germany

Since mid-2007, programmes that support climate protection activities or that implement climate protection policies in developing countries can be registered as CDM/JI projects (Programmes of Activities, PoA). PoAs reduce greenhouse gases by initiating a large number of small, individual measures that each alone cannot carry the CDM/JI transaction costs. They could take the form of a large-scale exchange programme "light bulbs for energy saving lamps", for instance. Further examples are household cookers (energy efficiency, biogas or solar cookers), solar-powered water heating, and energy-efficient equipment, machinery or motor vehicles. Yet, long preparation times and regulatory uncertainties involved in PoA development have led to hesitance on the part of project developers and their partners in uptaking the concept.

Against this background, the PoA Support Centre Germany was established in 2008 with the aim of fostering the development of Programmes of Activities. The areas of support include advisory, structuring and assessment services for programme proposals as well as grants to cover the preparation of programme concepts and project design documents (PDDs) including monitoring plans and validation. In addition, it offers know-how during programme



Using Carbon Finance to introduce cleaner cooking technology: the E+ Carbon Cook Stove PoA in West Africa

Table 3: KfW-supported PoAs		
Sector	Region	Operator (CME)
Energy Efficiency in Buildings	Poland, China	Banks Private Companies
Energy Efficiency in SMEs	Poland, India, Indonesia, Philippines	Banks Private Companies
Household Stoves, Biogas	Nigeria, Mexico, Ethiopia, Togo, India	NGOs, Banks, Public Institutions, Private Companies
Renewable Energy (Solar Water Heater / Mini Hydro)	South Africa, Central America, Philippines, Nepal, East Africa, Mexico	Banks Private Companies

implementation and assists with marketing of the expected carbon credits. **Table 3** provides an overview of the range of supported PoAs in different sectors and regions:

Current Project Portfolio of the PoA Support Centre

To date, 18 out of currently 40 promoted programmes are in the development stage of Project Idea Notes (PIN). Furthermore, 21 PoAs received subsidies during the PDD development stage. 50% of the supported programmes are located in Asia, followed by 25% in Africa (**Figure 4**). In total, 19% of KfW's PoAs are implemented in LDCs. This share is much higher in comparison to all LDC PoAs in the pipeline of the UNFCCC, where only 11% of PoAs are situated in LDCs. For stand-alone CDM projects, the situation

Improved Cook Stoves for West Africa: A Regional PoA

By Catherine Diam-Valla, E+Carbon

Togo, Burkina Faso, Senegal and Mali: four countries where deforestation, soil degradation and biodiversity loss are exacerbated by a dependence on wood fuel. In fact, in most of sub-Saharan Africa, charcoal and firewood are the predominant cooking fuels and will remain so for the foreseeable future. Thus far, no programme in the targeted countries has been successful in promoting improved cook stoves – the default cooking appliance for charcoal and firewood users – which is a crucial step towards the sustainable use of biomass.

To break this trend, E+Carbon together with stove manufacturers, local NGOs and governmental entities in these countries will disseminate efficient biomass cook stoves by way of a CDM Programme of Activities. The PoA “Promoting Efficient Stove Dissemination and Use in West Africa”, a programme commencing in 2011 with the first programme activity (CPA) in Togo, will use carbon finance to puncture barriers which traditionally denied households’ and businesses’ access to cleaner cooking technology. In most cases, the main encumbrance to clean cooking is the high cost of improved cook stoves compared to their traditional counterparts. Additional obstacles include the lack of qualified stove manufacturers and the inability of stove manufacturers to secure funds to set-up viable businesses. The programme aims to disseminate over 200,000 stoves per country and reduce an average of 300,000 CO₂e annually. Apart from Togo, other West African countries are expected to be added to the PoA at later stages.

In addition to reducing CO₂ emissions and halting environmental degradation, the PoA will provide a number of social and financial benefits. First, carbon revenues will enable stove manufacturers and distributors to set-up future-oriented businesses and create jobs. Second, reduced fuelwood consumption will translate into monetary savings for users who purchase fuelwood and time savings for those who collect their own firewood. Third, and most important, exposure to smoke inhalation and air pollutants such as carbon monoxide and fine particles will be reduced thanks to an efficient combustion of fuel wood.

More information at: www.eandco.net

Contact: Catherine Diam

Email: catherine.diam@eandco.net

is even worse: only 2% of all CDM projects are located in Africa and even less in LDCs (Source: UNEP RISOE, April 2012). In February 2012, the CDM Executive Board registered the first cookstove PoA in Africa which was developed by Atmosfair and financially supported by KfW.

From the start in 2008 until the end of April 2012, the PoA Support Centre has organised 15 PoA workshops in different countries all over the world (Asia, Africa, Latin America and Eastern Europe). The contents of these workshops vary from rather general information on the concept of PoAs up to workshops

for concrete PoAs. For example, a workshop in India focused on an energy efficiency improvement programme in the steel industry to develop a strategic plan for the PoA implementation and to instruct the Coordinating and Managing Entity (CME) on their role and responsibilities. Especially in Least Developed Countries (LDC), capacity building workshops are key to spread knowledge and information on PoAs.

Difficult Conditions in LDCs

The impact of climate change in LDCs is predicted to be immense. While adaptation measures are an ab-

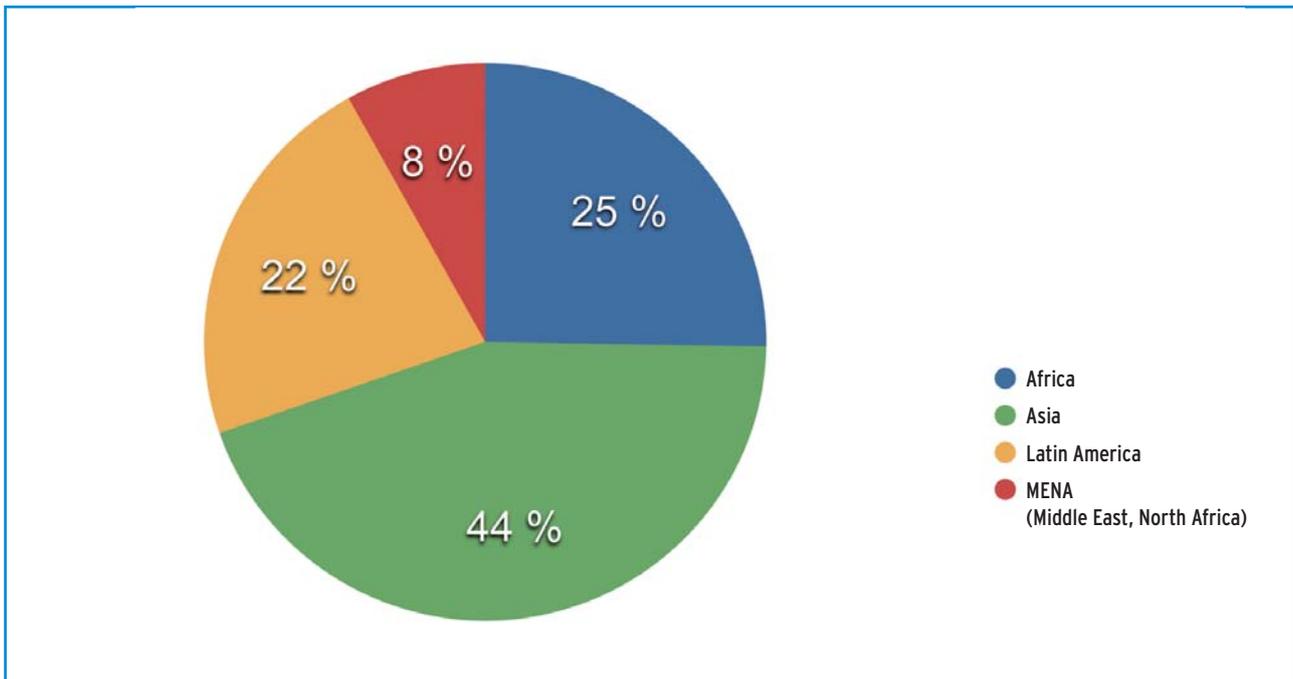


Figure 4: Regional Share of KfW-supported PoAs

solite necessity in a short-term perspective, implementing sustainable development and mitigation programmes can help fighting climate change in the long run. Moreover, LDCs show huge potentials for emission reductions, especially in micro-scale sectors. Yet, there are still major obstacles which hinder the development of PoAs in many LDCs, such as difficult investment environment as well as unstable and inefficient political conditions. In addition, technical knowledge and capacity of project developers is often limited and usually the private sector does not play a big role. Together with complex CDM regulations and limited access to finance, it is challenging to develop and run a PoA. Nevertheless, it is worthwhile to utilise the potential in LDCs for emission reduction programmes with a focus on micro-scale programmes, e.g. the distribution of energy efficient cook stoves or water purification tools for households. Those programmes offer very high social and environmental benefits and can benefit from the sale of carbon credits.

PoA Support Centre Enhances Activities in LDCs

The PoA Support Centre can help to overcome some of the above-mentioned barriers: On the one hand, it provides guidance through the CDM process including discussions with the host Designated National Authorities (DNA); on the other hand, the centre's grants for the development of the CDM-related documentation can facilitate programme development in the early stages.

From 2013 on, the EU-Emissions Trading System (EU-ETS) will only accept CERs generated from new CDM projects in LDCs. Therefore, the regional focus for CDM will change from the previous top CDM countries like China, India, Brazil or Mexico to LDCs. Since Africa has 33 of the 48 LDCs worldwide, the continent will become the centre of the market's attention. Yet, success of CDM in LDCs will depend on the outcome and implementation of the CDM reform, e.g. the development of standardised baselines or the utilisation of suppressed demand to generate CERs, cp. *Leapfrogging to Modern Energy Access* elsewhere in this brochure. In sum: The CDM has to be simplified to be applicable in LDCs and to be able to provide sustainable development benefits to these so far underrepresented countries.

In the light of the above, the future regional focus of the PoA Support Centre will be in LDCs. The centre supports the CDM reform with different activities like the development of standard eligibility criteria for PoAs or a sampling manual for CMEs.

Further information

The PoA Support Centre is supported by BMU as part of its CDM/JI initiative and managed by KfW. For detailed information, go to: www.kfw.de/carbonfund

Contact

Rainer Sünnen, KfW
Email: rainer.suennen@kfw.de

Finance PoAs, Develop the Carbon Market

The Foundation "Future of the Carbon Market"

The German Environment Ministry and KfW launched a new foundation named "Future of the Carbon Market". The foundation aims at promoting the further spread of PoAs by financially supporting them in the initial phase and making this concept more widely known. The operational start of the foundation will be mid-2012. Funds of ten million Euros were provided by the BMU under its International Climate Protection Initiative (ICI). The foundation is set up for a time-frame of at least ten years. The objectives of the foundation are tapping the future of



Solar Home Systems are ideally suited for programmatic CDM

the carbon market and promoting programmes with strategic considerations. Therefore, the foundation focuses on programmes with an innovative approach. In order to improve the regional distribution of PoAs, new and pioneering approaches shall be applied, including new methodologies and standardised baselines.

Types of Support the Foundation Can Offer

Especially the start-up financing of PoAs is often very difficult, as the coordinating entity (CME) has to initiate and finance the roll-out of the programme. Further, the realisation of carbon revenues can only be achieved after the issuance of the first CERs, which is at minimum 18 months after the start of the PoA. The foundation supports this early stage of PoAs by providing prepayments on carbon credits. The start-up financing is complemented by consulting activities aiming to increase the public awareness of PoAs, to alleviate the reservation against investments in climate-friendly technologies under the Kyoto Protocol and to increase capacity of governments to deal with PoAs in developing countries. The focus will be on small-scale emission reductions which require a high degree of organisation in underrepresented sectors and which have a high likelihood of being replicated in other regions or countries.

Further Eligibility Criteria for Projects

Supported PoAs should fulfil certain prerequisites. For example, the PoA must be financially viable (including carbon revenues), it should generate more than 25,000 CERs per year and the sector should play a strategic role in the national climate strategy of the host country. It is favourable for the approval and implementation of PoAs if countries pursue strategic objectives with PoAs and therefore have PoAs on their political agenda, including an already implemented governance structure for the approval process. When receiving support, the PoA should already be at an advanced stage with clear prospects of success in the CDM cycle, which means that it should usually be registered with the CDM Executive Board.

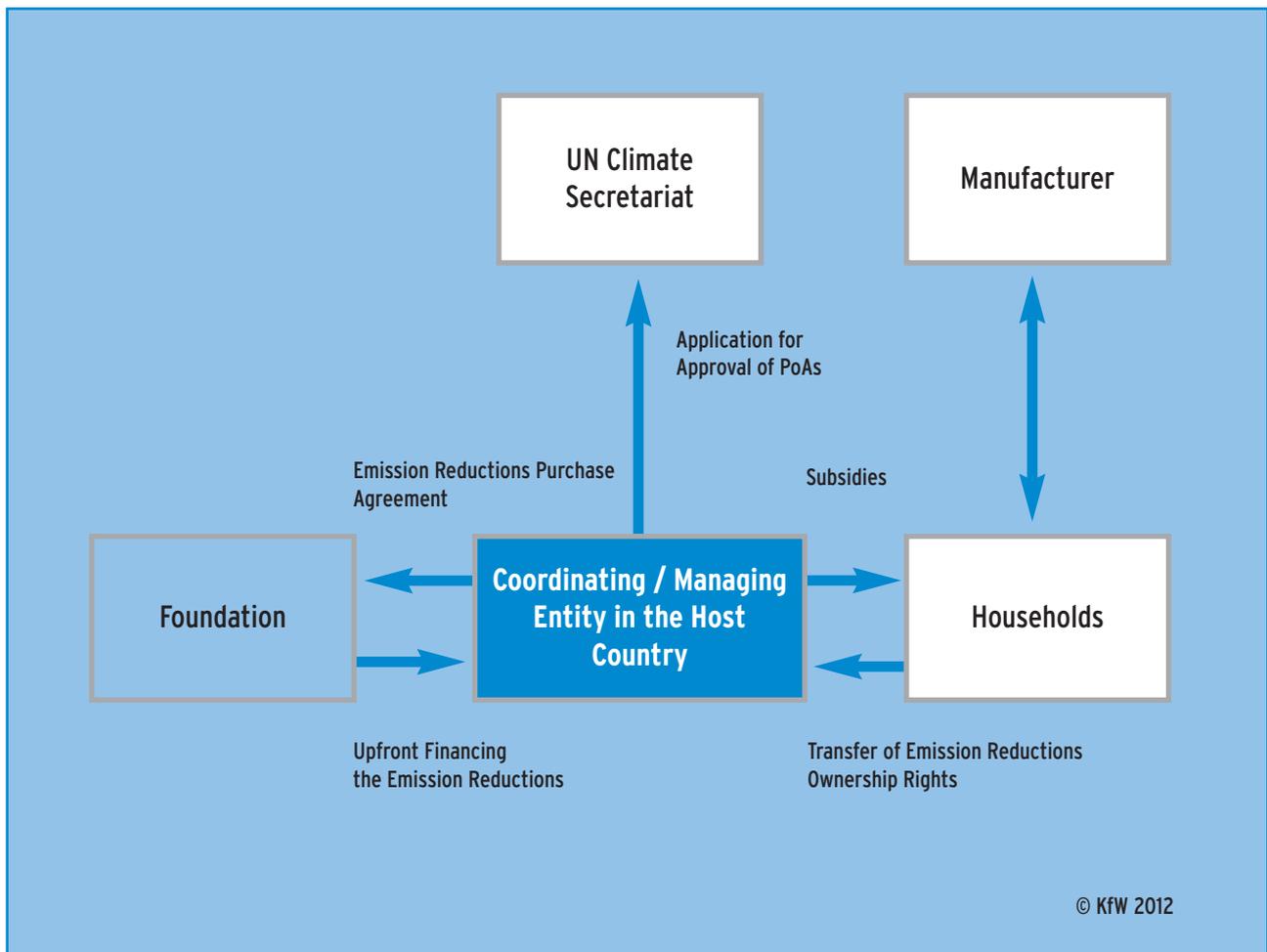


Figure 5: Example of a micro-scale PoA supported by the Foundation

Cooperation Opportunities

Furthermore, the foundation plans to cooperate with third parties on individual programmes and/or on the level of the foundation. Possible forms of cooperation include external funding, joint funding of start-up activities, early purchase of certificates when start-up funding ends as well as cooperation in the operative implementation of PoAs. Cooperation with local as well as international partners can lead to a leverage effect which increases the support for a greater number of PoAs and improves the knowledge and capacity for further carbon projects in the host countries.

Getting Started

Detailed participation requirements for PoA and guidelines for project developers will be published in summer 2012. Currently, the website of the foundation is being developed. In the meantime, please visit the KfW Website for further information.

Further information

This activity is part of the International Climate Initiative. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag. For further information, please go to: http://www.kfw.de/kfw/en/KfW_Group/Sustainability_and_Climate_Protection/Further_activities/Foundation_Future_of_the_Carbon_Market.jsp

Contact

Rainer Sünner, KfW
Email: rainer.suennen@kfw.de

PoA Working Group: Continuous Contribution to the Advancement of the Programmatic Approach

In 2005, a new project type entered the CDM world: “CDM Programmes of Activities” (PoAs) allow for a number of similar emission reduction activities to be registered as a single CDM programme. Yet since 2007, when the new framework was opened for project developers, progress has been slow despite the further development and improvement of the PoA regulatory framework. Current PoA rules rely heavily on single CDM project regulations which defy the logic of reducing barriers and speeding up the PoA validation and registration process.

Against this background, Perspectives Climate Change, with the financial support of BMU, has established the CDM PoA Working Group in November 2011. In a nutshell, the group has a twofold objective:

- Provide a **platform for dialogue, experience sharing and coordination** between members of the Working Group with regards to current PoA development, tackling existing challenges and developing concrete solutions.
- Act as a **“change agent”** to reform the PoA regulatory framework with the active participation of the international stakeholder community including UNFCCC, country-based CDM institutions, Designated Operational Entities, project developers, financiers among others.

Members of the Working Group are so far: CDC Climate Asset Management, the German DNA (DEHSt), International Institute for Global Environmental Studies (IGES), KfW Bankengruppe, the Project Developers Forum, and the World Bank. Additional invitations can be sent out to interested parties at a later stage.

Submissions to the Executive Board

The Working Group has proved a very valuable circle of experts that have the ability to jointly identify the most pending issues for PoA development and to recommend improvements with an outstanding degree of technical know-how and appropriate justifications. Since its inception, the Working Group has undertaken a number of outreach activities to contribute to the continuous improvement of the PoA mecha-

nism. This includes three submissions to the CDM Executive Board (EB), the UNFCCC DNA training workshop in Bonn (20-21 March 2012) and the UNFCCC Sustainable Development Mechanisms Joint Coordination Workshop in Bonn (24-25 March 2012).

Among the topics addressed in the submissions to the EB were the following:

Validation and Registration

Case 1: Before the 65th session of the CDM Executive Board (EB65), the threshold limits for micro-scale activities had to be applied at CPA-level rather than to the units under a CPA. Under these rules, project developers that want to apply micro-scale additionality guidance have to cluster household/SME/community level activities into CPAs that are below the micro-scale limits, which resulted in significant transactions costs. The Working Group recommended to apply SSC micro scale thresholds to the technology or units within a CPA and not to the CPA, where household/SME/community level activities can be deemed additional regardless the CPA size.

Case 2: According to prevailing CDM rules before EB65, a CPA could not start prior to the PoA validation start, i.e. publication of the PoA on UNFCCC website. However, rules also required the first specific CPA to be submitted along with the PoA for publication. The nature of PoAs was such that the institutional structuring of PoAs can require more time than is needed to prepare the first CPA. PoA structuring thus substantially delayed CPA implementation. The Working Group recommended to the EB to allow PoAs to submit a letter to the EB as proof of start date. The CPAs can then be allowed to start following an announcement of the PoA. An analogy for such a rule making are the guidelines on prior consideration (EB62) which specifies that, for proposed project activities with a start date from 2 August 2008 “the project participant must inform a Host Party designated national authority (DNA) and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status.”



Efficient lighting is a typical PoA activity, as the numerous micro activities could not carry the CDM transaction costs individually.

As a response to both recommendations, the EB requested the secretariat to prepare an analysis of the issue by EB67 (May 2012).

Monitoring, Verification and Issuance

Case 3: Until EB65, sampling, monitoring and verification had to be undertaken for individual CPAs, because the EB did not grant the possibility to sample across CPAs. As emissions reductions from CPAs were very small, especially when applying micro-scale rules, sampling of each individual CPA meant substantial and sometime prohibitive costs for the PoA developer. That is why the Working Group suggested to the EB in a submission for EB65 to allow cross-CPA sampling in cases where the user groups of the technology deployed under the PoA in the respective CPAs could be thought of as homogenous. The EB granted this request at EB65 and the “Standard for sampling and surveys for CDM project activities and programme of activities” now allows cross-CPA sampling.

Case 4: The CDM rules specify that each CER shall have a unique serial number including a country code of the party which hosted the CDM project activity. With regards to multi-country PoAs, the question arises how the issue of country code is handled and how the country of origin can be determined on the serial number of a CER from a multi-country PoA. The Working Group felt this was especially important for multi-country PoAs which have Letters of Approval (LoAs) from LDCs and non-LDCs, as the EU ETS only allows imports of CERs from CDM projects registered after 31.12.2012 that have an LoA from an LDC. The Working Group asked the EB to initiate the necessary measures to ensure that CERs originating from LDCs from multi-country PoAs could be uniquely identified by their serial number and differentiated from CERs from Non-LDCs from the same multi-country PoA. As a response, EB66 decided to prepare a proposal on how to record the host Party originating emission reductions or removals in case of multiple host countries.

The Working Group held its 3rd meeting in Addis Ababa, Ethiopia, in April 2012 just shortly before the African Carbon Forum. The particular focus of the meeting was on PoAs in Africa. The Working Group invited a project developer with a large PoA portfolio in Africa, Standard Bank, and the DNAs from Angola, Ghana and Togo to share their views on the topic. There was a consensus among all participants that for the PoAs taking place in Non-LDCs in Africa, registration by the end of 2012 is pivotal to ensure import of the CERs into the EU ETS. African DNAs were in general not perceived as bottleneck towards successful PoA registration before the 2012 deadline. However, there are a limited number of cases where the DNAs could communicate more clearly what kind of documentation they expect from the project proponents.

Taking the Broader Perspective

Issues that continue to be of highest concern for the Working Group are, for example, the existing barriers for obtaining multi-country Letter of Approvals and the future of the PoA mechanism in the light of the future of the CDM and possible New Market Mechanisms. The Working Group will critically and constructively follow the progress made on those and other important topics and continue providing its input to the relevant authorities when necessary.

Further information

This activity is supported by BMU as part of its CDM/JI Initiative and carried out by Perspectives Climate Change. The JIKO Info Newsletter regularly reports on the Working Groups meetings and outcomes, see www.jiko-bmu.de/457

Contact

Matthias Krey, Perspectives GmbH
Email: krey@perspectives.cc

Banking on Africa's Green Economy: the African Carbon Asset Development Facility (ACAD)

Africa is home to a wealth of untapped project opportunities with the potential to generate both significant commercial and social dividends. However, despite the explosive growth of carbon finance transactions worldwide, Africa has barely scratched the surface of its potential to finance its development through climate change instruments and the booming carbon trade. Major factors that have stood in the way of narrowing the African carbon gap include high transactions costs, unfamiliarity with carbon projects, and lack of expertise. Consequently, few project success stories can be used as role models. Together, these have stalled a number of otherwise technically viable projects, or left them in a position where they are developing too slowly to attract mainstream investors.

The Transaction Cost Barrier

Carbon assets are riskier and more costly to develop in Africa than in other regions. This is due to fewer concrete project successes to emulate, the more limited number of large-scale opportunities, and the greater suitability for carbon projects in CDM sectors that are less established. Recent surveys have shown carbon project transaction costs incurred during CDM project cycles can grow as high as US\$ 300,000. To break down the barriers that are keeping Africa from developing a robust carbon market, UNEP has developed the Africa Carbon Asset Development Facility (ACAD). Costs and risks at the early to mid stages of project development are particularly in need of relief from high transaction costs, most notably for banks and other investors that do not have advanced carbon transactional capacity. For this reason, the African finance sector will play a central role in ACAD to build their awareness of the risks and rewards of the carbon market.

Engaging Financial Institutions

ACAD helps bankroll carbon projects by engaging local actors crucial to realizing projects: financial institutions. By improving the ability of these institutions to identify, appraise, and transact viable carbon opportunities, ACAD helps to catalyze a more robust African carbon market. With BMU-ICI support, ACAD enters its second phase of implementation, building

on the foundation established during its first two years of operation.

ACAD's activities also result in reduced costs. By building a portfolio of projects that are both long-term and easy to replicate elsewhere in Africa, it will stimulate similar projects to follow the same approach, thereby decreasing the future costs of project development and mobilizing investment.

The ACAD Approach

Three principal outputs correspond to the three ACAD support lines. The outputs are instituted simultaneously, boosting technical and financial capacities of developers and financial institutions to facilitate the development of 20 replicable projects to carbon asset realization. This supplements the fourteen-project portfolio developed during the first phase.

Support Line #1: Transaction Cost Sharing

Targeted grants are directed through financial institutions to ensure that projects not immediately commercially viable can complete critical carbon project milestones like environmental impact assessments and project validation. This sharing complements the project developer's own contributions. Project selection focuses on innovative projects in replicable sectors without pre-determined target countries or technology sectors, and a window of support dedicated to more commercially immature areas such as programmatic CDM, LDCs, and non-Anglophone countries.

Support Line #2: Technical Assistance for Financial Institutions

ACAD partners with local financial sector actors and provides them with training on how to tap into carbon finance opportunities via workshops, project clinics, and one-on-one technical assistance. ACAD helps mainstream carbon finance capacity within the African financial sector and helps developers tackle key issues that occur throughout the advanced stages of the carbon project development cycle.

Support Line #3: Stakeholder Outreach and Mobilization and Methodology Development

In addition to training, ACAD engages in several activities to facilitate the scale-up of financial sector

participation in the carbon markets. Specifically, ACAD will develop an African Carbon Market Directory to serve as a tool to increase awareness of key market players, CDM service providers, investment vehicles, and existing CDM regulations. CDM experts will be placed within financial institutions selected through a competitive tender to serve as in-house experts, develop training plans tailored to bank needs, and serve as internal focal points to enhance public-private sector collaboration. Lastly, ACAD supports the development of a regional grid emission factor for Southern Africa cp. *Unlocking CDM Development in Southern Africa* elsewhere in this brochure.

By leveraging the financial closure of a pool of demonstration projects that are easy to replicate

elsewhere in Africa, ACAD will decrease transaction costs, and help mobilise additional finance.

Further information

This project is part of the International Climate Initiative. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag. ACAD is managed by the UN Environment Programme (UNEP). For more information, please go to: www.acadfacility.com

Contact

Françoise d'Estais, UNEP
Email: francoise.destais@unep.org

ACAD Project Example 1

NURU Lights, Kigali, Rwanda

In Rwanda, many rural households do not have access to electricity. Currently, most of these households (93%) use kerosene, but it is prohibitively expensive, bad for the environment, and detrimental to respiratory health.

The social enterprise NURU has developed a new technology to replace kerosene and provide lighting. The Nuru Light™ consists of multiple bright white LED lights, each many times brighter than the light produced by a typical kerosene lantern. The Nuru POWERCycle™ is the world's first commercially available pedal generator kit for the NURU Light units, producing 50W of power with minimal human exertion (approx. 60 rpm pedalling). The generator has a built-in docking station which allows 5 lights to be recharged at a time.

NURU provides potential for home or "cottage industry" income-generating activities during evening hours, and screens and selects local entrepreneurs to operate their own micro-franchises. Each sells lights and then charges the customers a small fee to recharge them. Entrepreneurs can each earn up to US\$ 10 per day.

Sustainable Development Benefits

The sustainable development benefits of the project are numerous and include: increased access to energy-efficient lighting, job creation, increased safety

through a reduction in kerosene-related fires, reduction of respiratory diseases, improvement in school performance, and dramatic savings in lighting costs (90%).

Carbon Impact

The project will replace the use of CO₂-emitting kerosene lamps in thousands of households each year. Each lamp emits an average of 0.15 tons of carbon dioxide each year. By replacing kerosene use for lighting, the project activity is expected to reduce CO₂ emission by more than 75,000 tonnes a year. Carbon Africa is the carbon consultant on the project.

ACAD Partnership

ACAD grant funding totalling US\$ 43,000 is directed towards reimbursing a portion of PDD development, validation, and ERPA drafting costs.

Project Contacts

Find out more at: <http://nurulight.com>
Email: info@nurulight.com



Nuru lights in practical use

ACAD Project Example 2

AFOVERT Energy, Niono District, Mali

The AFOVERT Energy project produces and commercialises two types of ‘Green Fuel’ manufactured from locally abundant biomass waste. It manufactures and sells fuel logs or “buchettes” from compressed waste vegetation, and green charcoal “briquettes” made from the buchettes. The green fuels, which are composed of combination of rice husks and the invasive aquatic Typha weed, offer direct replacements for fuel wood and charcoal, the two fuels predominantly in use in and around Niono.

Charcoal and wood are non-renewable energy sources due to the scarcity of forest resources, so they are hard to get and costly. However, households lack viable alternatives so they use them nonetheless, contributing to both deforestation and environmental degradation. Supplies of Typha are prevalent in canals and irrigation channels, and rice husks are produced in large volumes in the rice fields around Niono.



Green fuel to replace non-sustainable wood and charcoal use: the Afovert project has many benefits.



From 2007 to 2010, the Malian project developer Katene Kadji undertook a 3-year pilot project that demonstrated the viability of these fuels. The technology has been used in China, India, and Malaysia, but this is the first large-scale attempt in Africa. Manufacturing equipment has been installed for scale-up and once at full capacity, the project will produce 12,000 tons of buchettes and 1,000 tons of green charcoal per year. Proceeds from carbon credits are passed on to consumers through reduced fuel pricing.

Sustainable Development Benefits

Green fuel use results in direct replacement of wood and charcoal. Other effects include less time spent collecting wood, reduced pressure on disappearing forests, local employment opportunities, and smaller energy costs for households. The project also helps the environment by clearing weeds that choke waterways, reduces outdoor waste dumping, and improves water quality by limiting the number of waste piles that reduce dissolved oxygen content in the water.

Carbon Impact

The main focus of the project is to produce renewable biomass fuels, and then sell them to households that would otherwise be using non-renewable fuels to meet their domestic energy needs. This fuel switch results in the reduction of methane emissions from decaying piles of Typha and rice husks. Approximately 8,000 tons of CO₂-e emission reductions will be generated per year.

ACAD Partnership

ACAD contributes US\$ 61,000 to support finalization of the PDD, Environmental Impact Assessment, registration and ERPA drafting, and performance of three studies to assess product feasibility for local residents, caloric heat production for fuel mixtures, and the baseline on fuel use.

Project Contacts

Find out more at: <http://cascade-africa.org>
Email: sewakadji@yahoo.fr

A Low Emission Development Path for the African Power Sector - The Sugar Industry as Energy Provider

Biomass is a major source for energy production in Africa. A recent study carried out by GFA ENVEST therefore analysed the East African sugar sector's potential for CDM energy generation and energy efficiency projects. The findings confirm that while the use of sugar fibre (bagasse) for energy production is common practice, using sugar plant residues (leaves, tops) for energy production is a new financially viable option which is still untapped. Also, energy efficiency measures in sugar mills offer further potential for GHG reduction activities. Altogether such investment could be used to test and demonstrate which international climate policy mechanisms (CDM projects or programmes or Sectoral Approaches) might provide the best opportunities for implementing industrial-scale mitigation activities in African LDCs in the coming decade and contribute to the much needed rural electrification.

Sugar is one of the most important commodities in eastern and southern Africa, where 63% of African sugar is produced. The sugar sector offers vast unutilised potential for climate mitigation projects focused on energy efficiency and generation of biomass-based energy. Recognizing this potential, the German Environment Ministry supported a study of potential in Kenya and Tanzania. These two countries provide relatively good framework conditions characterised by a positive investment climate, the availability of feed-in tariffs and guaranteed grid access. From the countries' perspective, the sector additionally offers potential for fostering rural electrification due to its relatively decentralised structure. From an international perspective, projects in Tanzania are especially interesting due to the Least-Developed-Country-status meaning that CERs generated have unlimited access to the EU-ETS also post-2012.

For Tanzania, bio-energy produced by installations of less than 10MWel receives a guaranteed feed-in-tariff of 5.5 ct €/kWh for a period of 15 years. Kenya offers a general indicative maximum tariff of 5.4 ct €/kWh. Worldwide, the sugar sector has already hosted a considerable number of CDM projects primarily addressing the utilization of unused bagasse for energy recovery. Bagasse is the fibre that remains after sugar extraction from cane, and has very good combustion

properties. Because of its attractiveness, the potential for additional energy recovery from bagasse is almost exhausted. This is the case in Tanzania and Kenya. However, three other measures with significant potential have been identified:

- **Cane trash to energy:** Apart from bagasse, sugar cane offers a second source of biomass in the form of the plants' leaves and tops (known as 'cane trash'). Based on regional cane yields of 75 t/ha, this results in 28 t/ha of cane trash from which 11 MWh/ha of electricity can be generated in a regular power plant. A precondition here is 'green cane harvest', meaning refraining from burning standing cane to facilitate manual harvest as is still practiced in Tanzania. The overall potential offered by this measure in Kenya and Tanzania is estimated at some 220 GWh/yr, which is equal to around 140 ktCO_{2e}. The agronomic potential – using 60% of all available cane trash – is much higher.
- **Supply side efficiency:** The extraction of sugar from cane is an energy intensive process requiring superheat steam. In East Africa, heat is mainly generated in steam systems with pressure ranging from 20 to 25 bars. This results in system efficiencies of only 10%. Increasing pressure using state-of-the-art technology with 66 bars could result in system efficiencies of 25%. Conservatively calculated, this switch could tap a potential 32 GWh per year for an average sugar mill. The overall potential of this measure in Kenya and Tanzania is estimated at 860 GWh/yr, which is equal to around 550 ktCO_{2e}.
- **Demand side efficiency:** As the sugar extraction process mainly consumes thermal energy in the form of steam, the process efficiency is typically indicated in tons of steam per ton of cane crushed. Plants currently consume about 45% of steam on cane. Improving process efficiency to 55% steam on cane and utilizing the equivalent of saved steam in a standard backpressure turbine could recover around 11 kWh per ton of cane crushed. In the study, some the analysed mills consumed as much as 65% steam on cane.

Table 4	Opportunities	Barriers
Cane Trash	<ul style="list-style-type: none"> • Completely untapped potential • 11 MWh_{el}/ha + thermal energy • New income source for millers and farmers • Prefeasibility study available 	<ul style="list-style-type: none"> • Huge logistical challenges • Hesitation to adopt green harvest
Demand-side Efficiency	<ul style="list-style-type: none"> • Very high potential • Double current energy output 	<ul style="list-style-type: none"> • Requires massive investment
Supply-side Efficiency	<ul style="list-style-type: none"> • High potential • Up to 20% lower energy demand 	<ul style="list-style-type: none"> • Must fit into the factory's setup • No CDM methodology

Tackling Technical Barriers

The study identified technical solutions for the improvement of energy efficiency and for recovering energy from cane trash including the logistics of cane trash provision. For the latter, being a new activity in the region, non-conventional solutions were also considered.

Energy efficiency: The technologies for the improvement of energy efficiency on the supply-side (e.g. energy generation with improved boilers) and on the demand-side (e.g. reduced process heat demand due to heat exchangers) are available worldwide. Sugar mills in Kenya and Tanzania are generally well-informed about respective technologies and know operational best-practice examples, e.g. from Mauritius.

Cane trash to energy: The current situation found in Tanzania and Kenya is the same in terms of current use of cane trash and availability of mechanization for harvesting operations: in both countries cane trash is currently not used and harvesting is completely manual (cane is cut, aligned and topped by hand) while only loading is assisted by machinery. There is, however, an important difference in terms of pre-harvest operations: in Tanzania, cane is burnt before harvest to get rid of the “exuberant biomass” formed by the cane trash while in Kenya this is forbidden due to environmental reasons (avoiding dust emissions). Stopping pre-harvest burning of cane is a precondition for using trash but would reduce cane-harvesting speed. The study identified a semi-mechanised harvesting system as an operational alternative to compensate this effect. Semi-mechanization bears no negative social consequences: combined with cane trash harvesting it offers a job-neutral solution. Full mechanization in contrast (i.e. mechanised harvesters) is not expected to become a widespread alternative in the near future due to extraordinary high investment costs, the availability of cheap labour, and, in case of Kenya, also difficult topographical conditions because of steep terrain.

In terms of transportation of the rather bulky cane trash compared to stripped cane, a solution that accounts for its special physical properties is required. Trailers providing simple on-board compaction equipment were identified as most favourable and most-adapted technical solution.

Combination of measures: Sugar mills are complex industrial facilities, which consume process heat in form of superheated steam generated in steam boilers. Electricity required in smaller amounts is co-generated at a later stage of the steam-cycle by using exhaust process steam. Modifying one component normally requires the modification of the complete system or at least a compatibility check. A stepwise implementation of individual measures bears the risk of losing large synergy effects.

Tackling CDM Methodological Barriers

The CDM provides methodologies for the development of energy projects based on renewable biomass, however not for supply-side energy efficiency in the region.

Cane trash to energy and demand-side energy efficiency can be covered, for example, by the CDM methodology ACM0006 allowing for one or more of the following components:

- utilization of biomass for energy generation,
- at current or increased levels,
- increased energy generation efficiency.

This is available in case of power-only or combined heat and power plants. Due to the considerable number of sugar mills in the region, it is recommended to consider the implementation of a SSC-PoA, a sectoral approach, or a similar structure. This spares the necessity for precise timing of the activities and lowers CDM transaction costs.



Untapped potential: sugar cane production offers numerous opportunities for climate change mitigation projects.

For the development of supply-side energy efficiency activities, a methodology applicable to respective activities in the sector is not available. As in the region sugar mills commonly recover energy from 100% biomass, the improved energy efficiency can only translate into additional power generation. A clarification by the CDM Executive Board confirmed that no eligible CDM methodologies are available (SSC_587). Specific methodology development could make sense and find application in comparable industries. It should cover process efficiency improvements entailing additional power export in agro-/industrial facilities that are operated on renewable biomass only.

Economic Analysis

The result of the economic analysis proved that all three measures are financially attractive, especially if including CDM revenues, but to different degrees:

- **Cane trash to energy:** Investments will usually be necessary for all elements of energy recovery (mainly boiler and also turbine in case of power generation) and for cane trash provision. Only if unused energy generation capacities are available, investments are limited to the logistics chain covering the two activities of harvest and haulage. In Kenya, where green harvest is already practiced cane trash provision operational costs are restricted to haulage. In Tanzania, due to larger amounts of biomass to be handled compared to the current burnt cane harvest, operational costs must be calculated both for haulage and harvest.

To disregard site-specific investment capital availability, profit calculations in the study were based on gross margin (GM). The GM is around 3 to 8 €/t of cane trash, if the harvesting system is switched to green cane. In this case, the GM can increase to more than 20 €/t, if other measures

like semi-mechanized harvest or improved logistics through compaction trailers are applied.

- **Demand-side efficiency:** Investment costs are substantial. Costs for a 60 bar pressure plant are estimated to be at around € 1.4 million per MWel. This would translate into a €35 million investment for an average sugar mill. For higher pressure systems, investment costs increase over-proportionally.
- **Supply-side efficiency:** Investment costs cannot be estimated as there is no definition of standard equipment that would be necessary to achieve the targeted efficiency. However, internal rates of return (IRR) are generally high for this kind of activity and often achieve a two-digit level.

Tackling the Barriers in a Joint Approach

The co-investment through the CDM and other approaches could be tested and demonstrated on these activities in the East African sugar sector providing best opportunities for realizing industrial-scale mitigation activities in African LDCs. These activities quite often might fit into expansion activities planned by many sugar mills in the region. They would also contribute to future price stability and could make the region less dependent on imported energy. The involvement of foreign investment capital is certainly most needed in the undercapitalised sugar sector in the region. Foreign investors, especially from Annex I-countries, are generally interested in industrial energy projects, but usually condition their engagement on the possibility to receive CERs in the first place. In this context, tackling the CDM methodological barrier is at first priority.

Short-term assistance should concentrate on exploiting free energy generation capacities or on stand-alone efficiency improvements. More intensive support through tailored engineering consultancy will be needed for promoting the cost-effective combination of measures.

Further information

This activity is supported by BMU as part of its CDM/JI Initiative. The study was carried out by GFA ENVEST.

Contact

Dr. Daniel Blank, GFA ENVEST
 Email: daniel.blank@gfa-envest.com
 Joachim Schnurr, GFA ENVEST
 Email: joachim.schnurr@gfa-envest.com

Leapfrogging to Modern Energy Access: Accounting for Suppressed Demand in CDM Methodologies

Access to basic energy services is still constrained in developing countries. For example, more than 550 million people in sub-Saharan Africa lack access to electricity, while an estimated 884 million do not have access to improved sources of drinking water. Poverty is the main cause, but also a lack of infrastructure, limited availability of natural resources, or high unit cost of service. Without access to basic energy services, the people affected are excluded from consuming electricity or using potable water. Connection to the power grid or an isolated mini-electricity grid would quickly lead to energy usage for lighting, charging, and the like. Yet in absence of these services, demand for them is “suppressed”.

So far, carbon markets have not been able to mobilise projects in the context of suppressed demand. Emissions reductions have traditionally been determined as the difference in emissions with and without the proj-

ect. In the case of suppressed demand, the level of energy service and associated emissions without the project are low or non-existent. As a consequence, the project could not claim any emission reductions.

This situation changes, if the right to develop and the right to a decent life are taken into account. In this case, emission reduction calculations have to be adjusted, considering a pre-project situation where a minimum level of basic services is met.

Integrating Suppressed Demand in the Carbon Markets

Accounting for suppressed demand leads to credits for preventing future emissions. One example is the electrification of rural areas on the basis of renewable energy reduces emissions when compared to the fossil fuel-based alternatives. Consideration of a base-



Electricity pylons in Beaufort West, Western Province. Unlike in South Africa, many people in sub-Saharan Africa still lack access to electricity.

line that meets a minimum service is going to lead to an increase of possible emission reductions, as the minimum service level would most likely have been provided on the basis fossil fuel-based technologies.

This will increase attractiveness of projects dealing with suppressed demand and carbon finance becomes an interesting financing option for providing modern energy access to people currently living in a situation of energy poverty. How this can be achieved with the right balance between sustainable development on one hand and environmental integrity on the other, is a challenge that is attracting increasing attention by regulators of compliance and voluntary carbon markets alike.

Assessing the Current Status of Suppressed Demand

Several existing CDM methodologies as well as some methodologies for the voluntary market already address cases of suppressed demand. Nevertheless, existing methodologies have not been able to mobilise a critical mass of projects that address the issue. This can be explained by two key difficulties:

- the determination of the reference scenario, known as baseline
- the determination of the level of service which should reasonably be accounted for.

For example, in the case of rural electrification, it is not possible to measure the emissions of the electricity as no such service was available before. Therefore, only assumptions are possible. It also remains to be decided for which quantity of electricity emission reductions should be accounted.

In general, CDM methodologies are so far unsuited for projects that bring “first time” energy access and guidance on how to incorporate suppressed demand into the development of methodologies did not exist for a long time. In turn, new dedicated methodologies are required for closing the suppressed demand gap in, for example, the sub-Saharan Africa region.

In July 2011, the CDM Executive Board published guidelines on the consideration of suppressed demand in CDM methodologies and requested a work programme to internalise the concept into existing and new methodologies and has since been working to take the concept further.

Taking Account of Suppressed Demand in CDM Methodologies

The objective of this activity is to develop three new methodologies addressing suppressed demand for relevant project types in sub-Saharan Africa. All three developed methodologies are to be based on real cases studies in the region (South Africa, Benin and Malawi). The expected benefits expected from this methodology development are as follows:

- Providing methodologies which, if accepted under the Gold Standard, will directly allow carbon markets to intervene on projects which reduce energy poverty.
- Developing a simple yet robust approach for the quantification of future avoided emissions, either on the level of methodology or in the form of a generic guidance applicable across methodologies. This will be done through the definition of Minimal Service levels to determine the reference scenario.
- Establishing a methodological foundation for the recently launched Gold Standard micro-scale scheme, cp. *Paving the Way for the Compliance Market* elsewhere in this brochure.
- Proving a concrete case of interpretation of the recently adopted guidance on suppressed demand, especially for the different project types and typologies of suppressed demand encountered.
- Lowering entry barriers to potential projects of interest in underrepresented regions such as sub-Saharan Africa.

Table 5: Methodologies Addressing Suppressed Demand Developed as Part of the Project

Off-grid Rural Electrification and Energisation for Villages

Gold Standard micro-scale methodology

The methodology will be based on to the minimum electricity service levels found to be required by communities.

New Housing Performance Upgrade

CDM large-scale methodology

This methodology will in particular take into account the increase in thermal comfort through the use of a better building shell. The determination of baseline emissions is set to be based on a calibrated model.

Energy Use in the Processing of Agricultural Products

CDM small-scale methodology

This methodology will take into account the need for a minimum of mechanical energy to replace exhausting manual labour and increase the local productivity and generation of added value in poor countries.

The activity aims at delivering three new Gold Standard methodologies specifically addressing suppressed demand, compare **Table 5**.

The new methodologies will be complemented by a user-friendly web-based tool for a quick assessment of emission reductions. This will facilitate the application of these methodologies. To spread the acquired knowledge, lessons learnt will be compiled in a suppressed demand blueprint book in English and French.

Further information

This activity was commissioned by the Gold Standard within the framework of its work on innovative tools for underrepresented regions. The project is part of the International Climate Initiative. BMU supports this initiative on the basis of a decision adopted by the German Bundestag. The work is carried out by a consortium led by Perspectives, with its sub-contractors SouthSouthNorth Project Africa and NIRAS A/S.

Contact

Marc André Marr, Perspectives Climate Change
Email: marr@perspectives.cc

Paving the Way for the Compliance Market: the Gold Standard Programme for Underrepresented Regions

Within the framework of a programme funded by BMU's International Climate Initiative, The Gold Standard Foundation is developing a set of innovative tools that will lower entry barriers and allow for the scale-up of carbon market activities in underrepresented regions, such as sub-Saharan Africa, with the hope that in time these concrete solutions will be adopted under compliance schemes.

The Gold Standard is the premium climate finance framework, established by NGOs, including WWF, to demonstrate that carbon markets can deliver capital efficiently to greenhouse gas mitigation projects whilst delivering their full potential in terms of sustainable development co-benefits. The Standard has additional requirements in order to safeguard its approach: complementing the CDM documentation, project developers must demonstrate that they will implement one or more renewable energy or energy efficiency activities and will contribute to sustainable development by making a net-positive contribution to the economic, environmental and social welfare of the local population that hosts it. In the past decade, more than 500 Gold Standard low carbon projects have been listed (with another 200 in the project pipeline), predominantly in China, India, Turkey and Africa.

Least Developed Countries (LDCs), Landlocked Least Developed Countries (LLDCs), Small Island Developing States (SIDS) and poorer regions of developing countries have to-date attracted under-proportional amounts of carbon finance. With the focus of the CDM shifting in a post-2012 regime, the need for innovative approaches and institutional preparation to generate emission reductions from these regions has become much more pressing. In this context, the work aims to be a catalyst for both innovation and institutional preparation in targeted regions. In order to qualify, these can be located in any host country but must have been identified by the national gov-

ernment as a special underrepresented zone. Alternatively, the Millennium Development Goals can serve as the basis to assess eligibility.

The Gold Standard Micro-scale Schemes

The new Gold Standard stand-alone micro-scale scheme is a voluntary scheme allowing project developers to reduce transaction costs as well as project registration and issuance timelines for activities capped at a maximum of 10,000 tCO_{2e} per annum.

All renewable energy supply and end-use energy efficiency projects are eligible. Activities located in LDCs, LLDCs and SIDS, or targeting poor communities elsewhere, can benefit from simplified rules for demonstration of additionality, as long as they are not retroactive.

As for any activity applying for Gold Standard certification, a two-step stakeholder consultation must be conducted, but the process is greatly simplified within this scheme with no requirement for a systematic scoring of sustainable development indicators. Instead, a risk-based approach is adopted by which so-called objective observers are selected to go on site to appraise any potential negative impacts the project may be associated with during the validation and verification stages, and identify, together with the project developers, adequate mitigation measures.

Furthermore, the validation and subsequent verifications of a project activity are carried out internally by The Gold Standard Foundation unless, following a risk assessment, the activity is selected for external validation or verification by Designated Operational Entities (DOEs). All applicants pay flat fees into a validation and a verification fund, used to finance the external validation or verification.

The Gold Standard micro-programme scheme allows for the extension of the programmatic approach to Gold Standard's micro-scale scheme activities. It combines benefits associated with the respective approaches, such as the concept of a validation and verification fund, and the simplified procedures for the replication of similar activities under a programme,



Ensuring quality, boosting sustainable development: Gold Standard projects must adhere to strict additional standards.

thereby reducing transaction costs and project cycle time. Each activity under the programme is capped at 10,000 tCO₂e per annum, but no overall cap is applied to the programme as a whole. The activities are deemed additional if they match certain conditions listed in The Gold Standard Rules including the poverty of the targeted community and the scale of the installed capacity.

Like with the stand-alone projects, a risk-based approach is adopted for the assessment of sustainable development impacts. Potential negative impacts of the activity are required to be identified and mitigated with appropriate measures that will have to be monitored all along the crediting period. This happens through the review of the Local Stakeholder Report that is delivered early on in the project cycle for each of the activities, as well as empirical knowledge of the typical issues we find in the various types of activities. Objective Observers are sent on site to contribute to this assessment as part of the validation process.

The review by The Gold Standard of the inclusion of activities into the registered micro-programme is based on a target-random selection. Verifications are

conducted in line with the sampling approach approved at the validation stage, following a risk-based approach, i.e. some of the activities are selected for verification by DOEs (carbon accounting) and Objective Observers (sustainable development impacts) on site while less sensitive ones are spot-checked by the Gold Standard. Detailed practical information is available on the Gold Standard website.

The voluntary market has always been an incubator for innovation and on several occasions Gold Standard approaches, such as suppressed demand, have been adopted by the CDM. There is currently an interesting dialogue taking place on how The Gold Standard approach to sustainable development monitoring, reporting and verification may be incorporated into the compliance market and, as these outlined innovations focus very much on LDCs, there is certainly the hope for these to be adopted more broadly.

Special Procedures for Conflict Zones and Refugee Camps

Project proponents face considerable problems in contracting a DOE for validation and/or verification



of projects located in conflict zones or refugee camps. These new rules allow for deviation from the usual procedures in such circumstances and to combine desk reviews by DOEs with on-site visits conducted by Objective Observers. All project activities located in such zones, irrespective of their status in The Gold Standard project cycle, can adopt these procedures.

The Gold Standard DNA Programme

The Gold Standard emphasise the crucial importance of sustainable development in all of its projects to ensure that social, environmental, and economic benefits reach local and global communities. The DNA Programme aims to highlight and support Designated National Authorities (DNAs) that, like the Gold Standard, adopt rigorous procedures to evaluate the contribution to sustainable development of the projects before granting Host Country Approval.

The Gold Standard aims to identify opportunities for fast-tracking, co-marketing, and information exchange with those DNAs that have operationalise sophisticated sustainable development assessment methods. The DNA programme will also provide

institutional capacity building to DNAs that are still at the stage of designing sustainable development assessment procedures and criteria. Particularly for LDCs, LLDCs and SIDS there remains an express demand for Gold Standard-type tools, such as the sustainable development safeguards and indicators, to be applied by underrepresented DNAs.

Further information

This project is part of the International Climate Initiative. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag. For more information on the Gold Standard's work, please go to www.cdmgoldstandard.org

Contact

Nahla Sabet, The Gold Standard
Email: nahla@cdm-goldstandard.org

Unlocking CDM Development in Southern Africa – Developing a Regional Grid Emission Factor

The Grid Emission Factor (GEF) is one of the most important elements for developing CDM projects. It is an integral part of many project types, including key areas such as renewable energy projects or demand side energy efficiency. The GEF determines the amount of Certified Emission Reductions (CERs) that a renewable energy project may generate for feeding 1 MWh of electricity into the grid. If the GEF amounts to, for example, 1 tCO₂/MWh, a CDM project generates one CER per MWh. Yet, if the GEF is zero, renewable energy CDM projects will not generate any CERs and hence CDM projects are not feasible. This is the case in countries such as the Democratic Republic of the Congo (DRC) or Zambia, where the national electricity generation is dominated by large hydro power plants with no CO₂ emissions. Even though not explicitly required by the CDM rules and guidelines, the GEF is usually determined on a national level. There are a few exceptions where the GEF was determined at a sub-national level for very large countries, e.g. Brazil and China.

In Southern Africa, electricity trade between countries is very common and many countries depend on electricity imports. Countries such as Botswana or Namibia import more than half of their electricity from South Africa (Table 6). For such a highly interconnected electricity system, a national GEF approach may be inappropriate. A renewable energy

Table 6: Import to Demand Ratio for Selected SAPP Countries

Botswana	63.5%
Lesotho	28.5%
Namibia	52.0%
Mozambique	50.0%
Swaziland	59.0%

Source: Data provided by SAPP CC

The Southern African Power Pool

The South African Power Pool (SAPP) was created in 1995 through an Inter-Governmental Memorandum of Understanding for the formation of an electricity power pool in the region. SAPP currently comprises 15 power utilities (see Table 7) from the following 12 countries: Angola, Botswana, DRC, Lesotho, Malawi, Mozambique, Mozambique, Namibia, Republic of South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe. The SAPP Coordination Centre (SAPP CC), based in Harare, not only facilitates regional electricity trades, but also fulfills regional coordination functions with respect to planning capacity additions and developing energy regulations and policies. As such, the SAPP CC is an important hub for the development of a regional grid emission factor.

project in Zambia, for example, may export its electricity to Namibia, where it replaces CO₂ intensive energy sources. Following a national GEF approach, the project in Zambia will not generate any CERs as the Zambian GEF is zero.

Against this background, GFA ENVEST and the Coordination Center of the Southern African Power Pool (SAPP CC) developed a regional GEF which reduces the technical barriers to CDM project development in the region. This regional GEF is based on an energy model which covers the nine interconnected countries¹: Botswana, Democratic Republic of the Congo, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. All of the nine countries are members of the South African Power Pool (SAPP). The nine countries were integrated into one regional so-called 'Project Electricity System' (PES). The PES is the geographical area for which the 'Build Margin (BM)² and the 'Operating Margin (OM)³ are

1 Please note: energy companies from Angola, Malawi and Tanzania are member of the SAPP, but not yet connected to the remaining nine countries. Hence these three countries are not included in the SAPP GEF.

2 Build Margin (BM): emission levels of the last five commissioned power plants, reflecting the emission trend.

3 Operating Margin (OM): one of four different approaches for determining the average emission level of all power plants located in the PES.

Table 7: SAPP Power Utility Members and Host Countries

No.	Country	Power Utility	Abbreviation
1	Angola	Empresa Nacional de Electricidade de Angola	ENE
2	Botswana	Botswana Power Cooperation	BPC
3	DRC	Société Nationale d'Electricité	SNEL
4	Lesotho	Lesotho Electricity Corporation	LEC
5	Malawi	Electricity Supply Commission of Malawi	ESCOM
6	Mozambique	Electricidade de Mozambique	EDM
7	Mozambique	Hidroelectrica de Cahora Bassa	HCB
8	Mozambique	Mozambique Transmission Company	Motraco
9	Namibia	NamPower	NamPower
10	RSA	Eskom	Eskom
11	Swaziland	Swaziland Electricity Board	SEB
12	Tanzania	Tanzania Electricity Supply Company	TANESCO
13	Zambia	Zambia Electricity Supply Corporation	ZESCO
14	Zambia	Copperbelt Energy Corporation	CEC
15	Zimbabwe	Zimbabwe Electricity Supply Authority	ZESA

determined. The development of one regional PES was done in accordance with UNFCCC rules and procedures by proving that there are no transmission barriers according to the CDM EB's definition.

The GEF and its Implications

Based on standard weighting of the BM and the OM, the SAPP region offers a GEF of 0.92 t CO₂/MWh (see Table 8). Guidance on alternative weights can be found in the 'Tool for the Calculation of the Emission Factor of an Electricity System' (CDM EB63, Annex 19, page 18f).

The GEF calculation was submitted to Carbon Check, a Designated Operational Entity (DOE) located in South Africa. The DOE validated the GEF according to all applicable rules and confirmed the final value in a validation statement.

This features a wide range of implications:

- First and most important the development of the SAPP GEF opens the door for grid-connected CDM project development in various countries in Southern Africa. Prior to the SAPP GEF, this was not possible, as their national GEF values were low or zero.
- Second, GEF development is data-intensive. Often, it is difficult to access the appropriate data sources. Through the close cooperation with the SAPP CC, it was possible to aggregate the relevant data for all countries. Once the SAPP GEF will be published, this data will be publically available.
- The validation of a GEF may be cost-intensive, as the DOE shall verify the data sources. Having the validated SAPP GEF at hand may save some time and costs in the validation process.

Table 8: Summary of the Regional SAPP Grid Emission Factor

Operating Margin Emission Factor (in t CO ₂ /MWh)		0.93	
Build Margin Emission Factor (in t CO ₂ /MWh)		0.90	
	Weight of the Operating Margin	Weight of the Build Margin	Combined Margin Emission Factor (in t CO ₂ /MWh)
Wind and solar power generation project activities for the first crediting period and for subsequent crediting periods	0.75	0.25	0.93
All other projects for the first crediting period	0.5	0.5	0.92
All other projects for the second and third crediting period	0.25	0.75	0.91

- Finally, the current CDM rules (CDM EB28, §14) require a CDM project applying a regional GEF to submit Letter of Approvals from all countries involved. In the case of the SAPP GEF, this implies that a CDM project in e.g. Mozambique is required to receive a LoA not only from Mozambique, but from all nine countries involved. This may pose an operational barrier to the uptake of the GEF.

Facilitating the Application of the GEF

Currently UNEP, UNEP Risoe Centre, GFA ENVEST and all nine host countries discuss whether the GEF shall be submitted as a Standardised Baseline (SBL) to the UNFCCC. Having the GEF approved as a SBL would reduce the number of required LoAs from nine to the one (i.e. the actual host country). This may further facilitate the application of the GEF and may result in UNFCCC's first regional SBL.

Today, as the validation was successfully finalised, the GEF value is ready to be applied for CDM project development. BMU, UNEP, UNEP Risoe Center and GFA ENVEST hope that the regional GEF fosters the development of renewable energy projects under the CDM in Southern Africa.

Further information

This activity was carried out in the context of the ACAD facility project, which is part of the International Climate Initiative. BMU supports this initiative on the basis of a decision adopted by the German Bundestag. The GEF study was carried out by GFA ENVEST in close cooperation with the Southern African Power Pool Coordination Centre.

Contact

Martin Burian, GFA ENVEST
Email: martin.burian@gfa-envest.com

Johnson Maviy
Southern African Power Pool
Email: maviya@sapp.co.zw

ABBREVIATIONS AND ACRONYMS

ACAD	African Carbon Asset Development	KfW	Kreditanstalt für Wiederaufbau
		kWh	Kilowatt Hour
BM	Build Margin		
BMU	German Ministry for the Environment and Nuclear Safety	LDC	Least Developed Countries
		LLDC	Landlocked Developing Countries
		LoA	Letter of Approval
CAFEA	Carbon Foundation of East Africa		
CDM EB	CDM Executive Board	MW	Megawatt Installed Capacity
CDM	Clean Development Mechanism	MWh	Megawatt Hour
CER	Certified Emission Reductions	NAMA	Nationally Appropriate Mitigation Action
CME	Coordinating and Managing Entity		
CO ₂ e	Carbon Dioxide Equivalent		
CO ₂	Carbon Dioxide	NGO	Non-Governmental Organization
CPA	CDM Programme Activity		
		OM	Operating Margin
DNA	Designated National Authority		
DOE	Designated operational entity	PDD	Project Design Document
DRC	Democratic Republic of Congo	PES	Project Electricity System
		PIN	Project Idea Notes
EADB	East African Development Bank	PoA	Programme of Activities
EB	CDM Executive Board		
ETS	Emissions Trading Scheme	RSA	Republic of South Africa
EU	European Union		
		SAPP	South African Power Pool
GEF	Grid Emission Factor	SAPP CC	SAPP Coordination Centre
GHG	Greenhouse Gases	SBL	Standardised Baseline
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	SD	Sustainable Development
		SIDS	Small Island Developing States
GM	Gross margin	SME	Small or medium-sized enterprise
GS	Gold Standard	SSA	Sub-Saharan Africa
GWh	Gigawatt Hour		
		UCB	Uganda Carbon Bureau
ICI	International Climate Initiative	UNEP	United Nations Environment Programme
ICSEA	Improved Cooking Stoves for East Africa		
IRR	Internal rate of return	UNFCCC	United Nations Framework Convention on Climate Change
ISO	International Organization for Standardization	USD	US Dollar
JI	Joint Implementation	WWF	World Wide Fund For Nature

PUBLICATION ORDER:

Publikationsversand der Bundesregierung
Postfach 48 10 09
18132 Rostock
Germany
Tel.: +49 1805 / 77 80 90
Fax: +49 1805 / 77 80 94
Email: publikationen@bundesregierung.de
Website: www.bmu.de/publications

This publication is part of the public relations work of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. It is distributed free of charge and is not intended for sale. Printed on recycled paper.