United Nations Environment Programme

# Terminal Evaluation of project MT/4040-04-23 (5079) Using Carbon Finance to Promote Sustainable Energy Services in Africa (CF-SEA)

*Ghana, Mali, Cameroon, Zambia and Mozambique*

## Evaluation Office

**Bernt Frydenberg**

**October 2010**

**Front page photo:**

Celebration of the 50 years birthday of the Republic of Cameroon. Defilation of schools and educational institutions, 11th February 2010. Themes: peace, fight against corruption and Aids and for sustainable development Girls demonstrating for the use of Bio mass and Solar Energy for Climate mitigation. Photo: Bernt Frydenberg

INDEX

## Disclaimer and Report Information



Frydenberg, Bernt (2010). **Terminal Evaluation: Using Carbon Finance to Promote Sustainable Energy Services in Africa (CF-SEA) (MT-4040-04-23.**

Report to the UNEP Evaluation and Oversight Unit, Nairobi, Kenya. 59 plus annexes.

Bernt Frydenberg, Mercapto CDM Consult, Bolbrovaenge 16, DK 2960 Rungsted Kyst, Denmark.

Tel: +45 20 20 92 61

Fax: +45 35 85 33 85

Email: bernt@frydenberg.dk

# Acronyms used

| | |
|---|---|
| **CD4CDM** | **Capacity Development for Clean Development Mechanism** |
| **CDCF** | **Community Development Carbon Fund of the World Bank** |
| **CDM EB** | **Clean Development Mechanism Executive Board** |
| **CER** | **Certified Emission Reductions** |
| **CEEEZ** | **Centre for Energy Environment and Engineering Zambia Ltd** |
| **CFD** | **Carbon Finance Document** |
| **COP** | **Conference of the Parties** |
| **DANIDA** | **The Danish Development Agency (under the Ministry of Foreign Affairs)** |
| **DNA** | **Designated National Authority** |
| **DOE** | **Designated Operational Entity** |
| **EE** | **Energy Efficiency** |
| **EIA** | **Environment Impact Assessment** |
| **EIB** | **European Investment Bank** |
| **EMP** | **Environmental Management Program** |
| **ERPA** | **Emission Reduction Purchase Agreement** |
| **GEB** | **Global Environmental Benefits** |
| **GHG** | **Green House Gasses** |
| **LDC** | **Least Developed Countries** |
| **LoA** | **Letter of Approval (from the DNA for a PDD)** |
| **LoNO** | **Letter of No Objections (from the DNA for a PIN)** |
| **NC** | **National Communication** |
| **NPV** | **Net Present Value** |
| **ODA** | **Official Development Assistance** |
| **PDD** | **Project Design Document** |
| **PIN** | **Project Idea Note** |
| **RE** | **Renewable Energy** |
| **REDD** | **Reduction of Emissions from Deforestation and Degradation** |
| **SAPP** | **South African Power Pool** |
| **SD** | **Sustainable Development** |
| **UNFCCC** | **United Nations Framework Convention on Climate Change** |
| **UNEP DTIE** | **United Nations Environment Program Division of Technology, Industry and Economics** |
| **WAPP** | **West African Power Pool** |
| **WB** | **World Bank** |
| **WS** | **workshop** |

# 1 Executive summary

The CF-SEA program for promoting sustainable energy projects in Africa was implemented in five countries: Ghana, Mozambique, Zambia, Mali and Cameroon. The program was designed to accelerate the implementation of Climate Change Mitigation Projects, CDM Projects (Clean Development Mechanism Projects) in Africa. The initiative came from both UNEP and the World Bank's Carbon Finance Unit and the cost of the program was shared equally between the two organizations. Not only was the programme in the forefront of introducing CDM on the African Continent[1] but it was also the first UNEP/WB CDCF partnership programme. In short the objective of the CF-SEA programme was to assist a selected number of African countries, in which the CDM processes were hardly started, in creating an environment which would actively pursue the possibilities for creating CDM projects reducing the emission of Green House Gasses (GHG) and thereby establishing long term Global Environmental Benefits (GEB).

The CF-SEA programme was successful in assisting the establishment of the Designated National Authority (DNA) organizations and in establishing the legislative framework and operational capacity of governmental institutions to asses and approve CDM projects. Local intermediaries have been trained and four CDM projects have been registered in three of the selected countries. However no Certified Emissions Reduction (CER) deal flow was established for the Community Development Carbon Fund.

For Cameroon, the World Bank Carbon Finance Unit pre-approved the quality of 7 Project Idea Notes (PINs) out of the 13 PINs presented as the OUTPUT. Four high quality workshops (WS) were held in accordance with the contractual OUTPUT, which then, resulted in the formation of a knowledgeable and active DNA as OUTCOME/INTERMEDIATE STATE. The workshops further informed project proponents on the CDM procedures and possibilities and as a consequence two GHG emission reduction projects for the land fills at Douala and Yaoundé have been registered and are in the implementation stage. IMPACT in the form of Long term Global Environmental Benefits (GEB) from climate change mitigation and pollution reduction will be generated through the land fill projects and it is likely that the positive experience of the project developer HYSACAM will lead to further CDM projects.

For Mali the contractual outputs of the three workshops were met. The DNA had been created already in 2003, however the CF-SEA program helped in straightening out the functional procedures and organizing the DNA committee to having representatives from the participating ministries (6 delegates) and from NGOs and private sector (6 persons/delegates). More than 20 CDM projects were discussed during the CF-SEA programme and four PINs were developed for medium-scale hydro power projects. The Carbon Finance Unit however only approved the PIN for the Félou projects. The project contributes towards mitigation of the climate change effect and is further securing a long term GEB effect in creating sustainable and peaceful cooperation on the utilization of the Senegal River. For the Spanish Carbon Fund, the World Bank Carbon Fund Unit has entered into an Emission Reduction Purchase Agreement (ERPA) with Félou Hydro Power project and the financing of the project has been secured by 2 soft loans from IDA and a loan from EIB.

For Zambia, this evaluation concludes with certainty that the DNA was established as a direct OUTCOME of the project. Out of 8 PINs developed the World Bank pre-approved and paid for 7

[1] CDM projects had at the time of the introduction of the CF-SEA programme been established mostly in South Africa but not in the African LDC countries.

PINs and the DNA issued a Letter of Endorsement for all in July 2007. Since then, 6 other projects have been endorsed and one of them, The Lusaka Sustainable Energy project, has been registered as a CDM project. However, none of the CDM projects suggested during the CF-SEA programme has matured. Effort has since then been made by Centre for Energy Environment and Engineering Zambia Ltd (CEEEZ)[2] through other programs to reach the INTERMEDIATE STATE of a CDM project implementation. Up to now this has been unsuccessful due to the lack of financing sources as well as baseline problems. Zambia is supplied by power from hydro electric plants and not until a Project Design Document (PDD) has been registered by the UNFCCC using the $CO_2$ emission coefficient of the South African Power Pool will this baseline problem disappear.[3] The DNA could play a more pro-active role.

In Mozambique and Ghana, the CF-SEA program only covered the development of PINs, but not the organization of workshops. Nine PINs for Ghana and seven PINs for Mozambique were developed and from these PINs seven and six respectively were pre-approved by the Community Development Carbon Fund (CDCF) World Bank. IMPACT has been generated in Mozambique through a shift to low emission energy by the project" Cimentos do Mozambique – Matola Gas Company fuel Switch project" for which the PIN and the technology were developed during the CF-SEA program. The PDD was developed by ECON - assisting in the CF-SEA program in Zambia.

A lesson learned is that CDM projects - (a part from projects like those for the reduction of $CH_4$ emissions from landfill and energy efficiency -conservation, retrofit or use of BM waste as fuel - for industries) need to be included in longer term sustainable development strategies either at national/regional level or at company level.[4] Another lesson learned is that project financing from foreign investors, IDA credits or other soft loan financing is required if real progress is to be made.

Grants or similar soft loan conditions need to be exploitable for financing the upfront CFD establishments such as PIN, PDD and validation. The Copenhagen COP 15 Accord has suggested to make available an instrument which may be used for financing upfront CDM project development costs. One of the conditions is not more than 10 CDM projects being registered in the country in which the project is going to be situated. The advantage of the loan is that if the project is not brought to registration the loan is converted into a grant. It is a recommendation to assist in simplifying the rules for such a facility and making it easily accessible.

The overall rating of the CF-SEA programme is SATISFACTORY and the Project's value of having set a process in motion creating a snowball effect should not be underestimated.

# 2 Introduction and background

The CF-SEA program for promoting sustainable energy projects in Africa was implemented in five countries: Ghana, Mozambique, Zambia, Mali and Cameroon. The project was co-implemented by the Carbon Finance facility in the World Bank and represented the first combined effort of UNEP and the World Bank for accelerating the implementation of Clean Development Mechanism (CDM) projects in Africa. - *To scale-up investment in the sustainable energy sector and begin addressing*

[2] The local consultant company responsible for the development of CDM projects in Zambia see page 19

[3] The baseline problem relates to the fact that the national grid in Zambia is solely supplied from hydro power stations. Thus, no emission savings can be achived and documented in a PDD until the regional transmission grid is considered as the baseline. In this way the emission savings can be realized through increase in hydropower units which will replace coalfired units in South Africa.

[4] Bankers seminars and Workshops were included in the scope and revised scope of the CF-SEA.

*climate change through market approaches that internalize the environmental attributes of clean energy.*

The World Bank Carbon Finance Unit was established to assist the Global Community in implementing CDM projects. This included establishing different Carbon Funds where the participants would inject/commit to inject cash against rights to Emission Reductions created by CDM projects. The agreements of the founders of a particular Carbon Fund included the commitment to pay the Carbon Finance Unit of the World Bank for the preparatory actions as well as later the handling of the CER (Certified Emission Rights). The first Carbon Fund was the Prototype Carbon Fund (PCF), where the founders were governments and large companies wanting to have an early entry in the flexible mechanisms of the Kyoto protocol, even before it was made effective.

The Community Development Carbon Fund (CDCF) was created to serve as a vehicle for Sustainable Development benefitting the populations where the CDM project was to be established. A share of the Funds capital was addressed to help LDC countries and to make use of the Small Scale CDM methodologies allowing special rules for projects below 15 MW or 15000 MWh or 15000 tons of $CO_2$ reductions. The founders of the CDCF further accepted to pay 1 USD/tons $CO_2$ reduction for community benefits and to be willing to consider an upfront payment for Emission Reductions produced in the project period mounting to 25% of the total in order to ease the financing of CDM projects. A special CDCF plus facility was created by among others the Canadian Government for covering costs of establishing a pipeline of CDM projects in LDC countries.

World Bank had included the intent of including CDM projects from LDC countries on all continents in the foundation document of the CDCF and had consequently a serious interest in having established a CDM project pipelines in Africa. Experience from developing CDM projects on other continents[5] had proved that there was a need for simultaneous capacity-building of the Designated National Authorities (DNA), national intermediaries and project proponents. Particularly in Africa, the alliance between UNEP and the World Bank CDCF was seen as a help in establishing a pipeline of CDM projects and simultaneously creating the capacity to process these on governmental level as well as among intermediaries. A cooperation was formed creating the CF-SEA program, into which both parties injected ½ million USD plus 100.000 USD in kind.

For four years prior to the start of the CF-SEA programme UNEP had been applying a learning by doing approach in the African Rural Energy Enterprise Development (AREED) programme to support the growth of clean energy sector in five African countries. The CF-SEA programme was developed to cover the interest of the two organizations making use of their special capabilities. UNEP DTIE and URC were to provide hands on training and institutional capacity building of the organizations around the CDM as track 1 activity of the programme. The WB Carbon Funds administered by CDCF was to assist in establishing CDM projects in the form of Project Idea Notes (PINs), Carbon Finance Documents (CDF) and information on community development as track 2 activity.

The five countries selected in Africa were Mozambique, Ghana, Mali, Cameroon and Zambia. Since a Dutch financed UNEP capacity-building program CD4CDM was involved already in Mozambique and Ghana the track 1 activity for these countries was left to that program.

The strategy chosen for the services to be provided was to have external international consulting companies together with local partners in each of the countries to perform the services. Three groups were selected for the three countries where both track 1 and track 2 activities were

[5] Such as the development of a pipeline of CDM projects in Cambodia, East Timor, Democratic Republic of Lao and Mongolia in 2003 to 2004.

executed. One group was contracted for identifying the PIN possibilities in Mozambique and Ghana. The reason for making this choice was to have as many companies as possible involved in providing the services and having the opportunity to select the best offer, both technically and economically, for each country. The purpose was that this would also assure that a local intermediary was created who would be functional also after the project was terminated.

Letters announcing the project start together with project information were jointly send out to all five countries by the World Bank and by UNEP DTIE in June 2005.

In each country the programme's implementation strategy planned to:

- Strengthen the capacity of the local carbon experts, co-financiers and governmental authorities to engage in carbon activities.

- Put "theory into practice" by working with a number of project developers on specific promising carbon transactions.

The planned specific outcomes were:

- Legislative framework and operational capacity of governmental institutions to asses and approve CDM projects.

- Increased capacity of local/regional institutions to intermediate or facilitate CDM transactions;

- Increased capacity of developers to finance and build low carbon energy and infrastructure projects

# 3 Scope, Objectives and Methods of the Evaluation

The terminal evaluation was conducted as an in-dept evaluation using a participatory approach where the UNEP Evaluation Office, UNEP DTIE Project Manager and key representatives as well as the consultants and their collaborators and project proponents were consulted throughout the evaluation period. The objective and scope of the evaluation was to examine the extent and the magnitude of any project impacts to date and determine the likelihood of future impacts. In short the scope was to evaluate to what extend the CF-SEA did succeed in strengthening the capacity of local carbon experts, co-financers and governmental authorities in each country to engage in carbon project activities and to what extend this was demonstrated by actual CDM projects in the process of being implemented. The degree of fulfillment of the second part of the objective and scope is best analyzed using the ROtI method. Since the time which has elapsed since the CF-SEA programme in the countries was terminated has been sufficiently long it was possible for the evaluator to asses if real IMPACTS were generated by CDM projects or are in the process of being generated.

The findings of the evaluation have been based on the review of project documents made available by the UNEP project management, complete documents delivered by the selected consultants and PINs and communication documents provided by the World Bank. Telephone interviews with the project managers of the international consultants for the CF-SEA activities in Cameroon, Mali, Zambia, Mozambique and Ghana have successfully been made. Although most of the Project Managers of the consultants had changed jobs and were now working in different companies to the one at the time of the CF-SEA project it was possible to activate local contacts through them for in depth field study in Cameroon, Mali and Zambia.

The terminal evaluation was performed by interviews during telephone contacts starting in second half of January 2010 and direct contacts to the UNEP DTIE in Paris. As the project documentation

was incomplete particularly in terms of capacity-building and the acceptance of the Project Idea Notes (PINs) by the World Bank much effort was needed to obtain documents from the World Bank and the consultants having performed the services in 2005 to 2007. The assistance from this side was much appreciated since none were having obligations to help providing documents for the desk studies. The field studies were performed in Mali and Cameroon in February and in Zambia in March 2010. Since the PM staff had changed positions it was further necessarily to have direct contact to UNEP in Stockholm. Direct contact to the Evaluation Office in Nairobi in March 2010 and the dialogue with the EO was much appreciated.

The evaluation process was made difficult by the fact that all three project managers within UNEP/WB had moved or left their positions and the project files provided was without the detailed information from the Workshops. The lapse of time from the execution of the major part of the project in the five countries until the start of the Terminal Evaluation made it further time consuming to get an overview of how the programme had been executed based on the documentation received from the consultants or their local partners. Files of the workshops and manuals for establishing DNA and CDM projects were however obtained from the international consultants and files relevant to the approval of the PINs were further obtained from the World Bank IRIS data system.

At the same time it is appreciated that sufficient time has elapsed since the termination of the CF-SEA programme allowing for CDM projects being implemented in each of the countries (except Zambia) and funds being committed for investment in Climate Change mitigation projects.

Schedule of the field fact finding mission

| Date | Month | Place visited | Organisations visited |
|---|---|---|---|
| 26th to 27th | January | Paris France | UNEP DTIE |
| 8th to 14th | February | Douala and Yaoundé Cameroon | DNA, UNDP/UNEP, project consultants and project developers |
| 14th to 17th | February | Bamako Mali | DNA, UNDP/UNEP, DANIDA, authorities project consultants and - developers |
| 22nd | February | Stockholm Sweden | UNEP (project supervisor) |
| 14th to 18th | March | Lusaka and Kafue Zambia | DNA, UNDP/UNEP, Danida, Autorities, project consultants and – developers . |
| 19th | March | Nairobi Kenya | UNEP Evaluation Office |

The requirement of the ToR was to evaluate any outcomes and impacts the project may have achieved considering the difference between the answers to the two simple questions ***"what happened"*** and ***"what would have happened anyway"***. It has been possible to give fairly precise reply by the evaluator on a country by country base using the ROtI method.

The field- based ROtI assessment process was used by the evaluator for terminal evaluation of the outcomes and the long term IMPACTS trough intermediate stages of the CF-SEA in Cameroon, Mali and Zambia. This contains the steps of desk research, interviews with key informants and field investigations performed in both directions. In this process the key informants were the officials concerned in the governments, the UNDP/UNEP staff and donor organisations and the contracted consultant's project managers. The CDM projects which had given or potentially could give long term sustainable GEB were examined.

A field ROtI investigation includes the evaluation of the TOC elements (Theory of Change) each being rated as follows:

| | |
|---|---|
| Not achieved | rating 0 |
| Poorly achieved | rating 1 |
| Partially achieved | rating 2 |
| Fully achieved | rating 3 |

For the activities in Ghana and Mozambique where no workshops were held and no field surveys were performed by the evaluator the ROtI assessment is based on a desk study only. For these countries the PINs have been evaluated and the long term IMPACTS assessed[6].

# 4 Project Performance and Impact

## A. Attainment of objectives and planned results

This part of the evaluation examines the extent to which the project's major relevant **objectives were effectively and efficiently achieved and their relevance.** As the activities were performed in 5 countries by 4 different groups of consultants it was chosen to differentiate the evaluation country wise and then to provide a rating covering all as an average.

### i. Effectiveness

The project objective was to "scale up investment in sustainable energy sector and begin addressing the climate change through market approaches that internalizes the environmental attributes of clean energy"

In order to assess the effectiveness of the Project, we have used the ROtI method which is a process oriented method where the goal is to reach a Global Environmental Benefit as an ultimate IMPACT of the project activities. As the IMPACT generation process takes time the path towards generating impact is analysed identifying outcomes due to the project activities, intermediate states and emerging impacts. This includes two main outputs, (i) an impact pathway analysis and (ii) a quantitative rating of the achievement towards the outcomes and progress towards 'intermediate states' for each of the countries.

A general impact pathway for CDM projects is provided in Figure 1. This attempts to link the established project outputs, with the outcomes, intermediate states and finally its overall impact. In addition, this analysis examines the different assumptions, impact drivers and risks that influence the way in which project outcomes might – or might not – move towards having an impact. These are usually external to the project although should have been anticipated in the project design[7]. It is seen from figure 1 that the outputs are divided in track 1 and track 2 outputs and outcomes. As for the impact drivers and assumptions these are in various degrees valid for coming from the outcomes to the intermediate states depending on the character of the individual CDM project identified in a PIN. In the conclusive evaluation which is made here it is translated to the rating applied for the ROtI desk method. **Impact is demonstrated as achieved if a CDM project is**

[6] A summary of all the PINs from Mozambique and Ghana has been established by the Evaluator and can be found in Annex 4.

[7] It is seen from the workshop documents that the consultants have made an efford to choose categories of CDM projects which avoided the barriers. In the case of Zambia the barriers have been looked upon as temporarily by CEEEZ using the values of the parameters form an interconnected SAPP when evaluating the CDM potential.

**registered or is in the process of being registered at the time of the terminal evaluation resulting in investment in projects generating GEB e.g. mitigating climate change,** further it is noted whether the achievement is directly linked to the project. Since the registration of the CDM is happening after the termination of the project it is debatable what rating to use for the impact A or B**.**

The IMPACT in form of Global Environmental Benefit is the mitigation of Climate Change through implementation of CDM projects. In figure 1 the IMPACTS have been illustrated and subdivided into three project categories which is an oversimplification of all possible CDM projects but adequate for the CDM projects identified in the CF-SEA project. All categories of CDM projects having received the Letter of Approval from the Designated National Authority will have been screened for sustainability in terms of environmental parameters, economic parameters and social parameters and have consequently GEB values.

From the Impact stage the figure can be read backwards, as not all CDM projects are dependent on all of the elements pictured in the intermediate states column. This can be illustrated by an example of reducing GHG emissions from a landfill where the proceeds from the CER can finance the repayment of a project loan fully and at the same time generate profit to the project partners. Such a project requires the Intermediate State of Commercial banks having accepted to finance CDM projects in the country of the project. Further, the intermediate state of an efficient DNA function must have been reached. In the case of a medium size hydro power the project is dependent on Ministries having included the projects in their plans and Development Agencies providing long term soft loan and this is then the intermediate state which has to have been reached. For both types of project an intermediary/project developer has to be capable of developing a PDD under local conditions.

Going further back in figure 1 to the Impact drivers, barriers/risks column, it is evident that a landfill CDM project will only include power generation if the rules of PPA, preferential access to the grid and possibly the payment by the power system of the interconnection to a nearby load centre are drivers and not barriers. If no safe power purchage agreement can be reached the gas seepages from the landfill which are collected by the CDM project will be flared of at the landfill site generating a CER revenue due to avoiding $CH_4$ being emitted to the atmosphere. The GHG is having a climate effect per tons emitted of 23 times the effect of a tonnes of $CO_2$ emitted and is thereby the important part of the emission reduction achievable by a land fill gas project project. However no power will be generated making use of the energy in the $CH_4$ if rules are not in place. Considering the case of a hydropower project this is not likely to become a reality if the power marked rules are not transparent and a driver and not a barrier[8] giving a favourable return on investment. For both types of projects the CDM methodologies have to exist as drivers for the projects[9]. An illustration of the CDM methodology being a barrier serves the project type of reducing emissions from forestry, the LULUCF, where the methodologies were not yet approved at the time of the CF-SEA project and consequently such projects were not considered developing PINs for.

Under the impact drivers, creating a well functioning DNA is shown in a box "Grid emission coefficient/baseline" which indicates that it is the role of the DNA to use the combined margin methodology (ACM 002) for calculating the emission coefficient of the Grid. If a national grid in Cameroon, Mali and Zambia is used, where the power supply is dominantly provided by hydro power, the avoided emission adding another Renewable Energy (RE) power plant to the grid is

[8] The emission coefficient can be a barrier in the case of high share of hydropower in the existent power system.

[9] as they do for the two cases considered (the Approved Consolidated Methodologies used for presentation of Project Design Documents PDDs on the UNFCCC CDM register) ACM 0001 and ACM 002 where both applies to the landfill case in case of power generation

small. However if the regional grid, the West African grid in Mali and the South African Power Pool grid in Zambia is used when calculating the emission in the absence of the RE CDM project, the revenue from CER will increase much since the last unit to operate on the margin in the pool will be a thermal power plant.

If the CDM project is not viable in an economic sense but contains a social sustainable development factor, which is typical for small grid projects in villages or centres, the impact driver is the availability of Green Funds and/or a rational use of ODA[10] assistance

The Outcomes generated by the contractual Outputs are shown in the second column. It is to be noted that the UNEP PM supervising the services of the consultants took active part in advising on and assisting in reaching the outcomes. It is noted that early on in the project the PM realised financing as one of the the limiting factor[11] for CDM and the importance of sensibilitiation of the banking sector in Africa. This was achived as an outcome of three seminars/fora on CDM in Johannesburg and Dakar by the UNEP PM and the World Bank.

Column 1 shows the outputs of track 1; the workshops for developing an understanding of the CDM project cycle, the functioning of the DNA, the specific requirements in the methodologies as to baseline studies and additionaly the conditions to be met in the PDD and the validation thereof, and the developing of Emission Reduction Purchase Agreements (ERPA). These outputs are, to a certain degree, interrelated to the output of track 2, the presentation of PINs, as these were used in the workshops for hands-on training generating the outcomes in column 2.

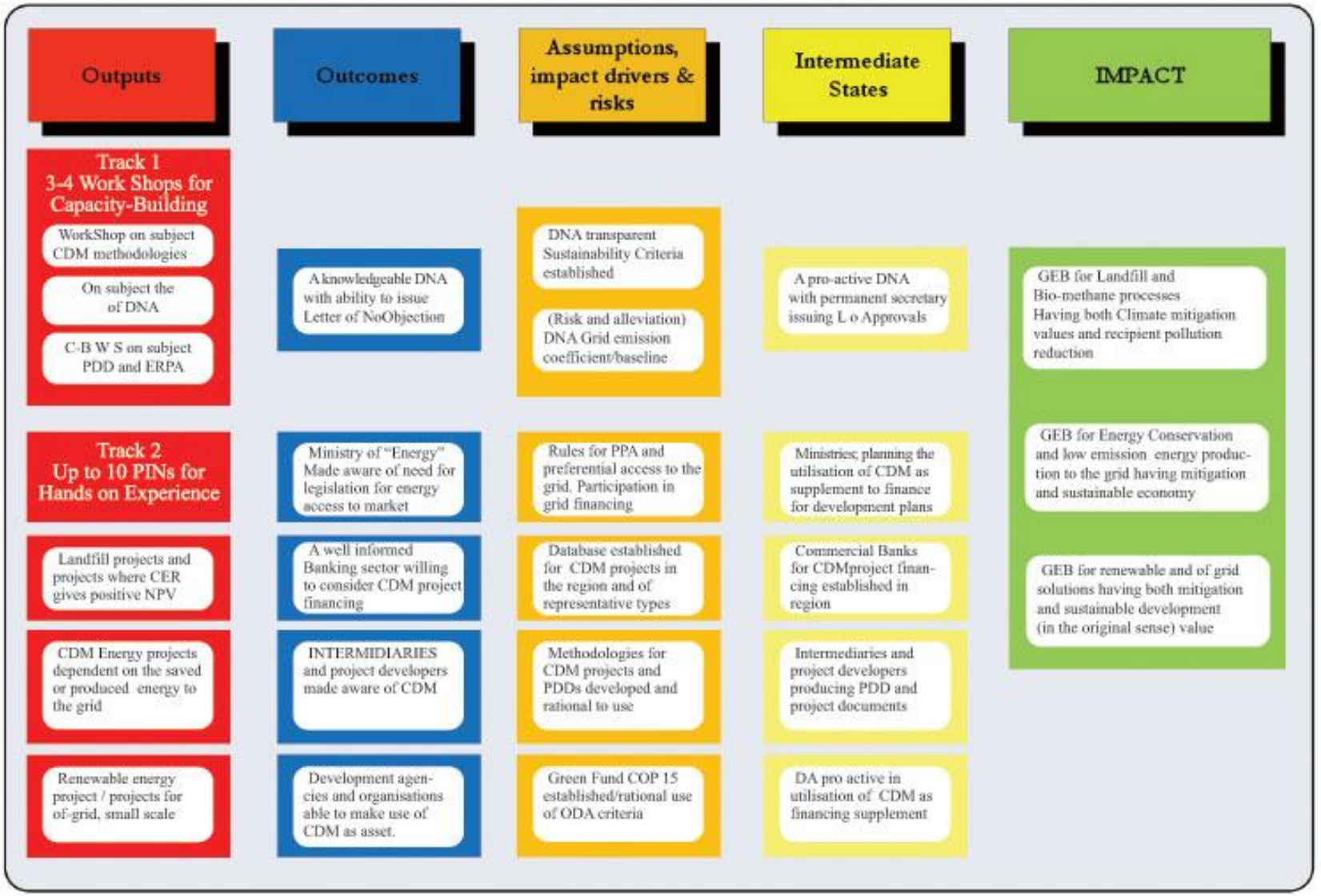
## Evaluation of project efficiency in the individual countries

As the project activities have been performed in 5 countries and by 4 different consortias of consultants an evaluation of the efficiency of the project is performed by using the ROtI method also for each country.

[10] no conflict with the Marrakech COP6 conditions.

[11] In Zambia this was reported already during the first workshop. The conditions for project financing was indicated as interest in the range of 15%, no long term financing loans and loan only against the books showing sufficient profit the last 3 years.

**Figure 1: 'Impact Pathway'**



ROtI for Cameroon

The state of generating a sustainable **IMPACT** has been reached approximately 4 years after the termination of the CF-SEA program in Cameroon. This has been verified by the field fact-finding mission to Cameroon the 8th to 14th February 2010, after having consulted the documents produced by Econoler International and the PDDs under registration.

The documentation reviewed for the evaluation consisted of reports from the workshops 21-22 July 2005, 25 August 2005, 16-17 November 2005 and 23-24 May 2006 with attachments on CDM "Guide practique sur la formulation de projets dans le cadre du mécanisme pour un development propre" as well as notes produced by Econoler on Baseline studies and on the function of the DNA. The documentation further consisted of 12 CDM PINs produced during the project period. Seven of these had been pre-approved by the World Bank Carbon Finance Unit.

These **OUTPUT**s were in accordance with the objective of the project documents. From the questionnaires[12] completed at the end of each workshop it appears that a high level of interest in CDM was established among government authorities, consultants/intermediaries and project developers which was the **major OUTCOME** generated. Further a **major OUTCOME** was exemplified by two landfill CDM projects that were considered in Project Idea Notes PINs by the solid waste collection company HYSACAM. **Another OUTCOME** as a result of the activities and workshops was the formation of a DNA in January 2006.

Although the UNEP PM vigorously tried to raise the interest of the local banks and the subsidiaries of the international banks for CDM financing by arranging three regional Bankers forums, the financing was one of the major stumbling blocks for bringing the two landfill gas recovery projects to a financial closure. CDCF has limited financing means for upfront financing. Thus, for 25% of the CER revenue traded in the ERPA, the project has to have either very low investment costs compared to the cash-flow generated or a commercial bank shall have to co-finance. The **intermediate state** "Commercial banks for CDM project financing established in the region" was reached perhaps as the banks gradually became more familiar with the CDM – and became aware of the generation of easy cashable CER in hard currencies.

**The intermediate state** of having a reasonably well functioning proactive DNA maintaining a register of ongoing projects and PDDs has likewise been reached. The most important **Intermediate state** has been reached by the uploading of the PDD on the UNFCCC homepage for comments and the succeeding validation of the documents as a pre-step to have the project registered as a CDM approved project. Having reached this step, only the implementation of the project on the ground is outstanding and in principle the **IMPACT stage** has been reached.

In Cameroon, the CF-SEA project has identified two CDM projects for $CH_4$ extraction from landfills at Douala and Yaoundé. The projects are financed by commercial banks and are becoming registered at UNFCCC. GEB is further generated by the fact the DNA may ad sustainability criteria as to how to operate the controlled landfills and if not adhered to may revoke approval of the CDM project. The Douala Landfill gas recovery and flaring project made by Hysacam and Vitol is stipulated in the PDD to have duration of 10 years (corresponding to the period in which HYSACAM has the concession to operate the landfill). A PDD was presented to the UNFCCC on The Nkolfoulou Landfill Gas recovery Project in December 2009 and it is planned to be operated by HYSACAM for a period of 21 years.

Rating **AA or BB+ - equivalent to Highly Satisfactory**

[12] All participants in the workshops were asked to give their ratings on the information presented; the relevance as well as the content of new information. In general the ratings given were ranging from high to very high value.

**Table 1 Reporting outcomes-impacts assessment findings for GHG emission reduction in Cameroon**

| TOC component | Qualitative Assessment | Rating |
|---|---|---|
| Outcome 1: the creation of the DNA. Outcome 2: Project developers' interest created | Workshops of high quality performed in a timely manner according to the project contract with the consultants. Focus on project development already before the second workshop made it possible to provide hands on training on the relevant CDM methodologies and procedures | 3 |
| ID: Transparent Sustainability Criteria established | An efficient DNA committee established the procedures for approving sustainable development projects, and maintaining an updated register of CDM projects in development (last 4 March 2009) | 2 |
| ID: DNA having established a grid emission coefficient | Calculations have been made by Econoler on how much CO2 emission would be reduced if an energy conservation project or a RE project were to supply power into the grid (combined margin). The focus is on landfill gas, forestry projects, and utilization of waste for of-grid power generation | 2 |
| ID: Rules for PPA, access to grid and shared connection | Apparently the rules are not yet sufficiently attractive for the two landfill gas recovery projects of HYSACAM to use the gas for power generation instead of flaring it of | 1 |
| ID: Methodologies for PDD developed by UNFCCC | For the two landfill gas projects which have reached implementation - and thereby the GEB IMPACT state – the methodology has been developed and consolidated ACM 001( outside project influence) | 3 |
| Intermediate state: A pro-active DNA | The DNA is capable of issuing Letters of Approval for CDM projects, and the permanent secretary is politically active in facilitating projects under the REDD program and active in the COP negotiations | 3 |
| Intermediate state: Commercial Bank financing | Local branches of International Banks being positive in taking CDM projects on their portfolio and international project finance banks demonstrated interest in taken CDM project risks (related to ownership of project, management of gas collection and verifying $CO_2$ reductions) in Cameroon | 3 |
| Intermediate state: project developers capable of PDD | Project developers being able to develop technical professional design documentation and PDDs developed according to CDM approved methodologies. (Successfully demonstrated for 2 landfill gas recovery projects) | 3 |

## ROtI for Mali

***In Mali*** Over 20 PIN ideas[13] were formulated or re-formulated, from which some were too small and others large scale/medium scale hydro power projects demanding long term soft financing. The major barrier against the hydropower projects was the baseline in cases where the national boarders were used for establishing the power grid emission coefficient as the emission coefficient for Mali alone is low due to the large share of hydropower in the power production. For example, the usage of the regional baseline of the West African Power Pool was one of the major drivers behind the Félou project where the Spanish Carbon funds of the World Bank Carbon Finance Unit were providing an ERPA for the purchase of the CER and the World Bank and EIB was providing the full project credit.

The state of generating long term **sustainable IMPACTS** has been secured by the additional IDA credit of 42.5 million USD for both Mali and Senegal. The credit was given in July 2009 to supplement the loans approved already by the World Bank and EIB in June 2006[14] when the **Félou hydroelectric project** had been identified by the CF-SEA program in Mali. The project is now in the implementation phase and the HPP is expected to be operational from 2012. The Climate Change Mitigation project is the direct result of the CF-SEA. This was verified from project documents produced by Econergy, key person interviews during the fact – finding to Mali 14th to 18th February 2010 as well as from project loan documents issued by the World Bank.

The documentation reviewed for the evaluation consisted of reports from the three workshops and the PINs developed. Additional documentation included the "Guide des mécanisme par le protocole de Kyoto" and a number of annexes and power point- presentations.

The DNA function was established in 2003 prior to the CF-SEA program and some of the projects were already presented in 2004 prior to the start of the CF-SEA. The project PINs, dated 21st October 2005 as **OUTPUTS** are 4 hydropower projects; The Félou-, the Taoussa-, the Kenie- and the Makala HPP. The Félou project situated on the Senegal River is well described in the PIN and was selected by the World Bank for financing via soft loans and at the same time as CDM project supported by the Spanish Carbon Funds. None of the others were pre-approved by the World Bank and were, at the time of the evaluation, still in a waiting position although the Direction Nationale d'Energie reported insufficient power production capacities in Mali. The valid **OUTCOMES** were the structuring of the DNA functions and the identification of a CDM project - which was well selected as part of the West African Power Pool and consequently fitted into both a power marked development model and a sustainable development project for Africa.

The **intermediate state** has been reached by having a well functioning DNA with permanent secretary capable of promoting CDM in public network, maintaining an updated CDM register, and participating actively in the COP. The DNA was supported in developing PINs by donors such as the Danish Green Facility, the UNEP CASCADe program, Norwegian funds administered through GTZ and French programme administered by Veolia. Also, the DNA of Mali has issued letters of Approval.

Rating **AA or BB+ - eq. to Highly Satisfactory**

---

[13] Of these only 5 were transmitted for the World Bank Community Development Carbon Finance and only one was approved for further development (the goal was to have up to 9 PINs and out of these select 1 for PDD development and financing)

[14] The Félou HEP is part of the USD 350million West Africa Power Pool (WAPP) APL 2 program. Three IDA Credits to the Government of Senegal, Mali and Mauritania of SDR 16.9 million each (app 25 million USD) were approved on June 29, 2006. EIB co-financed the project with an amount of 33 million EURO or app 40 million USD. Ten million USD was assumed to be financed by the project itself, however as tenders were called for and quotations assessed an additional financing were found necessarily.

**Table 2 Reporting outcomes-impacts assessment findings for GHG emission reduction in Mali**

| TOC component | Qualitative Assessment | Rating |
|---|---|---|
| Outcome 1: the improvement of the DNA functions Outcome 2: Project developer interest created. Outcome 3: Development Agency interest aroused | Three workshops performed, and according to the participants, they were appreciated as creating an understanding of CDM . Although the DNA was already functioning the project approved on procedures as to create transparency of the sustainability criteria. Focus on project development already before the second workshop made it possible at the same time to provide hands on training in the CDM methodologies and procedures connected to HHP but only 4 PINs were developed. The World Bank chose to make the Félou HHP project as part of the development of the West African Power Pool and at the same time making the CDM a project asset. | 2 |
| ID: The UNFCCC methodology favorable | The Combined margin methodology ACM 0002 applies. The sharing of the power production as defined in the agreement between Mali, Senegal and Mauritania forms the basis for the reductions ex ante. | 1 |
| ID: Rules for PPA/ power trading on the power pool | The West African Power Pool (WAPP) is gradually being established, The Félou project is high on the priority list for the WAPP, tariff study is in the process of being developed – in short rules will exist. | 2 |
| ID: Grid emission coefficient | As WAPP is becoming more and more integrated the baseline for Mali will change from a low national baseline base on hydropower in Mali to a regional where the coal fired units are operating on the margin. For the part of the emissions connected to Mauritania and Senegal Fossil fuel is dominant. | 3 |
| Intermediate state: A pro-active DNA | A pro-active DNA with permanent Secretary exists extending its activities for the new PIN development and responsible for an updated register of CDM projects (annex2). LoA issued by 3 DNAs | 2 |
| Intermediate state: Ministries / Development Agencies using CDM | The Félou project was being supported by the World Bank, EIB and the governments of Mali, Senegal and Mauritania from the 29 June 2006 integrating the CDM aspects in the project package. An additional IDA credit was provided 30 July 2009 amounting to 2x 42.5 million USD. | 2 |
| Intermediate state: Preparation of PDD | A PDD has been prepared and uploaded to the UNFCCC register for comments. The SOGEM intends to copy the project concept at Gouina with a project twice the size of Félou. | 3 |

## ROtI for Zambia

***In Zambia*** 8 PINs were established out of 12 project ideas and for 7 of these the DNA issued LoNO. The workshops succeeded in creating a sustainable interest in the CDM and the DNA was established based on the analyses presented. The Green Facility under DANIDA has further financed 3 of the PINs to the stage of PDD. Although local private interest and financing has started reaching a sustainable interim stage the DNA still needs further strengthening.

The CF-SEA project was instrumental in establishing a DNA function in Zambia. The **intermediate state** of creating a pro-active DNA is however only in the process. When a more active role is assumed, as of the opinion of a representative from the Donor Community in Lusaka, it would be possible to identify financing and thereby remove the barrier to CDM projects. The requirement would be the DNA presenting a prioritized list of CDM projects for Zambia at a donor conference.

In Zambia, the **Impact stage** has not been reached as a result of the CF-SEA project. However it has been reached by the first CDM project in Zambia "The Lusaka Sustainable Energy Project" registered by RWE. The project was was one of the early participators in the World Bank carbon funds and was based on the concept of reducing the amount of fuel wood burned for cooking by introducing highly efficient small cookers/stoves.

In Zambia, the project selected a consultancy "Econ" assisted by CEEEZ to produce the **OUTPUTS i**n the form of four workshop documents and presentation of 8 PINs from which 7 were pre-approved by the World Bank Carbon Finance Unit. A detailed background paper describing the different options for the formation and functioning of the DNA was delivered in November 2005. The DNA, one of the **valid OUTCOMES** of the project, was however not formed until December 2006. During the evaluation fact-finding mission to Zambia the 13th to 18th March 2010 a meeting was arranged with the functioning DNA and the permanent secretary. It was learned that the first CDM projects on the list of projects having received Letter of No Objection by the DNA were created by the CF-SEA program and it was seen from the list that only in 2009 the interest for CDM was renewed. Where the DNA function was established with much effort during the CF-SEA project the function has not reached the same pro-active level as for Cameroon and Mali and the donor community in Zambia voiced for more initiatives to be taken by the DNA to promote CDM for sustainable development projects.

The workshops were identified as creating driving forces for the development of CDM projects in Zambia as they increased competitiveness, enhanced sustainable development, worked towards poverty reduction and formed the resource base for CDM being it hydro, biomass or solar. The consultants made serious contributions for creating an environment where CDM projects will be implemented in increasing numbers. The development is however hampered by barriers which were not within the consultants' abilities to remove.

The baseline for grid connected projects is problematic resulting in very low CDM benefits since the national grid in Zambia is solely supplied from hydro power stations. Thus, the power grid emission coefficient was identified as being one of the barriers if the national grid was to be considered for the calculation of avoided emissions from a CDM project. As Zambia is connected to the South African Power Pool it should be possible to alleviate this barrier and use high emission reduction values. Thus, if, on the other hand, the South African Power Pool (SAPP) grid was considered the emission coefficient calculations would benefit from the fact that 75% of the power capacities and similarly the production are based on coal. During the evaluation field fact-finding it was verified that ZESCO is working on presenting such a baseline as they are having a vested interest in one of the project PINs identified during the CF-SEA program the Itzhi Tezhi 120 MW hydro power project which is planned to supply 500,000 MWh into the interconnected grid when erected. This is an important **Impact driver**.

In Zambia, the first national workshop took place already on 4th May 2005. It was opened by the Minister of Environment and National Resources, who announced his commitment to ratifying the Kyoto Protocol, announcing that the Ministry was moving towards establishing a DNA and pointed out that project finance is the main **barrier** to CDM. The second national workshop held on the 22-23 September had a high profile, it was well prepared, well attended by government officials and project proponents and was rated over all by the participants to be very good. The parties were invited to supply data to the project consultant for preparing PINs for the following workshop arranged 27-28 April 2006. At this workshop the participants were divided into 3 working groups one for grid-connected CDM projects, one for Mini hydro and grid extension projects replacing isolated diesel power generation, and one for bio-fuels and other projects. By applying the method for hands-on training it can safely be stated the **OUTCOME** of creating CDM Intermediaries and project developers has been reached. As the last workshop was held on 22 February 2007 almost 2 years after the start of the project, but only 2 month after the DNA organization had been established, the possibilities for the PM to assist in further CDM activities were quite limited. The PM managed however through UNEP Center Risoe to activate the Danish Green Facility.

Lloyd Financials Ltd. being represented in Zambia has expressed willingness to **finance** viable CDM projects and Danish Pension funds have through the association of Danish Industries made a similar announcement in Lusaka.

Although the professional performance of the PM, the international and local CDM consultants during the CF-SEA and the engagement of CEEEZ was with out faults theIMPACT stage has not been reached as no investments have been made nor is planned.

This is resulting in the rating **BC - equivalent to Moderately Satisfactory**

**Table 3 Reporting outcomes-impacts assessment findings for GHG emission reduction in Zambia**

| TOC component | Qualitative Assessment | Rating |
|---|---|---|
| Outcome 1: the formation of the DNA Outcome 2: Project developer interest created. | Background paper for the establishment of the DNA function prepared in November 2005, established December 2006. The technical conditions of the contract (se Annex5) demanded PIN not to be produced until the DNA was established hence the project was extended by almost a year. Workshops of high quality in content and method has created a durable interest in CDM among project proponents. | 3 |
| ID: Regional baseline approved providing a high grid emission coefficient | ZESCO is participating in the South African Power Pool and the national grid is reinforced in meeting n-1 criteria for the transmission line capacity for wheeling through hydro power from DRC to SA. As commercial rules for trading on the pool are being fixed the most expensive power production will be on the margin. This will normally be a Coal fired unit with high CO2 emission giving a favorable baseline | 1 |
| ID: transparent Sustainability criteria | In the project approval procedures of the DNA June 2007 (annex 3) the statement is "the Host country does not need to develop eligibility criteria for CDM projects". Further the Board are free to reject PDD | 1 |
| ID: PPA conditions preferential grid access | Presently the power tariff is kept low, to ease the economy of the power users. As a side effect energy conservation projects or production replacing provisions from the grid or to the grid are unattractive | 0 |
| ID: Methodologies for the projects existing | Small Scale methodology T for bio-diesel project is existing so is the ACM002 methodology for the Itzhi Tezhi hydro power project and the Kafue Sugar plantation project | 3 |
| Intermediate state: A pro-active DNA | A bilateral development agency indicated a willingness to find financing for sustainable CDM projects in case the DNA could present a prioritized list at a Donor Conference, DNA would become strengthened. | 1 |
| Intermediate state: banks being interested in CDM | Lloyds Financials as well as Danish Pension funds represented by the Association of Danish Industries has started showing an interest for CDM project financing in Zambia – IMPACTS still outstanding | 2 |
| Intermediate state: PDD issued by project proponents | During the CF-SEA program no PDD was established in a follow up activity financed by the Danish Green Facility the CF-SEA project partners developed 3 PDDs where 2 of these had had PINs prepared (one being Mali Investment Ltd. Bio-diesel project) and one only indicated on the CF-SEA project list IPP mini hydro replacing the diesel power at Chilinga and Zeng. | 2 |

## Desk Research ROtI for Mozambique and Ghana

The terminal evaluation was based upon interview with and documents provided by the project managers of the consultant[15] Quality Tonnes, which was selected to undertake the track 2 activities in Ghana and Mozambique.

Capacity building was not part of the CF-SEA project in these two countries. However, it was conducted under the CD4CDM[16] programme. Further some information on the CF-SEA activities in Mozambique and Ghana was retrieved in the data bank IRIS of the World Bank from which the PINs for the CDM projects in the 2 countries as well as the communication on the pre-approval was retrieved.

Whether the outputs in the CF-SEA programme generated outcomes which lead to Impacts is directly related to the PINs formulated during the CF-SEA as is the case for Mozambique or indirectly as is the case for Ghana the matrix rating in Table 4 below can be applied.

**Table 4: Rating scale for outcomes and progress towards 'intermediate states'**

| Outcome Rating | Rating on progress toward Intermediate States |
|---|---|
| **D**: The project's intended outcomes were not delivered | **D**: No measures taken to move towards intermediate states. |
| **C**: The project's intended outcomes were delivered, but were not designed to feed into a continuing process after project funding | **C**: The measures designed to move towards intermediate states have started, but have not produced results. |
| **B**: The project's intended outcomes were delivered, and were designed to feed into a continuing process, but with no prior allocation of responsibilities after project funding | **B**: The measures designed to move towards intermediate states have started and have produced results, which give no indication that they can progress towards the intended long term impact. |
| **A**: The project's intended outcomes were delivered, and were designed to feed into a continuing process, with specific allocation of responsibilities after project funding. | **A**: The measures designed to move towards intermediate states have started and have produced results, which clearly indicate that they can progress towards the intended long term impact. |

The information on each of the PINs has been presented in annex 4. For Ghana the projects were identified after having identified potential key sectors for development of CDM projects. This follows from a 4 page brief report on Ghana issued by Quality Tonnes 29 June 2005. It is assumed the same procedure was applied for Mozambique although it was not documented. It can be seen from comments to the PINs that they are all of high quality. They have been designed to feed into a continuing process, but do not include prior allocation of responsibilities after the project end.

It is further noted that a GEB has been reached in both countries as both have a CDM under registration.

***Mozambique*** 7 PIN of high quality were established. A summary of each project is given in annex 4, including the evaluator's comments and the acceptance of the World Bank. One project to substitute coal with natural gas in the cement production has reached the state of CDM registration "Cimentos Do Mozambique – Matola Gas Project" and investment on 810,488 USD according to the PDD is imminent. As the World Bank did not pre-approve the project it was developed by ECON

[15]Seth Baruch and Kevin James who at the time of the project were employed by the company

[16] The CD4CDM is a comprehensive program promoting CD by making use of Dutch funds for capacity building and a documentation in pamflets and book forms of "all" subjects related to the successful implementation of CDM. It is managed by URC UNEP.

Analyses South Africa[17], with Carbon Limits a/s as the buyer and NDV as the DOE. The **IMPACT** has been created and it is safe to state that without the CF-SEA this would not have happened as neither the project would have been defined by a PIN nor would the information on this have been transmitted to the consultant. The gas is a waste product at the refinery adjacent to the Cement industry and the project presents a real saving in emission calculated as the avoided $CO_2$ emission from the coal consumption which would happen in the absence of the CDM project. If not receiving the income from the CER the project would have had a negative NPV.

Rating for Mozambique translated to **BB + or Highly Satisfactory**

***Ghana*** 8 PIN of high quality were established. A summary of each project is given in annex 4, including evaluator's comments and the acceptance of the World Bank. The Green Facility administered by DANIDA tried to develop some towards PDD state together with a wind farm project but results are still outstanding.

For Ghana the CDM project under registration is an Afforestation Reforestation project "Large scale oilseed crop cultivation at Yeji, the Pru district Ghana". The Project is using the LULUCF guidelines but it can not be verified to be attributable to the CF-SEA programme. The project is located on the banks of the lake created when the Akasumbo dam was constructed across the Volta River. The trees being planted are *Jatropha curcas* and *Moringa oleifera* and 1000 to 1600 trees will be planted on each hectare developed. The operation will be labour intensive providing work to app. 2000 persons. It is to be noted that LULUCF projects were not yet possible at the time of the CF-SEA program as the methodologies were not yet developed and approved and it is debatable how the CF-SEA indirectly might have contributed to the CDM project. However as a consequence of the CF-SEA the Danish Green Facility Fund did pick up on capacity building and PDD development of project PINs identified under this and thereby activating the CDM network in Ghana. The **BC+** Rating is translated to **Satisfactory**

**The overall rating for the ROtI evaluation of the Outcome – Impacts in the five countries is SATISFACTORY**

## ii. Relevance

This part of the evaluation examines whether the project outcomes were consistent with World Bank and wider UNEP program objectives. The high level of political support exists through a separate chain of UN negotiations in COP (Conference of the Parties) on the CDM. Presently some countries like China, India, Brazil, Malaysia, Thailand, Vietnam, Philippines, Indonesia, Mexico, Colombia, Chile and Argentina have a substantial number of CDM projects where as African Countries and LDC countries in other part of the world have very few. It is highly relevant to investigate barriers, analyze potential and develop projects in these countries by establishing a hands on program for creating a better knowledge on and ability to make use of the Clean Development Mechanism. There are a number of ongoing programs in Africa to support this development:

**CD4CDM: A UN initiative to promote CDM.** A program administered by UNEP Risoe which a part from training in CDM methodologies and procedures in a vast number of countries annually are issuing a publication on the progress made as a source of inspiration to the COP negotiations. The program further finances series of publications as guidebooks. The CF-SEA made use of the program.

[17] by the PM from ECON responsible for the CF-SEA program activities in Zambia. He learned from the CF-SEA program about the project and the possibilities for development of it into a PDD.

**CASCADe:** A UNEP program which has the objective of assisting in capacity building and establishing projects of a sustainable nature and which to some extent is continuing the development of CDM projects in Mali and Cameroon after the termination of the CF-SEA program. (also valid for **point B**)

**Green Facility:** A program financed by Danish environmental Fund and administered by DANIDA for continuation of the CF-SEA activities and possibly development of CDM projects up to the COP 15 in Copenhagen.

**Millennium Development Goals**: CF-SEA outcomes contribute mainly towards the MDG Goal 7 (Environmental Sustainability). There is also evidence that CF-SEA outputs might assist in achieving other MDG goals, including Goal 8 (develop a global partnership for development) through greater self-sufficiency in information generation and dissemination.

In summary, CF-SEA outcomes remain consistent with the UNEP CBD and UNFCCC goals and objectives, as well as those of other UNEP and UN programs and initiatives. As such, it has been rated as '**highly satisfactory'** in terms of its continuing relevance.

## iii. Efficiency

The World Bank and UNEP both contributed 500,000 USD to the financing of the project. If the efficiency is assessed from the cost of consultancy contracts it is noted it would hardly be possible for the World Bank/UNEP DTIE to obtain similarly advantageous contracts. The UNEP/WB PM made a very qualified selection of consultants and their local sub-consultants making certain choosing the best team for each of the countries. If the quality of the PINs against costs is evaluated as the criteria of efficiency there is room for differentiation between the consultant teams. Overall it is found that the hands on training elements in developing the PINs are more important than the actual quality of the individual PINs. Further it can be seen from the table that the cost of track 2 activity preparing the PINs for each of the countries have been of the same order for the five countries/consultant teams indicating same level of effort made and same efficiency achieved. It is noted that the costs of track 1 and track 2 activities are both around 300.000 USD or roughly 1/3 of the available financial funds, each which indicate a balanced and efficient split. It is noted that the disbursements of funds for the activities in Zambia performed by Econ Analyses lag behind the disbursements for activities in the other countries and thus, is behind the schedule. However, this is evaluated as not being due to the management of the project but to the fact that the Zambian Government only established the DNA function in January 2007. The administration costs were likewise kept low and this made room for extending the services to include additional regional Bankers seminars/conferences in Dakar in 2008 as well as financing of information pamflets and a homepage for the CF-SEA program. Considerable investments have been made in Implementation of CDM projects over 200 times the CF-SEA funds. The Rating is '**highly satisfactory'**

**Distribution of Project Cost on consultants and tracks**
**Component 1200 expenses: 1215230 CF CEA Track 1 and 2**

| | 2005 | 2006 | 2007 | 2008 | Total |
|---|---|---|---|---|---|
| **Track 1** | | | | | |
| Econergy, USA | 50008 | 20000 | | | 70008 |
| Encooler, Canada | 40004 | 38626 | | | 78630 |
| Econ Analysis, DK | 30032 | 20016 | 20000 | | 70048 |
| Shultz Mali folder | | | 380 | | 380 |
| Akticon folder | | | 14480 | | 14480 |
| Dakar workshop | | | | 24793 | 24793 |
| Peter Fries Consult | | | | 5000 | 5000 |
| CFBV | | | | 20000 | 20000 |

| | | | | | |
|---|---|---|---|---|---|
| Climate Focus | | | | 8000 | 8000 |
| Finn Hagen Madsen Grafical Design | | | 1056 | | 1056 |
| Upgrad, french translation/printing | | | | 10725 | 10725 |
| **Total** | **120044** | **78642** | **35916** | **68517** | **303119** |
| **Track 2** | | | | | |
| Econergy, USA | | 36220 | 12258 | | 48478 |
| Quality Tonnes, USA | 30004 | 70004 | | | 100008 |
| Econoler, Canada | | 68631 | | | 68631 |
| Quality Tonnes, USA | | 30000 | 2912 | | 32912 |
| Econ Analysis, DK | | | 55009 | | 55009 |
| **Total** | **30004** | **204855** | **70179** | **0** | **305038** |
| **Grand Total** | **150048** | **283497** | **106095** | **68517** | **608157** |

## B. Sustainability

Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the project funding ends. The project activities were terminated in 2005-2006, with the exception of Zambia where they were not finalized until February 2007 upon successful assistance to the Government of Zambia in establishing a DNA organisation.

### i. Financial resources

In order to maintain a functional environment for CDM projects in a country the DNA must show an ability to administrate the CDM focal centre and activate the investors, donors and the participating ministries and organisations. To do this, there is a need to allocate financial resources to activities which are directly or indirectly beneficial to the organization of the DNA. This can be seen, for instance, from the activities in both Cameroon and Mali where after the termination of the CF-SEA the CASCADe UNDP program has provided further financing. For Cameroon, the REDD program of the World Bank together with technical assistance in evaluating the forest resources provided by GTZ secures sustainability and development. For Mali the Green Facility further provided financing and presently Veolia is financing training activities for the DNA and GTZ with funds from the Norwegian government for developing 10 new PINs. In Zambia DANIDA has financed the development of three PDDs via the Green Facility. However, in the view of the evaluator, the maintenance of the core outcomes, which is a well functioning DNA, is not necessarily financially demanding, and the demand for additional financial resources is often a proxy for other issues e.g. insufficient understanding and emphasis on demand-driven information generation by senior staff.

As the CDM is a project based mechanism the financing of the preparatory investigations PIN, Baseline studies, PDD development and validation by the DOE are necessities for creating sustainability. Looking at the financing problem it is possible to make a rough project categorization based on the various forms of finances needed and evaluate the likelyhood of these to be provided:

- **Landfill gas projects and similar projects avoiding bio-gas emissions or the like** For this type of projects the revenue from the CER to be generated may be sufficient for both repayment of investment costs and generating an supplementary income. The project type is illustrated by the two projects identified in Cameroon by HYSACAM. The fact that the

local bank SGBC[18] and a Swiss project financing bank are the financiers of the project establishes the fact of financial sustainability.[19]

- **Larger grid connected RE projects:** for these type of projects the financial viability depends on commercial/market conditions having been established for delivery to the grid e.g. grid codes, power purchase agreement conditions and power pool trading conditions. For African countries the BOT concept of financing is still difficult to apply as the political risks may be considered too high for entering into a 30 years commitment. The financing of power production projects, and among these RE projects with CDM, therefore remains with international banks providing loans on soft loan conditions. An example is the Félou project in Mali where World Bank is providing 40 years IDA credits and the EIB are co-financing[20].
- **Of-grid RE projects, independent producers and energy conservation projects**: the focus here is either on industries and the like for which a saving may be obtained in using another fuel, retrofitting of boilers/cogeneration plants or making use of more efficient equipment. The focus can also be on providing of local grid energy services to groups previously not supplied using RE. For the first category project financing is on the companies balance sheet since the additional income from CER often is quite insufficient for the repayment of a project loan. An example is the conversion from coal to NG at the Cement Industry in Mozambique where the switch of fuel was attractive as it was a waste product from the nearby refinery and where the combination of the savings in energy costs and the CER made the project viable. Secondly it is unrealistic to imagine a financing without assistance from outside.

Although the financing of the CDM projects are construed as being the major barrier CDM may assist in alleviating this. A major progress in assuring sustainability has been made at the COP 15 and is included in the Copenhagen Accord. For countries in which less than 10 CDM projects have been registered[21] a loan facility has been established drawing on the proceeds being paid into the UNFCCC for issuing CERs to existing projects. The loan facility may finance the upfront costs for PIN, baseline study, PDD and validation by DOE entirely and if the project for one reason or the other is not realized, the loan is converted to a grant. Another outstanding financing problem is to be able to mix grant project support with loan finance[22] for individual projects. The Copenhagen Green fund may become a source of soft financing if the loan is provided based on the technical quality of the CDM project. As the part of the financing is being provided by an increasingly interested banking sector and as the sustainable development aspect has the highest international political interest this project has been rated as '**likely'** in terms of its overall financial sustainability.

## ii. Socio-political

One of the problems in several African Countries is the political stability required to be able to enter into long term commitments and an environment which is considered sufficiently safe to undertake longterm investments as required in most CDM projects. It is the rule rather than the exception for the power industry being the sector in which most CDM projects are generated that long term commitment is required. The potential for project outcomes to progress to intermediate

---

18

19 Investment according to the PDD for Douala landfill gas recovery project 2.9 million USD and for Yaoundé Nkolfoulou landfill gas recovery project for the first 7 years period 4.5 million USD.

20 Three credits each of 25 million USD to the Governments of Mauritania, Mali and Senegal in 2006 and further two credits each of 42.5 million USD to the Governments of Senegal and Mali in 2009. The co-finacing from EIB of 40 million USD was secured in 2006.

21 As is the case for all five countries in the CF-SEA program

22 For larger projects this may exist as soft loan. However conflict between the conditions in the Marrakech accord COP 6 on no deviation of ODA for CDM and the need for soft financing may arise

states and then to a long-term impact can thus be influenced by external factors, including social and political risks.

This is reflected in the local banks having practically no willingness to enter into long term project financing as was learned during the workshops in both Cameroon and Zambia. The alternative to local commercial bank loans are international bank loans with Export Credit Agencies (ECA) to guaranty against political risks, and the loan is then often linked to the import of goods from the country in which the ECA is based.

Factors which reduce the socio-political risks are the international rules that prevail for CDM projects. The fact that international methodologies are developed and applied by UNFCCC secures high and consistent standards. The fact the DNA when becoming accredited has to establish transparent sustainability criteria and the DOE has to be licensed for validating project categories according to its special abilities all secure stable CDM conditions both relating to the generation of CER and to securing that the population effected has been properly informed about to the project. The sustainability criterion addresses possible negative effects to the population in the vicinity of the project. Further the CDCF program has a special facility allocating 1 USD per tons of $CO_{2eqv}$ to a social project benefitting the population in vicinity of the project site.

Another stabilizing factor can be illustrated by the Félou project which is an initiative of Senegal, Mali and Mauritania for the peaceful utilization of the Senegal River. Firstly the project utilizes overflow and consequently does not cause problems to the local population depending on water flow. Secondly, the fact that the project is managed by an organization (Societe de Gestion de l'Energie de Manantali) in which all participate according to pre-agreed rights and commitments, will have a tendency to reduce socio-political conflicts on the utilization of the water resources of the river.

For other types of CDM projects where the ownership or the rights to operate are limited by concessions, political risks of not having the concession renewed may be a direct reason for not executing a CDM project. It is seen that the two landfill gas recovery projects under execution in Cameroon have different CDM project durations. Where the project for Yaoundé is intended having a duration of 3x7years the project in Douala is, according to the PDD, only being given one period of 10 years as HYSACAM will only have the concession to operate the landfill site until 2020. In the case of the five projects suggested by GIC-FAUCA on the gasification of sawdust for power and heat generation at the five different sawmills, one of the major obstacles was that the length of the concession to operate the timber cutting and the sawmills was only five years.[23] The socio political risks in such a project would be minimized if the source of financing the ERPA was the World Bank CDCF demanding (and supporting financially) acommunity development side project.

As long as the conditions under which renewable energy power production projects are decided by the national governments, they are subject to socio-political risks. However socio-political risks related in particularly to power generation projects are increasingly becoming regional rather than national as the power grid is being connected and power pools being formed as is the case for the West African Power Pool as well as the South African Power Pool covering the CF-SEA countries except Cameroon. For the economic risk of providing services to clients/of-take in other countries may be connected to risks of lack of capacity or willingness to pay. However, regional co-operation has normally a stabilizing effect transferring the decision power to the pool participants who have a genuine interest in the rules being adhered to.

In general, therefore, the potential for socio-political risks that might impact the outcomes of CF-SEA and the CDM projects to follow are not seen as substantial, and thus the project has been rated as **likely'** in terms of its overall socio-political sustainability.

[23] This was not the only barrier against the projects, but it is evidend if the payback period of a project is between 5 and 10 years a financing institution will be reluctant to take the political risk related to renewal of the concession.

## iii. Institutional frameworks and governance

A favorable institutional framework and governance climate is particularly important to the sustainability of the CF-SEA outcomes. As the Climate Conventions are on the top of international focus the impact of the CF-SEA program is very likely to remain and strengthen. If the participation in the COP 15 can be taken as an indicator, Cameroon and Mali have a strong and pro-active DNA set up. In Zambia on the other hand, it is the representative of CEEEZ the local Carbon consultant who shows the strong engagement and the DNA organization could benefit from some strengthening.

- ***Cameroon*** The CF-SEA program in Cameroon assisted in setting up the organization of the DNA in January 2006 providing the legislative framework and operational capacity of the institution to asses and approve CDM projects. The organization has a Permanent Secretary, Dr Amougou Joseph Armatheé, who actively promotes CDM project possibilities and is instrumental in the DNA committee making their decisions based on sustainability and transparency criteria. In annex 5 a presentation of the functioning of the DNA is given. It can be seen that the number of CDM projects in the pipeline is increasing as well as the "Climate" local network. The permanent secretary of the DNA is very engaged and is cooperating with UNEP in the projects under article 4 in the RECOREN programme as well as the World Bank under CDM foresty projects REDD. Apart from the reduction of landfill gas emission projects of HYSACAM, DNA sees particularly LULUCF/REDD project possibilities coming up for Cameroon as projet development costs are in the range of 2-3 USD/ton $CO_{2eqv}$. Further DNA is involved in the negotiations of the replacement/extension of the Kyoto Protocol after 2012 and PS participated in the COP 15 in Copenhagen. The rating is '**Likely'.**
- ***Mali*** The DNA was notified to the UNFCCC in 2003, however the CF-SEA program in Mali helped straightening out the functional procedures and in organizing the DNA to have representatives from the ministries involved (6 delegates) and from NGOs and the private sector (6 persons/delegates). A Permanent Technical Secretary, Engineer Boubacar Sidiki Dembele, is actively promoting the opportunities in CDM in television as well as in seminars. The permanent Technical Secretary participated in the COP 15 in Copenhagen. Since CF-SEA, program support has been secured first from the Danida administered Green Facility, The UNEP program CASCADe and later from a GTZ administering development of 10 PINs and a French CDM training program by Veolia Environment. By this involvement the DNA and the Government of Mali has taken a pro-active role in securing development of CDM projects. The rating is '**Likely'.**
- ***Zambia*** The DNA organization was a direct output of the efforts made by the CF-SEA program in Zambia in January 2007. After the last workshop had been executed the project was addressed for further assistance to the DNA. This was provided by experts from UNEP Risoe under the Danida administered program Green Facility. It is the impression that only limited progress was made since then until 2009. The major part of the PINs for which a Letter of No Objection has been given was established during the CF-SEA program. It appears that a second wave of CDM projects have started in 2009. The permanent secretary function is covered by a temporary head of function and the DNA was, according to him, voting through the South African representative in COP negotiations. The donor community has expressed willingness to consider financing CDM projects if a priorities list can be presented. However, this may require some strengthening of the DNA. The rating is '**moderately likely'**
- ***Ghana and Mozambique*** the evaluation did not include a contact to the DNA in these countries. However, it can be seen that a CDM project for which the PIN was established during the CF-SEA programme was successfully brought to implementation in Mozambique. In Ghana, a CDM project has similarly been brought to implementation, which indicates that the institutions have the necessary capabilities for handling CDM procedures.

**The overall rating for sustainability of Institutional frameworks and governance is LIKELY**

### iv. Environmental

The environmental risks are project related and not country related although there are some environmental risks which can be related to climate or to the general management of the environmental legislation. A project may cause environmental problems or assist is avoiding environmental problems. One of the obligations of the DNA is to establish transparent sustainable development criteria. These shall be used by the DNA committee when evaluating a PDD before issuing a LoA which may contain specific requirements to a project. The rights to the proceeds of a CDM project depends on these obligations being respected and the DNA may revoke the LoA in case they are not. Conditions to controlled landfill projects may include the obligation to limit the access of rainwater into the dump and to collect and treat the percolate before it is allowed into a recipient such as a river or a lake. For projects such as dams and hydro power projects for which PINs were established in all the 5 countries during the CF-SEA strict conditions for Environmental Impact Assessments and set up of EMP applies if projects are developed using international soft financing.

All PDDs have a special section where environmental impacts have to be reported and the mitigation of the impacts both in the long term and during the construction period has to be described. Local stakeholders have to be presented to the project and comments received must be documented and exhibits reported in the PDD. Further the DOE are paying special attention to this having been adhered to before giving a positive Validation Report. From the validation of the CDM projects due to the activities in the CF-SEA program and now under registration this can be verified.

The CDM and the climate effect mitigation projects have in fact the ability to improve the environment by using waste and converting it to energy for some projects, in replacing inefficient equipment with more efficient etc. and in increasing the use of RE. The national communications of the countries to the UNFCCC reporting on the sources of GHG emissions are an instrument for managing the climate effects by adaptation and mitigation.

In general, therefore, the CF-SEA has been given the rating '**Likely'** for environmental sustainability.

## C. Catalytic Role and Replication

The purpose of the CF-SEA project was primarily to act as a catalyst for the implementation of CDM projects and if possible, to select a few projects for further financing with CDCF support or for full financing also activating IDA credits. The CF-SEA project as such e.g. the co-operation between UNEP DTIE and the Carbon Fund Unit of the World Bank for "scaling up investment in sustainable energy sector addressing the climate change mitigation through the CDM" might be seen as a short cut for promoting the use of CDM in African countries. Previously DNA function was only rudimentary in African countries and no or only a few CDM projects were being thought of prior to the CF-SEA programme. In the following paragraphs the catalytic role which the CF-SEA has played in the project countries and the replication possibilities of certain CDM project types is considered.

### i. Foundational and enabling activities

This element of the evaluation examines the foundational and enabling activities. This is the exact purpose of track 1 for Cameroon, Mali and Zambia. The workshops and the hands-on capacity building in designing PINs has enabled the governments to plan DNA functions and allowed their subsequent development thereof in order to harness DNAs' capacity and thus expand their quality and usefulness. As the workshops were also attended by other stakeholders such as project developers, consultants, bankers, NGOs and Development Agency representatives the enabling was

beyond the Institutions and the Governments. As the presentation of PINs was an integrated part of the workshops the CF-SEA has further provided hands-on training to project stakeholders and local as well as regional banks for participation in developing CDM projects.

**Cameroon**: The workshops enabled participants to participate in the development of CDM projects and thus were considered by them as satisfactory or highly satisfactory. Proof of this is given by the active pursue of CDM projects by the Technical University of Yaoundé, HYSACAM and GIC-FAUCA. The CF-SEA was directly responsible for enabling the Government of Cameroon to establish the DNA function in January 2006. The DNA has proven records of managing the pipeline of CDM projects.

**Mali**: As such the CF-SEA assisted in establishing the functions of an already established DNA and in creating an active community around the CDM project development. Half of the representatives in the DNA committee are consultants and representatives of enterprises and NGO's outside the government activating the function and securing that lessons learned are transferred. The DNA serves as a focal point, keeps an active CDM project pipeline and supports on-going information activities.

**Zambia**: The formation of the DNA was a direct result of the CF-SEA program in Zambia. The DNA was established in December 2006. The durable effects of enabling process was in reality limited to CEEEZ and to the CDM project proponents which later received support by The Green Facility program of DANIDA. Only limited CDM activities have been registered at the DNA focal point. However one CDM project has been registered with UNFCCC by RWE and a Church organization "The Lusaka Sustainable Energy Development" project.

**Mozambique**: Despite there being no formal capacity building during the CF-SEA programme DNA seemed to be functional in Mozambique. The assistance by Norway particularly in establishing the first PDD for a CDM project, converting Cimentos do Mozambique to use NG which were otherwise flared-of at the nearby refenery instead of coal has had a positive impact.

**Ghana**: The enabling activities of the CF-SEA programme were limited to presentation of durable PINs. However none of the CMD possibilities identified for Ghana under the CF-SEA program has been further developed despite being pre-approved by the World Bank Carbon Finance Unit. It is further the impression from the Green Facility program which continued the enabling activities and did build on some of the PINs to reach PDD stage that further enabling activities are required.

### ii. Demonstration activities

This corresponds to track 2 of the CF-SEA program establishing PINs as a hand-on and demonstration activities with the effects of:

- **Increasing in-county capacity through training of the project developers, consultants and other stakeholders at the workshops creating awareness of the CDM methodologies and procedures**: illustrated by selection of projects for which the project parameters, the mitigation effects, the costs and the socio-political as well as the environmental conditions were established using the PIN format of the World Bank.
- Real project **development possibilities of thePINs in all 5** countries which were evaluated by the World Bank Carbon Unit for quality, implementation and financing. Outside the CF-SEA program a number of follow up CDM demonstration activities are being under taken in both Cameroon and Mali where the DNA has resumed a pro-active role.

### iii. Investment

The CF-SEA project has been a direct link for investments allocated for 4 CDM projects. The Félou 60 MW hydro power project in Mali is the only one of these four projects which involves long term financing from the World Bank in terms of a 40 years credit of 160 million USD from IDA (3x25 million USD and 2x42.5USD) and app. 40 million USD co-financing from EIB. The Cimentos Dos Mozambique CDM project is being financed by the industry itself with 810,488 USD according to

the PDD. From the two landfill projects developed by HYSACAM, the one in Douala received an investment of 2.9 million Euros from the investor/co-project owner Vitol S.A. Switzerland and the other one in Yaoundé was financed by(ORBEO) trough the contacts of SGBC a local branch of Socité Gerale. The investments, 4.6million Euros, are for the period of first seven years.

### iv. Project Champions

There is no doubt that the project succeeded in Cameroon, Mali and Mozambique whereas the CDM projects registered in Zambia for 'Lusaka sustainable energy development' and in Ghana for 'Large scale oilseed bio-fuel production' were not related to the CF-SEA program. There is willingness in Cameroon and Mali to replicate the projects by the project developers. In Cameroon, HYSACAM is likely to develop other similar projects, since it has the concession for collection of household waste in several other towns of Cameroon. It has even been mentioned by the management of HYSACAM that since the company owns contracts for solid waste collection also in Chad and Niger, they would be interested to replicate the landfill gas recovery project there thereby disseminating the technology even beyond the national borders. For Mali, the next CDM project being considered by SOGEM for development of the Senegal River is the 125 MW Gouina project.

**The overall average rating for catalytic role and replication is SATISFACTORY**

## D. Stakeholder participation / public awareness

A co-signed letter by UNEP DTIE and the World Bank addressed to the Ministry of Environment in each of the countries with copies to other ministries, UNEP/UNDP and WB regional offices raised attention of the CF-SEA programme and invited all to participate. The national workshops were attended by participants from the addressed ministries and organizations.

At the start of the project an information sheet of the CF-SEA program was distributed for each of the five countries. The consultant for the activities in Cameroon further established a homepage with all relevant information of the program, the workshops and the progress made. After the termination of the CF-SEA the homepage was left with the DNA for further development.

In the process of finding durable CDM project opportunities the international consultants together with local partners identified project proponents who were then invited to participate in the workshops. In addition to them, all stakeholders having an interest in CDM were invited. Further, the PM organised one to one meetings with representatives from local banks and invited them to participate. However, as it proved to be difficult to convince the local bankers to participate in the workshops, three regional CDM bankers' conferences, covering the full CDM project cycle, were organized in Dakar and Johannesburg by the UNEP project management. The conferences were well attended and journalists made certain that the information was disseminated to the wider public, even beyond the five African countries considered for the CF-SEA programme.

A database on the CF-SEA programme and the results achieved financed from the non-used funds of CF-SEA project has been established by the PM. In Mali and Cameroon online networks of CDM stakeholders enabling formal and informal communication have been established by the focal point of the permanent secretary to the DNA.

The Project's Executing Office at UNEPRisoe is participating in a number of CDM activities and programs and a large number of relevant CDM publications have been prepared by them. These publications can be accessed in internet and some of them were made available in the countries during the execution of the CF-SEA project. UNEPRisoe is further managing an updated database on all CDM projects in the world whether they are being rejected, registered or in the process of becoming registered.

**The average rating for Stakeholder Participation/Public Awareness is SATISFACTORY**

## E. Country ownership / driven-ness

The assessment includes country by country ownership evaluation and a general impression as to how the response is to making substantial green house gas emission reductions.

### i. Level of country ownership

***Cameroon*** From the interview and discussion with the permanent secretary of the DNA it can be established that Cameroon has taken ownership of the process of promoting CDM possibilities within the country. In annex 5 an extensive overview is given of all CDM activities in Cameroon being performed by the CDM Focal Center with DNA. Opportunities are being pursued, including search for supporting financial means, for projects resulting in reduction of waste and improvement in the state of the environment, The cost efficient development of CDM projects such as LULUCF projects was a point raised at the meeting with the permanent secretary/the DNA. As a consequence of the ownership and the pro-active role of the DNA a REDD program is now under execution in Cameroon with the assistance of the World Bank and with GTZ providing expertise to the categorization of different types of forests. The purpose is to definine LULUCF projects which lead into a CER of 3USD in a region where the marked prize is 15-20 USD/ton$CO_{2eqe}$. **Highly satisfactory**

***Mali*** PINs for 4 hydro power projects were established and the World Bank chose to pursue the project of Félou. The consultant of the CF-SEA program, however, offered to assist the Direction D'Energie in establishing PDD's for the other three at no costs but with shared rights to the CER. However, no response was given and one might wonder if the offer was ever even send. A more likely explanation is that the government was considering a BOT model[24] for the other three hydro power projects leaving the question of capitalizing the CER from the GHG emission reductions to the project developer. Without the financial means to invest or the desire to prioritize the expansion of Electricite de Mali (EdM), the ability to take ownership of the CDM potential by the Government is not existent. As to the ownership and expansion of the operation of the DNA the interview with the Permanent Technical Secretary and the documentation presented shows that the government has taken ownership. During the interviews with the Permanent Technical Secretary of the DNA it was explained that DNA was actively finding assistance and sources of finance from Veolia and GTZ to help promote the CDM according to DNA plans. **Satisfactory**

***Zambia*** The late establishment of DNA caused considerable delays in the CF-SEA project in Zambia. When the expected results had finally been achieved in February 2007, a request from the Zambian Government for further assistance followed immediately in March 2007. It is understandable that the progress of taking ownership lacks due to the late establishment of the DNA. In addition, the Permanent Secretary is presently not available for health reasons and the acting DNA is perhaps without a strong personal engagement. It seems as if the CDM had been revived in 2009. Danish Government had already supported further development of PINs to PDD thourhg Green Facility. Impression gained from an interview with DANIDA in Lusaka indicated that if DNA would call for a donors' conference after preparing a priority list for CDM projects to be implemented, means for CDM project development might be easy to find. '**Moderately Satisfactory'**

***Ghana and Mozambique*** Whereas the CDM country ownership in Mozambique appears to be successful the team involved in the Green Facility activities in Ghana have a mixed impression on the country ownership being taken in Ghana. It shall be noted that the role Ghana has been playing in the COP 15 meeting shows a strong interest in defining the next "Kyoto protocol" and the development of the PDD for "Large scale oilseed crop cultivation at Yeji in the Pru district" gives reason for assessing CDM country ownership.

---

[24] BOT (Build Own/Operate and Transfer of power plants typically for 30 years where the investor carries the risks and the full benefits (including the proceeds from CER) and the Power System Operator/Government typically guaranty a base load power delivery)

## ii. Level of country commitment

By definition in the Kyoto protocol the countries are commited with different rights and obligations corresponding to whether being Annex one or non Annex one countries. The CF-SEA programme assisted the five in this context. Upon signing the Kyoto protocol, the countries have also agreed to establish and transmit a National Communication to the UNFCCC in which they have listed the major sources of greenhouse gas emissions. The countries are also obliged to report on changes in emissions in the following National Communications. At COP 15 one of the questions which raised differing opinions was in fact whether the non annex countries should be committed to undertake mitigation projects. An issue of who has the responsibility to mitigate and who is going the take financial responsibility was raised on NAMAs[25]. It appears to be a principal issue for the African delegation as part of the G77 officially to refuse such an obligation to mitigate without full compensation. On the government level the African Countries are committed and the CF-SEA programme can be seen as one of the first practical activities assisting the 5 countries participating in creating substance in activities and on the organizational level – how to support the financing of the mitigation actions is the crucial point for most CDM projects.[26]

The commitment of DNAs in Cameroon and Mali to efficiently perform the duties in accordance with enabling advises and guidelines received are satisfactory. The countries are committed to successfully pursue the possibilities of supporting and paving the way for the implementation of CDM projects. In Mali, the Permanent Technical Secretary is playing an essential role in maintaining the public interest by informing about CDM activities at seminars and on national television. In Cameroon, the commitment is illustrated by the fact that the use of renewable energy is high on public agenda (see frontpage of report).

In all of the five countries the DNA/Government representatives have influenced which priority sectors to promote for CDM activities and carefully evaluated the proposed PINs presented. Letters of No Objection have been issued signifying that the sustainability criteria have been met. For the few projects which have reached the PDD level for registration, the countries in question have, as required by the rules of UNFCCC, issued Letters of Approval demonstrating full country commitment.

In addition, there is an interest in Cameroon to reduce emissions substantially by opportunities of REDD project. Similarly there is an interest in Ghana for emission reduction through large scale oilseed projects by LULUCF, and in Mali and Zambia[27] by hydro power projects. All of the countries share an interest for landfill projects.

**The overall average rating is SATISFACTORY.**

# F. Achievement of outputs and activities

## i. Delivered outputs

The main outputs of track 1 and 2 were designed to be:

**Workshop outputs (track1):** The workshops in Cameroon, Mali and Zimbabwe and the supporting documents produced were one of the main outputs of the project. The workshops were different in quality and approach but had a content which was in accordance with the contracts of the consultants and the workshops were all rated high by the participants. The workshops, the cooperation related to their preparation as well as follow up activities succeeded in delivering the

[25] National Appropriate Mitigation Actions of developing countries.

[26] It is more than likely the commitment to implement CDM projects will increase drastically when the Copenhagen Accord is being materielised in an agreement/protocol.

[27] Once the baseline problem have been solved using the grid emission coefficient from the West African Power Pool and the South African Power Pool respectively.

outcomes requested in the original Log Frame which was made as the CF-SEA programme was prepared for internal financial approval:

- Legislative framework and operational capacity of governmental institutions to asses and approve CDM projects.
- Increased capacity of local/regional institutions to intermediate or facilitate CDM transactions.

**Specific PIN outputs (track 2) is the other main output** providing the outcome as specified for track 2 activities in the Log Frame[28] increasing the capacity of developers to finance and build low carbon energy and infrastructure projects they were as follows:

**Cameroon**

The international consultancy chosen in Cameroon was Econoler International which was locally supported by CETEF Inc. in co-operation with the Technical University of Yaoundé. The first Workshop was held 21-22.07. 2005, and development of PINs started immediately thereafter. The second Workshops (WS) were held in Yaoundé (25.08) and Douala 29.08-2.09.2005 both focusing on subjects related to PIN and Project Baselines. The third WS was held 16-17.11.2005 focusing on the responsibilities of the DNA and progress on PINs resulting in the formation of the DNA in January 2006. The final WS took place the 23-24.05.2005 and prior to this the World Bank Carbon Finance Unit had pre-approved the quality of 7 PINs out of the13 PINs presented as the OUTPUT. The four workshops were in accordance with the contractual OUTPUT and of high quality, resulting in the formation of a knowledgeable and active DNA as OUTCOME.

In Cameroon 12 PINs were generated and the project was directly responsible for the establishment of the DNA. Four workshops of very high quality have brought knowledge to the CDM mechanism into project developers, local banks and a pro-active DNA organization illustrated by the project portfolio and CDM contacts attached in the Annex 5.

PIN 1 Cameroon - GIC-FAUCA Sawmill Waste-to-Energy - Lomie GIC-FAUCA Renewable Energy - Biomass Power CDCF **pre-approved** (but problematic to implement)[29]
PIN 2 Cameroon - GIC-FAUCA Sawmill Waste-to-Energy - Peal Nsem GIC-FAUCA Renewable Energy - Biomass Power CDCF **pre-approved** (but problematic to implement)
PIN 3 Cameroon - GIC-FAUCA Sawmill Waste-to-Energy - Ngoro GIC-FAUCA Renewable Energy - Biomass Power CDCF **pre-approved** (but problematic to implement)
PIN 4 Cameroon - GIC-FAUCA Sawmill Waste-to-Energy - Nsimalen GIC-FAUCA Renewable Energy - Biomass Power CDCF **pre-approved** (but problematic to implement)
PIN 5 Cameroon - GIC-FAUCA Sawmill Waste-to-Energy - Libongo GIC-FAUCA Renewable Energy - Biomass Power CDCF **pre-approved** (but problematic to implement)

PIN 1-5: GIC-FAUCAs five locations for a cogeneration plant using waste sawdust and wood at sawmill facilities were developed as CDM PINs by the intervention of Econoler International providing the contacts to a Canadian technology provider who was interested in supplying gasification units, waste heat recovery boilers and combined cycle turbines together with 55% of the project finance. The local project finance however was not available and a proper engineering dimensioning of the plants at the various locations was outstanding for years. UNEP DTIE invited the proponents to have the project supported by the CASCADe program managed by UNEP. An application for Belgian ODA finance was also made but was unsuccessful. Whereas the World Bank

[28] When the CF-SEA programme was designed in 2004 (MT-4040-04-23 and UNE-RAF-04-326) the ROtI method was not yet developed as the tool for project evaluation – and although there is a logic connection between indicators suggested for verification in the log frame and the IMPACT assessment the ROtI method seams the most appropriate for measuring the degree of success.

CDCF pre-approved the PINs and paid Econoler International a thorough examination found the technology solution too expensive to make the project viable and the plants heavily over dimensioned. Further the risks connected to the projects – such as the sawmills which were both provider of the BM fuel and purchaser of the power and heat to be generated were only having a 5 years concession – were assessed to be too high if the Sawmills Companies were not themselves investors in the projects. In fact two of the locations where the plants were intended to be erected had already closed down. The project was politically supported by the Government claiming WB acted too much as bank and not sufficiently for Sustainable Development. The Evaluator is of the same opinion as the WB and the PM that the project facts are not sufficiently clear and the projects need to be investigated further by the project developer. In the COP 15 (December 2009 Copenhagen) consent was reached that non annex countries having less than 10 CDM projects registered could gain access to loans from UNFCCC for feasibility studies and PDD preparation.[30] One of the advantages' of such a loan is that if the project is never realized no repayment of the loan is requested. For a project of this type where an appropriate technology might generate a high return of investment access to intermediary finance may prove useful. A offer on 250,000 USD for preparing a PDD was made by Econoler International and their sub-consultants to GIC-FAUCA and provided they get the all project facts collected they may be able to activate such a loan when the facility become operational using their contacts in the government.

PIN 6 A and B Cameroon- Yaounde and Douala Landfill Gas Hysacam/Municipalities of Douala and Yaounde Methane Recovery/Waste Management CDCF **pre-approved**

PIN 6A, B: HYSACAM – the company responsible for solid waste collection in Cameroon and operating as a contractor in Ndjamena Chad and Niamey Niger – has during the project established a PIN for methane gas extraction from controlled landfills receiving the household waste from Yaoundé and Douala. The World Bank expressed an interest in establishing an ERPA for both projects. The company has found investors as ORBEO a CF branch of Societé Geralé, represented in Cameroon by SGBC for the Nkolfoulou landfill at Yaoundé, and the Swiss company Vitrol for the PK 10 landfill project at Douala. The PDD have been prepared by the foreign investors. GEB has been created reducing the GHG emissions by estimated 150,000 tons $CO_{2eqv.}$ Letters of approval have been issued by the DNA and the projects drilling wells for biogas extraction was scheduled to start in 2010. This represents the full line from creating interested Project Developers and establishing interest from local banks as OUTCOME and via the information drivers reached the INTERMIDIATE STATE as project developers of having the overview of the project in feasibility and PDD form resulting in durable IMPACT being created after positive evaluation of the DNA issuing the LoA, validation by the DOE and registration by UNFCCC.

PIN 7 Cameroon - BOCOM Waste Heat Recovery BOCOM International Energy Efficiency **rejected by WB** (due to too low $CO_2$ emission reduction not meeting the requested 30.000 tonnes /year)
PIN 8 Cameroon - SDAI Palm Waste to Energy Société de Développement Agro industrie du Cameroun Renewable Energy - Biomass Power **rejected by WB** (due to too low $CO_2$ emission reduction not meeting the requested 30.000 tonnes /year)
PIN 9 Cameroon - Nygoyla Micro-hydro bundle Ngoyla Municipality/Community Renewable Energy - Hydropower **rejected by WB** (due to cost and low emission reduction benefits)
PIN 10 Cameroon - Biogas utilization in date palm greenhouses MINADER/MINEP Renewable Energy - Biomass Power **rejected by WB** (due to too low $CO_2$ emission reduction not meeting the requested 30.000 tonnes /year)
PIN 11 Cameroon - Biomethanisation of Abbatoir Waste SODEPA/SNI/Ministere de Finances Methane Recovery/Waste Management **rejected by WB** (due to too low $CO_2$ emission reduction not meeting the requested 30.000 tonnes /year)

[30] The exact formulation is on the agenda at the EB 54 meeting in Bonn.

PIN 12 Cameroon - Composting in Communities Enviro-Protect, Maroua Municipality, ICCO, communities Methane Recovery/Waste Management **rejected by WB** (due to too low $CO_2$ emission reduction not meeting the requested 30.000 tonnes /year)

## Mali

The international consultant selected after a thorough tendering process by the World Bank CDCF and UNEP DTIE was Econergy International Consultancy. They were assisted by Mali Folkecenter (MFC) and ENDA TM. The contractual output of three workshops were met; one in September 2005, one in February 2006 and one in October 2006[31].

PIN 1 Mali - Kenie Hydroelectricity Ministry of Mines, Energy & Water Renewable Energy - Hydropower **rejected by WB** (financing not readily available and when available the CER benefits are assumed to become the property of the financier)
PIN 2 Mali - Taoussa Hydroelectricity Ministry of Mines, Energy & Water Renewable Energy - Hydropower **rejected by WB** (financing not readily available and when available the CER benefits are assumed to become the property of the financier)
PIN 3 Mali - Felou Hydroelectricity Government of Mali/OMVS Renewable Energy – Hydropower accepted by **Spanish Carbon Fund and IDA credit and the project being financed by World Bank IDA credits 160 million USD and 40 million USD (35 million EURO) cofinancing from the EIB**

PIN 3: A PDD has been developed for the Félou, which is a run of the river hydro power plant using the overflow on an existing irrigation dam replacing an old plant with 600kW in capacity. The project is planned to be completed in 2012 and will generate 160,000 tons $CO_2$ credits yearly[32] . The power generated will be divided between the 3 countries participating in the SOGEM-OMVS[33] Manantali project with the shares Mali 45%, Senegal 30% and Mauritania 25%. As the CDM project is a regional project all of the involved DNAs have issued Letter of Approval. The project has, apart from being a project assisting in mitigation of the climate effect, a long term GEB value in creating sustainable and peaceful cooperation on the utilization of the Senegal River between the bordering countries.

PIN 4 Mali -Markala Hydroelectricity Ministry of Mines, Energy & Water Renewable Energy - Hydropower **rejected by WB** (financing not readily available and when available the CER benefits are assumed to become the property of the financier)

## Zambia

The international consultant selected was ECON, assisted by the local consultants EECG and CEEEZ. The Workshops providing capacity-building for the upcoming DNA organization and hands-on training on establishing PINs were performed in May 2005, September 2005, and July 2006. An additional workshop was held in February 2007 after the formation of the DNA in December 2006.

PIN 1 Zambia - Kafue Sugar Bagase Cogeneration Consolidated Farms Ltd. Renewable Energy - Biomass Power CDCF **pre-approved** (the ownership and management of the Kafue Sugar Company has changed and the new management, together with CEEEZ has expressed serious interest to develop the co-generation project using the excess bargasse)

---

[31] dates indicative only.

[32] according to the PDD on the UNFCCC CDM pipeline with RisoeUNEP.

[33] Company formed for the common utilization of the Manantali power and dam project where the power production is divided between Mali 52%, Senegal 33% and Mauritania 15%, under the "Organisation pour la Mise en Valeur la fleuve Senegal" (OMVS)

PIN 2 Zambia - Manchinchi Biomethanation Electricity Generation Lusaka Water & Sewerage Co. Methane Recovery/Waste Management CDCF **pre-approved** (The plant is not functioning. It already has a digester for the sludge which is however, not in use since no sludge is being collected in the waste water treatment process. Thus the project is presently not relevant)
PIN 3 Zambia - Lusaka and Amanita Water Energy Efficiency Project Lusaka Water & Sewerage Co. Energy Efficiency CDCF **pre-approved** (in order to have potential for CDM the existing water pumps etc. have to be proven having at least 10 years more of technical life which is not very likely)
PIN 4 Zambia - Itezhi Tezhi Hydroelectric ZESCO Ltd./OPPPI/Ministry of Energy Renewable Energy - Hydropower CDCF **pre-approved** (this project was informed by ZESCO to be on their priority list for implementation and would, with IDA financing and delivery of power to the SAPP, make an excellent CDM project)
PIN 5 Zambia - Biodiesel production from *Jatropha curcas* Marli Investment Zambia Ltd Bio-fuels CDCF **pre-approved** (CEEEZ has, under CF-SEA and the Green Facility, developed this project to the state of PDD – the contribution from future CER sales to the viability of the project is however very limited and a suggestion would be to reformulate the project taking Aforestation Reforestation (LULUCF) aspects into the PDD)
PIN 6 Zambia - Multi-industry Energy Efficiency in Copperbelt AHC MMS/ Nkana Water & Sewerage Co. Energy Efficiency CDCF **pre-approved** (in order to have potential for CDM the existing water pumps etc. have to be proven having at least 10 years more of technical life which is not very likely)
PIN 7 Zambia - Kafubu Water Energy Efficiency Kafubi Water & Sewerage Co. Energy Efficiency CDCF **pre-approved** (in order to have potential for CDM the existing water pumps etc. have to be proven having at least 10 years more of technical life which is not very likely)

**Mozambique and Ghana**

The international consultant selected after a thourough evaluation process was Quality Tonnes from the US. The two country teams working under different Project Managers performed the services of identifying CDM projects efficiently. The consultants, however, were not responsible for hands-on training and institution building. For a detailed project presentation see annex 4.

PIN 1 Mozambique **-** Hulene Landfill (Date of Submission: August 19, 2005)The objective of this project is to improve the current management situation at the Hulene Dump Site, in order (1) to reduce the significant environmental health impacts that nearby settlements and low-income communities are experiencing and (2) to utilize landfill gas from the site to generate electricity. The project is viable with a pay back period of 7-10 years (depending on CER prizes) without taking the revenue from power sales into consideration. Further development is advised. PIN pre-approval by World Bank CFU on 05/04/2006.
PIN 2 Mozambique -Ethanol Substitution for Petrol (Date of Submission: February 2006). The objective of this project is to utilize the local sugar producing capacity of Mozambique to produce Ethanol to replace at least 5% of Mozambique's petrol consumption.The project is viable as a CDM project. For the FIRR calculation the transportation costs, the processing costs and the loss of sugar production should be measured against the revenue from the ethanol sales. PIN pre-approved by CDCF on 05/04/2006, Community Benefits requested.
PIN 3 Mozambique - Micro Hydro Project Bundle (Date of Submission: November 1, 2005). The objective of this project is to rehabilitate several small hydro facilities damaged during the civil war that will provide power to villages, business and industries that are not currently connected to the grid, supplying reliable electricity to help spur local economic development and displacing polluting and expensive diesel fuel, as well as the use of charcoal and fuel. The mini-hydro fits perfectly under the CDCF and the annual amount of CER should be sufficient for making the project interesting for the CDCF. The costs are heavily under-budgeted and the CER will be needed. Even if the project was grant financed there would still be a need for financing the O&M and it should be possible to demonstrate the additionality criterias being fulfilled. PIN pre-approved by CDCF on 05/04/2006.

PIN 4 Mozambique - Corumana Hydro Generation Rehabilitation (Date of Submission: February, 2006). The objective of this project is to upgrade the Corumana hydro facility that is currently operating well below its potential capacity. Since Mozambique is directly connected to the South African electricity grid, the additional renewable electricity would be replacing predominately fossil fuel based generation in South Africa. Mozambique is supplied with electricity produced by hydropower. As long as no regional baseline originating from the South African Power Pool has been accepted by the UNFCCC it is to gamble on the emission reduction since the grid electricity emission coefficient for Mozambique alone is too low for making the contribution from CDM interesting.
PIN 5 Mozambique - Fuel Switching at Cimentos Cement Plant (Date of Submission: November 7, 2005). The objective of this project is to reduce the carbon intensity of the production of cement by switching from predominately coal and diesel fuel to natural gas. As a direct consequence of the CF-SEA, one of the other consultants (ECON Analyse) based locally in South Africa was given the task to develop a PDD by the Mantola Company in April 2007. The deal was signed July 2007 and a baseline study and PDD was developed 25 October 2008. The PDD was validated by Norsk Veritas and sent for registration the 22 October 2009. The annual emission savings has been calculated to be 37,153 tonnes and the NPV using the WACC discount rate of 12.8% has resulted in reduction of 6,3 million USD. The large deviation in the assessed costs in the PIN and the NPV of the PDD is principally due to the cost of the gas pipeline between the Mantola oil refinery and the Cimentos Mozambique.
PIN 6 Mozambique - Chicamba and Mavuzi Hydro Generation Rehabilitation (Date of Submission: November 15, 2005). The objective of this project is to rehabilitate two hydro facilities that are currently operating at only about half of their potential capacity. Since Mozambique is directly connected to the South African electricity grid, the additional electricity would be displacing generation in South Africa. Baseline must be recognised by the UNFCCC as the regional baseline for the South African Power Pool in order to make the project viable. The project was pre-approved according to the final report by UNEP DTIE. However letter of exclusivity to the PIN and CBQ was not transmitted to the CDCF.
PIN 7 Mozambique - Distribution System Extension (Date of Submission: November 1, 2005). The objective of this project is to eliminate several unclean diesel generators from operation in currently non-connected areas in Northern Mozambique by connecting them to the hydro generation capacity of the Northern Grid of Mozambique. Rural electrification in Mozambique only reaches about 6% of the population. Much of this generation is non-grid connected diesel. The project is dependent on receiving soft loan by ODAs such as SIDA, the Swedish International Development Agency, The Islamic Bank, and the BADEA. The project was pre-approved according to the final report of UNEP DTIE, but neither letter of exclusivity nor the CBQ was received by the CDCF.

PIN 1 Ghana - Accra's Oblogo Landfill in Ghana (Date of Submission: September, 2005). The objective of this project is to capture the landfill gas currently being emitted from the Oblogo landfill in Accra, thereby reducing methane emissions and utilizing the landfill gas to generate electricity – helping to meet the ever-growing power demand in Ghana. The electricity could also provide the city with an additional source of revenue, since the landfill is currently a net liability for the Accra municipal authority. The project is likely to be feasible if CER value is fixed at 8 USD or above. If PPA cannot be reached in the first phase, the development costs flaring only will reduce the cost and the emission reductions will not be reduced proportionally with the investment costs. **P**IN pre-approved by the Carbon Finance Unit 05/04/2006.
PIN 2 Ghana - Essipon Gas to Energy Project (Date of Submission: November, 2005) Similar to the landfill gas recovery project of Oblogo. The PIN was pre-aproved by the Carbon Finance Unit 05/04/2006.
PIN 3 Ghana - Kumasi Landfill (Date of Submission: September, 2005). Similar to the land fill gas recovery project of Oblogo. Kumasi is one of the cities covered under the World Bank's Second Urban Environmental Sanitation Project (UESP-2), which was approved by the Bank's board in April, 2004. The project has a solid waste component that includes support for effective operation

of a landfill in Kumasi, which was constructed under UESP-1. This support involves monitoring for environmental compliance and the involvement of local private operators in their operation. Collection of landfill gas is not a part of the project as outlined in the Project Appraisal Document (PAD). The PIN was pre-approved by the Carbon Finance Unit 05/04/2006.

PIN 4 Ghana – Optimization of Hydropower Facilities in Ghana (Date of Submission: February 2006). The objective of this project is to use an information technology product to collect both hydrologic data and other information, which can be used to increase the efficiency and output of the Volta River Authority's hydropower assets. Even an improvement of output of a few percentage points will generate a significant amount of additional MWH, which can displace fossil fuel generation. The project is highly feasible even without CDM as the extra revenue from the power generation has not been taken into the cost benefits assessment. There is likely to be problems in defending additionality - except from a lack of technology and risk point of view. The PIN has been pre-approved by the Carbon Finance Unit 05/04/2006. Further development is waiting for a letter of exclusivity, LoNO and project financing plan.

PIN 5 Ghana – Ghana Transmission and Distribution Project (Date of Submission: February, 2006). The objective of this project is to improve the efficiency of transmission and distribution systems in Ghana, through a proposed World Bank program, which will reduce MWH losses by about 120 GWH per year. This fits in with the development objectives for Ghana, which are to: (i) improve the transmission and distribution networks to enhance reliability and efficiency of power to existing customers;(ii) provide increased access to affordable, reliable and adequate electricity; and (iii) improve the efficiency and security of fuels such as LPG, wood, and charcoal. The PIN has been cleared with the Carbon Finance Unit for payment of the consultant 05/04/2006. A further development awaits LoNO, exclusivity agreement, baseline study and additionallity clearance (methodology) and finally a commitment of one of the World Bank administered Carbon Funds for taking the risk of developing a PDD for registration with the UNFCCC.

PIN 6 Ghana - Energy Efficiency and Fuel Switching in Volta Aluminium Company (Date of Submission: March 2006). The objective of the project is to improve energy efficiency by minimizing overall electrical energy power consumption by 15% and switch from using residual fuel oil in boilers and plants to natural gas for energy generation. Reducing electricity demand from VALCO, the largest energy user in the country, will free up electricity to be used in other areas of Ghana's strained electricity grid. The project will also reduce VALCO's own dependence on potentially unreliable hydropower in the country. The PIN was cleared by the Carbon Finance Unit for payment of the consultant the 05/04/2006. No further actions have been taken issuing LoNO by the DNA, or giving WB exclusivity for development of PDD.

PIN 7 Ghana - Restoration and Expansion of Refinery Gas Electricity Generation System at the Tema Oil Refinery (Date of Submission: January 30, 2006). The Tema Oil Refinery is the only refinery in Ghana and provides the country with much of its gasoline. Like most refineries, Tema emits a good deal of methane in the form of refinery gas. The facility currently uses some of this gas for on-site thermal and electricity generation, but much of the refinery gas is flared. This project would recover all of the refinery gas currently being flared and use it for more on-site electricity generation, thus avoiding flaring and displacing electricity currently bought from the grid. The project will also enable some export to the grid. The project will repair an existing generator that is currently not in use (6.5 MW) and build an additional generator (5.5 MW). A total of 12 MW of additional capacity will be added, in addition to the 5.5 MW that is already in use. The total on-site generation will thus equal to 17.5 MW. The carbon credit in itself would not be sufficient to finance the project. However if the power would be sold on the West African power pool which is about to be extended towards Mali, Senegal and Mauritania, the revenue expected would be approximately 10 USc/kWh delivered minus the charges for grid extensions /wheeling through charges. This could generate revenue up to 7 million USD. The project would have a very short pay back period and it is possible to defend the additionality of the project as a CDM project by the CER being necessarily as a guaranty against a commercial bank-loan since the marked conditions in the power pool might give quite fluctuating energy prices. With the power pool under establishment it makes good sense to further pursue the project. The PIN was cleared by the Carbon Finance Unit for payment of the consultant 05/04/2006. No further development has taken place.

PIN 8 Ghana – Tema Wind Farm Project (Date of Submission: December 12, 2005). The project will construct a grid connected wind farm within a new embedded/distributed generation framework developed by the utility regulators. The capacity of the wind farm is 52 MW and will generate about 85 GWH per year based on wind speeds measured in the wind resource assessment. The wind regime has been investigated and has not changed much since, however the costs of the wind turbines have increased. It is generally know that the value of the CER generated by a wind project will not contribute with more than 15% to the project finance. For Ghana the baseline does not give a high emission coefficient for the grid and as the power tariff is relatively low the fact that the capacity factor is low makes the project not feasible. The indication that the Danish Green Facility fund did not chose to develop the PIN further into a draft PDD supports this, as UNEP Risoe executing the Green Facility in Ghana is assumed to have a detailed knowledge on wind farm projects. The PIN was not cleared by the Carbon Finance Unit meaning the project did not meet the Bank's target.

## ii. Soundness and effectiveness of the methodologies used

The overall goal of the establishment of PINs a part from the useful hands on practical training was to identify one PIN from each country for which the World Bank, depending on if it had received a letter of exclusivity, would have requested the consultant to established a Carbon Finance Document CFD. If the project was interesting enough for CDCF community development and of a sufficient size[34] the intention was then to have one of the Carbon Funds[35] administered by the bank to support the development of PDD and DOE Validation.

**Programmatic problems**: The generation of CER starts only after the project has been implemented and lack of financing will constrain the CDM project being implemented. Therefor even projects where the CERs are sufficient for full amortisation of a loan a third party financing is required. Consequently it was not possible for the World Bank to bring projects into execution unless long term loans, according to normal bank procedures, could be established. Comments were raised that the World Bank Carbon Finance Unit was "thinking as a bank" and not as a development institution.

**Institutional problems**: The coordination of CF with other divisions of the World Bank will inevitably lead to longer lead time between the CDM project opportunities being identified and Banks' programme having been adjusted to provide for such opportunities. As seen, UNEP has been able to mobilise resources for the CASCADe program with shorter notice, this however only finances the capacity development not the entire project.

**Solutions:** The demonstration effect of a successfully implemented CDM project in a country depends, not so much on what source the finance is drawn from, but on the fact that it is implemented without delays and problems. The objective of the Carbon Finance Unit is just as much directed towards providing a leadership for establishing methodologies and high quality CDM projects as to coordinating purchase of CER by funds administered by the World Bank. As such, the project has been successful since project proponents were able to attract project finance to three of the CDM projects identified and developed to PDD's themselves and the Bank to arrange long term credits for financing the forth. It is noted that the World Bank has established an Energy Group in the Africa Region division, Sustainable Development Department, which is also the organisation handling the Félou project.

[34] at least 30.000 tonnes of $CO_{2eqv}$ CER generated each year

[35] The World Bank CFU is administrating a number of funds for purchasing the CER from CDM projects such as the Prototype Carbon Fund, CDCF, the Spanish C F, The Italian C F, The Duch C F and the Danish C F.

## iii. Credibility of Project outputs

The credibility of the outputs/outcomes of the track 1 activities is best illustrated by the fact that the DNA organization at least in Mali and Cameroon has reached the state of being well functioning and pro-active[36]. The credibility of providing increased CDM capacity to intermediaries can best be assessed by the fact the CF-SEA programme resulted in more than 200 millon USD investments in CDM projects. Whether the individual CDM project ideas PINs were credible is further evaluated below.

**Cameroon:** The PIN 6A and 6B for the Landfill projects at Douala and Yaoundé are bases on research and profound investigations at the Polytechnic Institute in Yaoundé. The fact that they are being implemented in 2010 after a due diligence by a project partner who is providing the entire investment capital gives a certain guaranty for the quality. The projects 7 to 12 were considered too small or too complicated for the World Bank whereas the first 5 were pre-approved. The projects 1-5 were based upon the utilization of BM waste from sawmills to generate power and heat for the sawmill itself. The process chosen was the delivery of 5MW biomass gasification units, and combined cycle gas and steam turbines to each of the five projects. After the pre-approval of the PINs, the project was found to be too expensive by World Bank to have a possibility of becoming implemented. Further, the feasibility study on the project load curves/demand and realistic tariffs have never been prepared.

**Mali:** From more than 20 **draft** project ideas only 5 were prepared and 4 presented for large and medium scale hydropower. All 4 PINs are of high technical quality. As the World Bank only approved one of these, there appears to have been a lack of understanding on both sides leading to no PINs being established for two sugar industries, for two Landfills as well as one Retrofit of a Thermal power plant for EdM and a cogeneration plant for an oil seed company. In total, 10 quality PINs could have been developed, however, the local consultant probably did not have sufficient time for this.

As the DNA was formed prior to the start of the CF-SEA program in Mali, CDM project ideas already existed and had been presented in 2004 in Montreal but prober and detailed PINs using the World Bank Carbon Finance Unit format and adding baseline and additionality were established by the consultants. The projects were all hydro power projects: Makela 13.5 MW, Kénié 56 MW, Taoussa 20 MW and Félou 62.3 MW[37]. The Carbon Finance Unit chose to approve the Félou PIN established 17 January 2006 and made an agreement with the Spanish Carbon Fund to support the development of this project to a CDM state and purchasing the CER from the project. In June 2006 an IDA credit for 75 million USD was approved and the EIB provided a loan of 33 million EURO (corresponding to 45 million USD at the rate of exchange at the time of approval). A further IDA credit of 85 million USD to meet the increased project costs were applied for 30 June 2009.

A PDD has been developed for the Félou, which is a run of the river hydro power plant using the overflow on an existing irrigation dam replacing an old plant with 600kW in capacity. The project is planned to be completed in 2012 and will generate 160,000 tons $CO_2$ credits yearly[38] . The power generated will be divided between the 3 countries participating in the SOGEM-OMVS[39] Manantali project with the shares Mali 45%, Senegal 30% and Mauritania 25%. As the CDM project is a

[36] This can be seen from the attachment in the Annex.

[37] according to the information at the time of the presentation of the PINs

[38] according to the PDD on the UNFCCC CDM pipeline with RisoeUNEP.

[39] Company formed for the common utilization of the Manantali power and dam project where the power production is divided between Mali 52%, Senegal 33% and Mauritania 15%, under the "Organisation pour la Mise en Valeur la fleuve Senegal" (OMVS)

regional project all of the involved DNAs have issued Letter of Approval. The project has, apart from being a project assisting in mitigation of the climate effect, a long term GEB value in creating sustainable and peaceful cooperation on the utilization of the Senegal River between the bordering countries.

Since the Carbon Finance Unit and the World Bank was not in a position to assist in developing the three other hydropower projects as CDM projects the consultants made a follow up contact to the Directeur in the Direction National l'Energie. The proposal made in a memorandum of understanding dated 4 April 2006 was to develop the three projects to the PDD state and to act as CER brokers. Due to change of the director (Direction National l'Energie) the Memorandum remained unanswered.

Projects identified during 1st and 2nd workshop in other fields such as; Sukala Sugarmill Bagasse Cogeneration Project, SoSuMar Sugar mill Bagasse Cogeneration Project (Phase I), Sikasso Landfill Gas capture Project, Bamako Landfill Gas Capture Project, Cogeneration and process efficiency at the Huicoma (Oil Seed Company) and EdM Thermal Plant Conversion or Retrofit (Dar el Salem 2) were indicated having interest of the WB Carbon Finance Unit. The consultants were invited to identify possible community benefits by replying to the Community Benefit Questionnaire[40]. It is explained in the minutes of the 3rd workshop that not much further development of PINs was made[41]. A full list of 22 PINs -as draft ideas- were developed and can be found in Annex 2.

**Zambia:** All 7 projects presented received LoNO and were pre-approved by the CDCF. From these, three PINs were concentrated on energy savings by changing existing pumps in water and sewerage companies with new capacity and pressure regulated units. The expected savings in energy were around 30%. One condition in making such a project type a CDM project is to be able to prove without reasonable doubt that the existing pumps would be able to operate at least 10 years. Based on the visit to the sewerage treatment plant of Lusaka to evaluate PIN 2 it can be established that if equipment conditions are as at the Manchinchi waste water plant the equipment will not have a remnant lifetime of 10 years. The Zambia PIN 2 is not creadible as it has a number of serious misunderstandings. It could, however, be credible, if the waste from latrines/septic tanks and slaughter houses was used as a feed stock directly for the digesters proposed in the PIN. This would be very useful and at the same time it would prevent the sewerage plant from being over loaded (as is the case today). The hydro power project PIN 4 is intended to be constructed by ZESCO, and the Sugar factory project PIN 1 using bagasse as fuel for own cogeneration is going to be financed and implemented by the factory itself – according to the interview with the management. The bio-fuel project PIN 5 has been developed to the state of a PIN and would, in many aspects, be a perfect project for the Carbon funds since it has the potential of including the temporary storage of $CO_2$ as in a LULUCF project provided the waste land rules are respected.

As to the credibility for the outputs in Zambia in general, the CEEEZ took charge in identifying CDM project opportunities right from the start. The workshops involved presentation of different types of CDM projects. At the third workshop working groups (WG) were formed corresponding to; WG 1

[40] CBQ consists of 10 detailed questions on how the community around or affected by the project would benefit. This investigation is time consuming but is a necessity to complete if the project shall candidate for CDCF (Community Development Carbon Funds) where an additional amount to the payment for the CER will be paid to the community development sub-project.

[41] The project manager from Econergy has in a Key Person phone interview explained the difficulties working in Africa compared with an easier access for Econergy to the Latin American marked made Econenergy downgrade their interest in Mali. It was further explained the bonus of 5000 USD did not match the cost of developing a PIN since both feasibility study information collection and CBQ would by far outreach the income.

grid connected projects, WG 2 mini-hydro and grid extensions replacing isolated diesel and WG3 bio-fuels and other projects. A part from active participation the participants were also asked to rate the quality of the workshops and a very good rating was obtained for them all. Credible results were demonstrated at a first stage. This is outlined below:

*The Grid connected projects for which PINs were developed*: The Itezhi Tezhi hydro power project with a capacity of 120 MW and an annual generation of 500,000 MWh for which the PDD to be developed by ZESCO. The Kafue Sugar Cogeneration project consisting of an rehabilitation part and adding 5 MW new generation capacity[42] for which the PDD is to be developed by the Plant management. Three Multi Industry Energy Efficiency Projects for Lusaka Water-, Nkana Water- , and Kafubu Water-Company. The projects will become viable only if the regional baseline corresponding to the South African Power Pool is used for calculating the saved emissions. The reason is the avoided emission by not taking power from the national power grid is practically non existent as Zambia's own power production comes from hydropower where as the South African Power Pool is provided with 75% of the electricity from coal fired power plants.

*Mini-hydro or grid extensions replacing diesel generators*. A PIN has been developed for the Chilinga mini- hydro. For this type of projects the implementation costs compared to the power demand covered makes the projects not viable even with an emission saving coefficient of 0.8 to 1 Kg $CO_2$ /kWh. The projects are development projects and may only be possible when ODA or other grants are provided to the project.[43].

*Bio-fuels and other bio projects were considered as a third group*. A PIN was developed for the bio-methanization of the sludge generated at the Lusaka Water and Sewage Company's sewerage treatment plant at Manchinchi. This was further developed into a PDD[44]. Another bio-fuel project for which a PIN was developed was a bio-diesel project at Kabwe. The economical sustainability of this project is highly dependent on the price of diesel as the topping up from the CER revenue only changes the IRR of the project slightly. A PDD was developed with support of the Danish Green Facility[45]. A case for development although the effects of the CER generated is minim on the economy of the project.

Out of 8 PINs developed by the Consultants, the World Bank pre-approved and paid for 7 PINs and the DNA issued a Letter of Endorsement in July 2007. Since then 6 other projects have been

---

[42] Meeting with the plant management resulted in a revision of the feasibility study is needed as the factory would like to meet their needs for power of 15 MW to the irrigation water pumps from own power production, except in the month March to May when the sugar production at the factory has not yet started. Project finance may however not be easily obtainable apart from 3 years loan at15% interest.

[43] where the CER might help generating income this would only be sufficient for alleviating the operation and maintenance costs – and contrarily to the intention in the Marrakech Process the condition of "no deviation of ODA funds to Climate projects" truly development projects which at the same time are reducing the effects on the climate will not benefits from a CDM premium which could meet the operation and maintenance cost and thereby guaranty the project functioning for a longer period.

[44] Green Facility Funds made available by DANIDA has financed the PDD. It is the opinion of the evaluator the project is not to be supported as the treatment plant has already 3 digesters (presently not operated) where the sewerage sludge is supposed to be an-aerobically treated. With modifications in the project this could serve for the content of the pit latrines and for concentrated industrial waste with high BOD content. If the conditions of the electromechanical equipment at the plant can be taken as an indicator for the condition of equipment considered changed in the 3 energy efficiency CDM projects the baseline for the project may be difficult to defend as the continues operation for the next 10 year of the existing equipment.

[45] The Danish Government granted a special environmental project facility administered by the Danish Agency of Foreign Development Assistance DANIDA to help a number of African counties enabling them to present real CDM project opportunities at the COP 15 conference. As DANIDA entrusted the project selection to UNEP URC the funds were used to further develop the most promising PINs to PDDs.

endorsed and one of them The Lusaka Sustainable Energy project has been registered as CDM after development of PDD and validation by DOE.

The PINs have served for developing PDDs and the local banks have established special units for developing CDM projects and trading in CER such as LLOYDs Financials. The business community is likely to implement projects once the BASELINE question using the regional grid emission factor instead of the national grid emission factor is solved.

**Mozambique and Ghana:** IMPACT has been generated in Mozambique through the project" Cimentos do Mozambique – Matola Gas Company fuel Switch project" for which the PIN and the technology was developed during the CF-SEA program. The PDD was developed by ECON - assisting in the CF-SEA program in Zambia.

IMPACT has been generated in Ghana through the large scale oilseed crop cultivation project in the Pru district but credit for this cannot be given to the CF-SEA program. The DANIDA administrated Green Facility has continued the development of the projects for which PINs were developed during the CF-SEA. However UNEPRisoe has experienced some difficulties with the DNA functions in Ghana and in arriving at credible outputs.

**The overall average rating is MODERATELY SATISFACTORY**

## G. Preparation and Readiness

The project itself was construed to create readiness for the exploitation of the potential in CDM for each of the countries. It was to be considered as a pilot project for the cooperation of the World Bank Carbon Finance Unit and UNEP DTIE focusing on the dual aspects of community development and viable CDM project development as funds used for supporting the CF-SEA program were drawn from the Community Development Carbon Fund.

The project objectives, expected outputs and components are clearly stated in a precise manner in the various program documents and sub-documents.

The major weakness of the project design was its overly ambitious nature in wanting to achieve results within a very short timeframe. Looking into the documentation and according to the interview with the PM it appears that the programme was initially planned to have a longer duration but was speeded up in order to produce a CDM project pipeline as early as possible. Another weakness was the incoherent timeschedule by introducing stumbling blocks into the contracts of the consultants, such as not to start identifying PINs until the DNA had been established (which was not possible in Cameroon or Zambia). In Zambia, the duration of the project was estimated to be one year. However, the DNA in Zambia was established more than 1½ years into the project and the project was terminated 2 years after the start. The identification of PINs had been going on already from the second workshop.

A second weakness of project preparedness was the limited financial resources for the development of demonstration CDM projects. Project development takes time and to identify finance possibilities and conclude negotiations including due diligence and risk assessments are seriously time requiring activities. This is clearly illustrated by the projects which became successful and for which PDDs are registered. The process took five years from the beginning of the CF-SEA programme to the registration with UNFCCC.

Despite the weaknesses in the timeframe this project has been ranked as '**Satisfactory'** in terms of preparedness and readiness.

## H. Assessment monitoring and evaluation systems

### i. M&E Design

The Log Frame for CF-SEA programme was established including objectively verifiable indicators for the 3 requested outputs (or in the ROtI terminology outcomes) which are given below:

- Legislative framework and operational capacity of governmental institutions to asses and approve CDM projects, using the objectively verifiable indicators:

    1. Number of Designated National Authorities established. (Target DNA having issued approval procedures with clear timelines in all target countries
    2. Number of DNAs having approved their first CDM project (Target DNA approving projects in 2 out of 3 target countries
    3. Increased capacity of local/regional institutions to intermediate or facilitate CDM transactions, using the objectively verifiable indicators
    4. Number of projects being intermediated by local or regional institutions (Target a minimum of two intermediated projects per country)
    5. Number of local non- financial institutions trained to facilitate CDM project development on a continuing basis. (Target: Two per country)
    6. Increased capacity to developers to finance and build low carbon energy infrastructure projects, using the objectively verifiable indicators
    7. CDM project deal flow created (Target: an equivalent of nine PINs approved – for this purpose a CDF approved by the World Bank is equivalent to two PINs – per country)
    8. CDM transactions completed and tones of $CO_2$ mitigated (Target: One project validated by third party per country. Each project mitigating at least 30.000 tonnes of $CO_2$ per year).

Rating **Moderately Satisfactory**

## ii. M&E plan implementation

The Log Frame indicates project duration of 64 months which is probably a realistic period for evaluation of the indicators. It is however not certain if this was the intention when the programme was put in the hands of the PM of UNEP DTIE, UNEP URC and CDCF/World Bank Carbon Finance Unit. The workplan given to the UNEP DTIE PM lists the activities which shall be performed monitored and evaluated. It shall be noted that this work plan operates with a 24 months time table and even then appears to be condensed. It further operates with outputs such as 6 national workshops in each of the target countries.

The PM prepared a standard work plan for the project activities supplemented with remarks on their execution. The time schedule and activity plan was considerably shortened when made part of the consultants contracts. The plan operates with 4 national workshops supplemented by an activity to assist and advise the governments on the establishment of a DNA function for track 1. For track 2 activities the focus is on identification of CDM sectors and liaison with the CDCF and local intermediaries. However, no progress was monitored using this table. This is defendable since the project was scheduled to have a duration of 12 months only and the time table for the execution of the activities showed no flexibility for meeting delays due to political or operational problems. The monitoring was reduced to comments on the content of the planned workshop programmes, which were forwarded to the PM prior to their execution by the consultants, and further checking the OUTPUTS and whether the reports were presented two weeks after each workshop and whether PINs were presented for pre-approval of the CDCF releasing 5000 USD as bonus payment.

Monitoring of the progress of the entire CF-SEA programme was made by issuing Annual Progress Reports. These were to the point and the activities completed were indicated as well as those in progress. The reports further gave supplementary comments on events (such as “Zambia has

ratified the Kyoto Protocol" and "is now eligible to participate in CDM and track 2 activities" issued January 2007) and on additional activities put in action by the CF-SEA programme and not foreseen originally.

No formal midterm evaluation was performed which was probably not required due to the planned short project duration The duration of the project was extended twice last time to the end of 2008 and the remaining funds were used for establishing a CF-SEA programme website by URC and bankers forum managed by the UNEP project managers. The results of the project activities, including the regional bankers' forum in Johannesburg and Dakar are summarized in the Final Narrative Project Report (June 2009). It is noted that the quality of the conferences and the impact in form of publicity on the events were monitored and evaluated by the press and the participants as being successful.

No record is kept from Steering Committee meetings if indeed these were undertaken. From the interview with the supervisors[46] of the PM it can be concluded the communication between the two partners the World Bank and UNEP was easy and quick and the need for formal steering committee meetings was probably of less importance. However no written information exists on the monitoring of project progress and the decision on how to adapt to changes compared to the initial plans.

Rating **Moderately Satisfactory**

### iii. Budging and funding for M&E

No separate budget was set aside for monitoring and evaluating[47]. However 15.000 USD was set aside for Evaluation and 30.000 USD was spend on the Final Narrative Project Report in 2008 (report dated June 2009) from the UNEP Participation Component budget prepared by UNEP DTIE in 2005.

Rating **Moderately Satisfactory**

## I. Implementation approach

### i. Adherence to project design

The ToR for consultancy services the specifications on the time schedule and the activities were detailed and well prepared. The demands on the consultants to perform both capacity building in the detailed CDM methodologies and procedures and at the same time thoroughly develop CDM projects ideas were high.

Timing of the projects: the most obvious change in the project design was the considerable lengthening of the project duration. Only in Cameroon the team managed to hold the 4 workshops within the revised schedule of the project and at the same time present 12 PINs from which 7 were pre approved.

The quality of the projects: It is not possible to give a general statement of the quality of all PINs from the different countries supplied by different consultants as they were of various qualities. For hands-on training focusing on educational side the quality was to some extend sufficient. As to the

[46] CDCF Andrea Pinna and UNEP DTIE Erich Usher

[47] According to GEF a budget of app 7 % shall be allocated for M&E and the technical papers of the UNFCCC indicate the evaluation process of capacity building to be necessarily, costly and time consuming

practical implications for real project development the engineering side and to some extend the cost estimates were not sufficiently reliable.

### ii. Responsiveness to evaluation

The financial management by UNEPRisoe kept track of the project development and since the actual for developing CFD in Track 2 activities were below budget the project period was requested to be extended twice. The request dated 27 June 2007 for extension until 1 January 2008 was approved 8 September 2007 and the request dated 15 February 2008 for extension until 31 October 2008 was granted quickly after on the 3 March 2008. The conditions in the last was; (1) to hold a regional project workshop;(2) to convene a Carbon Finance Investment Workshop for financial Institutions in Francophone Africa in Dakar in February 2008 and; (3) properly asses the existing inventory of carbon finance projects created during the CF-SEA program. This plan was adhered to at no extra costs.

The REDD programme undertaken by the World Bank in Cameroon can also be seen as a response to the evaluation as can the CASCADe programme by UNEP.

### iii. Issues of effectiveness, efficiency and adaptability of project management

**Project management by Consultants**: The project was contracted to four different teams of consultants consisting of an international consultant specializing in CDM project development – not necessarily with profound engineering capabilities – and local consultants with different capabilities from country to country. The terms of the contracts were very strict but as local conditions were causing delays the UNEP/WB project management allowed for deviations but at the expense of the consultants. The costs were kept low, the results for track 1 were efficiently delivered and the time schedule was adapted to local conditions.

**UNEP and World Bank Project Management:** The dual tracks capacity building as track 1 and PIN development as track 2 created a situation where the consultants had two masters; the UNEP and the CDCF of the World Bank. However, this also had advantages. Both elements had the following effects:

(a) Workshops: were under the management of the UNEP staff but World Bank resident representative in Cameroon supporting the CF-SEA programme opened the first workshop and thereby raised the interest in the CDM as a financing mechanism. This was not the case in other countries.

(b) Introduction letters of the CF-SEA: The program was introduced on the ministry level by letters co-signed by the heads of departments of the World Bank and the UNEP indicating co-operation but giving no clear line of command as to who were responsible for the operation in the country.

(c) PINs: The PINs being developed in contact with the UNEP management had to pass a pre-approval by the World Bank Carbon Finance Unit which had the realism of the projects and the development costs at hart. This resulted in a situation where hydro projects were turned down as well as sustainable energy development projects with too small of an annual amount of CER.[48]

(d) African Bankers Carbon Finance Investment Forum in Johannesburg May 2007: The main outcome of this was to create an awareness of the CDM possibilities in Africa the conference/seminar was co-organized with the Development Bank of South Africa and were covered by the South African Broadcast Company.

[48] The UNEP project staff reported on the 30,000 tonnes $CO_2$ equivalent being increased during the project to 50,000 tonnes and further to 70,000 tonnes a project a year.

(e) Forum Africane de Carbone 3-5 September 2008 Dakar: The event which was possible to arrange due to the extension of the CF-SEA program was a high profile conference/seminar opened by Yvo de Boer General Secretary of the UNFCCC followed by Konrad von Ritter of the World Bank, Henry Derwent of IETA and finally Yannick Glenmaree of UNDP GEF.

### iv. M&E during the project implementation

Monitoring of the progress was made using standard format including background information, Project Status Reports, list of attached documents, assessment of Project effectiveness or impact, and communication of results.

Annual progress reports were supposed to be issued for the first half year and then for the full year. Three reports (Aug. 2005-Jan 2006; June 2006-Jan 2007; Jan 2007-Jan 2008) were available to the evaluator and are found to be both precise and informative.

A final report was made by UNEP DTIE which documented the PINs defined and included substantial information on the regional bankers workshops.

The rating '**moderately satisfactory'** is given to the CF-SEA program implementation.

## J. Financial Planning

This terminal evaluation has not been able to make a detailed assessment of the quality and effectiveness of financial planning and control over the project's lifetime. However, a partial control was made possible due to information obtained from UNEP Nairobi, UNEP DTIE and UNEP URC (Risoe).

The initial budget approved in November 2004 for the CF-SEA programme divides the budget in part to be administered by UNEP DTIE and in part by UNEP URC. The budget is based on assumption of a two year project execution period and thus can only serve as an initial reference. The initial budget also confirms that 15.000 USD for the final evaluation was included from the start of the project (but no separate budget for monitoring was allocated).

The evaluator has reviewed the initial budget of UNEP DTIE, the accounts for the expenditures during the execution of the CF-SEA programme as well as semi annual progress reports. According to the documents and interview with one of the UNEP Project Managers[49] the evaluator has the impression that the project was financially well managed.

The administration of the accounts for the service contracts and the project PM was delegated to UNEP URC within a budget of 798.000 USD and the evaluator was given a copy of the final accounts.

Total budget (US $)

| | | |
|---|---|---|
| Total Grant Funds | $1,000,000 | 83% |
| *Of which:* | | |
| *UNF Core Funds* | *$452,381* | *38%* |
| *UNF 5% Programme Support Cost* | *$47,619* | *4%* |
| *World Bank* | *$500,000* | 42% |
| In-Kind Contributions | $200,000 | 17% |
| *Of which:* | | |
| *UNEP* | $100,000 | 8% |
| *World Bank* | $100,000 | 8% |
| **Total Cost of Project** | **$1,200,000** | **100%** |

[49] Jan Kappen

From interview with the UNEP PM it is the impression that the contracts with the four consulting groups were negotiated to the limit of barely covering the costs with the only incentive of creating future business with the World Bank as leverage.[50] It is consequently expected that no cost overruns have been accepted and the proof is 118,671 USD remaining on the project at the end of 2007. The final accounts show a cumulative expenditure of 766.473 for the period 2004-2008 including the bankers forum in 2008. The expenditures for track 1 activities amount to 303.117 USD and the expenditures for track 2 activities amount to 305.038 USD[51].

The PM cost of UNEP DTIE and CDCF amounting to 185.816 USD as well as the Programme Support Costs of 5% amounting to 47.614 USD shall be added to these costs. The total is in balance with the budgeted amount of 1 million USD. This evaluation has not explored the details of financial control beyond above but is of the opinion that the budget was well spent.

The rating applied is **Satisfactory.**

## K. UNEP Supervision and Backstopping

Whereas no formal Steering Committee meetings have been held for supervising the performance of the project managers the informal supervision and backstopping has no doubt functioned well. It is noted that when planning the workshops the consultants transmitted the intended program to the PM who then, in the normal e-mail correspondence, would comment on it. The formal organization of PM supervising the activities on a country bases as communicated by one of the UNEP PM[52] at the start of the project was not adhered strictly to as it appears that the PM team assisted each other indicating there was a good communication between the different country PM and co-responsibility was established.

The interviews had with the supervisors of the CF-SEA programme exemplified the direct involvement of Erich Usher and Andrea Pinna in backstopping. This could be also regarded as an evidence of an organization where the direct contacts between PM and supervisors make steering board meetings superficial. The internal work in the World Bank for promoting climate effect mitigation projects to become realized – demonstrated by the Félou project – certifies that coordination took place within the the World Bank it self.

The need for double backstopping and careful examination of the quality of the PINs as to ensure sufficiency of pre-feasibility information including practical engineering aspects of the projects have, however, not been fully observed in the CF-SEA program.

The missing backstopping and supervision on the technical qualities of PINs as they were developed requesting follow up by the PM for in depth investigations, CFD development, letters of exclusivity or directly replacements of PINs make the evaluator use the **moderately satisfactory** rating.

## L. Complementarity with UNEP Medium Term Strategy and Programme of Work

### i. Linkage to UNEP's Expected Accomplishments

The UNEP *Mid Term Strategy (2010 – 2013)* consists of six themes (UNEP, 2008). The relevance of CF-SEA is briefly discussed against each of these below:

- **Climate change**: climate change is at the core of the CF-SEA program. The purpose of the track one capacity building has been to start the process of CDM projects by building DNA

[50] Telephone interview with Jan Kappen

[51] For break down see under point Aiii

[52] Glenn Hodes

institutions and by creating an interest based on knowledge for implementing projects on sustainable development energy solutions. The purpose of track 2 was first and foremost of opening the eyes of public authorities and private project developers in seeing the potential for CDM projects in order to assist in the mitigation of the climate change.

- **Disasters and conflicts**: The Climate change may be the direct cause for disasters and conflicts. It may be assumed that one of the reasons why World Bank choose to support the Félou project through Carbon Funds and IDA credits was not only that it will provide sustainable energy but that the project will simultaneously promote peaceful cooperation among the countries bordering the Senegal River.
- **Ecosystem management**: Many of the potential CDM projects such as the use of BM waste, reforestation and afforestation, and control of water flows in rivers are designed to help managing the ecosystems.
- **Environmental governance**: The creation of/support to adaptive energy solutions for sustainable development is the most important function of the DNAs and is at the heart of CDM. Each CDM PDD must be examined for its environmental effects EIA and EMP are to be developed as well as stakeholder consultations made.
- **Harmful substances and hazardous waste**: Some types of CDM projects, such as projects concentrated on reducing methane seepages from landfills, have the secondary GEB of improving the control of the landfills. This is done e.g. by using a specific membrane cover and draining system for collecting the percolate. Increased control of the landfills will also limit the risks of hazardous waste being dumped as in the case of the Yaoundé Nkolfoulou landfill where each truckload is being weighted and inspected.
- **Resource efficiency**: sustainable consumption and production is again at the hart of the CDM.

## ii. Project contributions and coherence to the Bali Strategic Plan

CF-SEA has a number of relevant outcomes to the objectives of the *Bali Strategic Plan for Technology Support and Capacity-building* (UNEP, 2004). This includes:

- To use and sustain the capacity or technology obtained through training or other capacity-building efforts after such efforts have been completed (Objective a(v));
- To develop national research, monitoring and assessment capacity to support national institutions in data collection, analysis and monitoring of environmental trends and in establishing infrastructure for scientific development and environmental management, in order to ensure sustainability of capacity-building efforts (Objective a(vi));
- To enable collaboration with all relevant stakeholders and provide a basis for a comprehensive approach to developing partnerships, including public-private partnerships (Objective f);
- To enhance delivery by UNEP of technology support and capacity-building, within its mandate, to developing countries as well as to countries with economies in transition based on best practices from both within and outside UNEP, including by mainstreaming technology support and capacity-building throughout UNEP activities (Objective i); and
- To promote, facilitate and finance, as appropriate, access to and support of environmentally sound technologies and corresponding know-how, especially for developing countries as well as countries with economies in transition (Objective j).

### iii. South-South Cooperation

In 1978, the United Nations established the Unit for South-South Cooperation to promote South-South trade and collaboration within its agencies. South-South Cooperation is a term historically used by policymakers and academics to describe the exchange of resources, technology, and knowledge between developing countries, also known as countries of the global South.

The cooperation within Africa and in G77 for setting common goals and obtaining common rights in the COP negotiations shall be seen as a very important South- South cooperation. This has been shown during the discussions on NAMAs at the COP 15 in Copenhagen where the loan facility for up-front expenses to develop CDM projects PIN, Baseline studies, PDD and Validation by DOE as well as assistance to ERPA negotiations is an important progress now formalized in the Copenhagen Accord. Outstanding is now to agree upon the conditions of a Copenhagen Green Fund which makes it possible to finance the long term sustainable energy solutions and to have a FFM[53] to supervise the Engineering Qualities of projects supported by the Green Fund.

# 6 Conclusions

The conclusion of the Terminal Evaluation is shown in table 5 with a short statement summarizing the comments given above. The general impression is that the CF-SEA programme was SATISFACTORY.

It was a bold action to combine the efforts of two organizations the UNEP and the World Bank Carbon Fund Unit in pursuing the objective "to scale-up the investment in the sustainable energy sector and begin addressing climate change through market approaches that internalize the environmental attributes of clean energy."

The time frame compared to the initial for the project was shortened to 12 months in order to generate swift results and a delegation of responsibility to international consultants was used maintaining the approved budget of 1 million USD (November 2004). The combination of capacity building and hands on training in developing real CDM projects did permit a short time line from building of institutions to CDM projects defined as PINs receiving a Letter of no Objection from a functional DNA. Where the political process took time, as in Zambia where the Government first had to ratify the Kyoto Protocol before a DNA could be registered, the CF-SEA programme track 1 and track 2 activities were not completed until 20 months after the start of the programme.

Project development is time consuming and the CDM part of project documentation from the early pre-feasibility studies to the completion of detailed design and tendering process is only a small part. This means that only for projects where the technical preparations were well under way was it possible to bring the PIN to a state of CFD, where the financing of the project and the additional advantages from the sales of CER determines the viability of the project. The interviewed PM has reported that no CFD was prepared. It is inevitable however that such a document has been under preparation with the assistance of the CDCF for the landfill projects in Cameroon where the project developer HYSACAM had the engineering assistance of the Technical University of Yaoundé. The two landfill projects were successfully developed as CDM projects with the PDD under registration using private sector and commercial banks to finance the project implementation.

The selected international consultants and their local collaborators made considerable effort in identifying CDM projects and establishing PINs which were then presented to the World Bank

[53] FFM – Flexible Financing Mechanism supervised by engineers and project economists establishing a database for high quality sustainable energy solutions and reviewing application for financial support from the COPENHAGEN GREEN FUND. Support from the fund should at the same time be construed as not requiring the additionality analyses and no deviation of development assistance proof needed. However baseline study would have to be made in order to calculate the GHG savings.

CDCF for pre-approval or rejection. The project barriers were several and the alleviation of these through the revenue from sales of CER not always realistic. The PM was not equipped to provide engineering solutions to these or other PINs with CDM project potential during monitoring of the progress. The effort of the PM to arrange three bankers' forums in order to create positive attitude to the financing of CDM projects deserves to be praised.

The integration of the Félou hydro power project into the development of the West African Power Pool by providing 40 years of IDA credits for 160 million USD and co-financing of app. 40 million USD from the EIB is a successful result of the CF-SEA programme in Mali. As the terminal evaluation has been postponed until today it has been possible to assess the significance of CF-SEA programme for the registration of the project in Mali as well as for two projects in Cameroon and one project in Mozambique. Whereas co-financing of the programme as such has not taken place the amount spent on the CF-SEA programme has activated more than 220 million USD for financing of these 4 projects.

The CF-SEA programme was successful in assisting the establishment of DNAs and establishing legislative framework and operational capacity for governmental institutions based on which to asses and approve CDM projects. Local intermediaries have been trained and 4 CDM projects have been registered in three of the selected countries.

**Table 5: Overall Evaluator Ratings Table for the CF-SEA program**

| *Criterion* | *Sub-criteria* | *Evaluator's Summary Comments* | *Rating* | |
|---|---|---|---|---|
| **A. Attainment of project objectives and results (via ROtI)** | A.1. Effectiveness - overall likelihood of impact achievement | Outcomes for the five countries were in accordance to the intended and IMPACTS have been achieved | S | **S** |
| | A.2. Relevance | Relevant and consistent with the goals of UNFCCC | HS | |
| | A.3. Efficiency | Much was achieved within a well kept moderate budget. | HS | |
| **B. Sustainability of project outcomes** | B.1. Financial | Whilst considered as a barrier, financial requirements are likely to be met by the sources: Commercial Banks, Development Banks and Copenhagen Green Fund | L | **L** |
| | B.2. Socio-political | No major issues presently, although there is a risk to sustainability from political instability in particular | L | |
| | B.3. Institutional framework & governance | The projects have succeeded in assisting in establishing a DNA and establishing functional institutional strategies. The DNA has shown capabilities to manage CDM and in Mali and Cameroon active in promoting CDM. | L | |
| | B.4. Environmental | The project has illustrated to the DNA the sustainable development criteria to be fulfilled for CDM projects when PIN and PDD documents are prepared. | L | |
| **C. Catalytic Role** | | The CF-SEA has had a recognized catalytic role by the hands-on training in CDM project development | | **S** |
| **D. Stakeholders involvement** | | Workshops were open for all stakeholders having an interest in CDM. Information of the project was published on the web. The UNEPRisoe maintained a web page containing CF-SEA documentation and workshop documents on CDM. | | **S** |
| **E. Country ownership / driven-ness** | | DNA has taken country 'ownership' in Cameroon and Mali and to some extent in Zambia. Conditions in Mozambique and Ghana are not known. | | **S** |
| **F. Achievement of outputs and activities** | | The output in the form of PINs is below the expected number. Some of them are of good quality and have been pre-approved by the CDCF and some were not realistic. Workshops were in general up to standard delivering the expected outcomes and the bankers' forums in Dakar and Johannesburg were even high profiled. | | **S** |
| **G. Preparation and readiness** | | The project objectives, expected outputs and project components were clearly stated in ToR and supporting documents. The concept was well constructed. | | **S** |

| *Criterion* | *Sub-criteria* | *Evaluator's Summary Comments* | *Rating* | |
|---|---|---|---|---|
| **H. Assessment of monitoring and evaluation system** | E.1. M&E Design | The M&E plan was detailed but with unrealistic targets for the indicators | MS | **MS** |
| | E.2. M&E Plan implementation (use for adaptive management) | Intermediary monitoring and coordination in formalized steering committee meetings would possibly have improved the results. | MS | |
| | E.3. Budgeting & funding for M&E activities | UNEP DTIE, only US$15000 was allocated andUS$ 30.000 was spent and none on interim progress reporting. URC budget on US$ 20.000 was not spent. | MS | |
| **I. Implementation approach** | | Having two masters both for the consultants and the CDM project proponents and no visible line of command have not been optimal in the implementation | | **MS** |
| **J. Financial planning** | | A well performed tendering process getting favorable quotations and a strict management to avoid cost over runs. | | **MS** |
| **K. UNEP Supervision and backstopping** | | CF-SEA could have benefitted from backstopping and supervision on the technical aspects of the projects. | | **MS** |

**Keys:**

| Rating | Project objectives and results | Project M&E |
|---|---|---|
| **Highly Satisfactory (HS):** | *No shortcomings* in the achievement of its objectives, in terms of relevance, effectiveness or efficiency. | No shortcomings in the project M&E system. |
| **Satisfactory (S):** | *Minor shortcomings* in the achievement of its objectives, in terms of relevance, effectiveness or efficiency. | Minor shortcomings in the project M&E system. |
| **Moderately Satisfactory (MS):** | *Moderate shortcomings* in the achievement of its objectives, in terms of relevance, effectiveness or efficiency. | Moderate shortcomings in the project M&E system. |
| **Moderately Unsatisfactory (MU):** | *Significant shortcomings* in the achievement of its objectives, in terms of relevance, effectiveness or efficiency. | Significant shortcomings in the project M&E system. |
| **Unsatisfactory (U):** | *Major shortcomi*ngs in the achievement of its objectives, in terms of relevance, effectiveness or efficiency. | Major shortcomings in the project M&E system. |
| **Highly Unsatisfactory (HU):** | *Severe shortcomings* in the achievement of its objectives, in terms of relevance, effectiveness or efficiency. | The Project had no M&E system. |

| Rating | Sustainability |
|---|---|
| Likely (L): | No risks affecting this dimension of sustainability. |
| Moderately Likely (ML). | Moderate risks that affect this dimension of sustainability. |
| Moderately Unlikely (MU): | Significant risks that affect this dimension of sustainability |
| Unlikely (U): | Severe risks that affect this dimension of sustainability. |

# 7 Lessons learned

1. Clean Development Mechanism (CDM) projects in general cannot be financed by the proceeds from the Certified Emission Reductions (CER). Projects like reduction of $CH_4$ emissions from landfills and energy efficiency for industries (conservation, retrofit or use of BM waste as fuel) might, however, generate sufficient amounts of CER for the full repayment of commercial bank loans. Other CDM projects for sustainable development need to be included in longer term strategies either at national/regional level or at company level.

2. The combination of capacity building and hands on training on the development of PINs increased the experience in Clean Development Mechanism projects but it also raised expectations of availability of additional financing means beyond the proceeds from the Carbon Fund which was not part of the CF-SEA programme to provide. There was a lot of learning by doing in the teams and some frustrations in the process, but overall the combined approach did seem to strengthen the overall delivery of the results intended by the CF-SEA programme. It is challenging to build capacity when recipients are unsure whether financing for the projects will be realized. Future such projects should be designed in phases to ensure that the capacity built can be effectively used in the next phase of the project.

3. Financing such as commercial project financing, IDA credits or other soft loan financing is required if real progress is to be made for Clean Development Mechanism in Africa. It is not an easy and swift process to secure financing closure for a project. This may be illustrated in the CF-SEA programme from the process of identifying a potential CDM project and issuing a PIN 17 January 2006 for the Félou hydro power project. Although the initial credits lined up from IDA and EIB came in June 2006 the international tendering procedures and the requirement for additional finance to be provided to meet the increased costs [54] have resulted in Certified Emission Reductions being produced only in 2012.

4. Project financing is needed for the development of truly sustainable energy projects and as the investment costs of renewable energy solutions are known to supersede the investment costs of more conventional solutions it should be possible to make use of grants for covering the extra costs. THE COPENHAGEN GREEN FUND - to be established when the COP negotiations are terminated - for mitigating the Climate Effects (track 2) provides such a possibility. However COP 6 (Marrakech accord) will have to be revised to permit Clean Development Mechanism and ODA to be compatible for Least Developed Countries in an operational manner.

5. A well functioning Designated National Authority Committee with transparent criteria for evaluating environmental, social and economical sustainability and with an active permanent secretariat function is at the core of implementing Clean Development Mechanism projects with long lasting Global Eenvironmental Benefit values. It was learned during the performance of the CF-SEA programme how proper advising helped the various ministries in cooperating on potential CDM projects by establishing DNA committee of representatives with feed back into the respective ministries and thereby making it possible to have CDM project development integrated in the plans of development.

6. Public awareness of clean development is vital for the long term development of sustainable energy. This can be illustrated by the example from Cameroon where school children celebrating the 50th anniversary of the Republic are demonstrating the

[54] requested 30 June 2009 from IDA.

importance of solar and biomass RE in a defile in front of the Minister of Education (see front page photo). The Permanent Secretary of the Designated National Authority which was established as a result of the CF-SEA has through the vast network influenced on the sustainable energy agenda in Cameroon as it apears.

It can be concluded that under the CF-SEA programme, the technical inputs provided for CDM projects were under-dimensioned compared to the capacity building element. When developing the CDM projects into PDDs technical feasibility studies are required and project design activities have to be carried out alongside as part of the complete project package. The CDM project development cannot stand alone.

**Annexes**

**1. Terms of Reference**

**2. Introduction to the Theory of Change / Impact Pathways, the Roti Method and the ROti Roti results schoresheet**

**3. List of interviewees**

**4. List of documents consulted**

**5. Summaries of PINs for Mozambique and Ghana**

**6. République du Cameroun Ministère de l'Environnement et de la protection de la Nature CN-MDP – Comité national MDP: Situation de la mise en œuvre au Cameroun du Mécanisme de développement propre du Protocole de Kyoto**

**7. Short CV of the evaluator**

## ANNEX 1. TERMS OF REFERENCE

### Terminal Evaluation of the UNEP project: "Using Carbon Finance to Promote Sustainable Energy Services in Africa (CF-SEA)" MT-4040-04-23

## 1. PROJECT BACKGROUND AND OVERVIEW

### Project rationale

Market research undertaken in 2003 revealed a steady increase in carbon market transactions, with volumes rising from 12 million tons of C02-equivalent (tC02-e) traded in 2001, to contracts for over 75 million tons of tC02-e in 2003, and indications that more than 64 million tC02-e have been transacted between January and May 2004. Of these, however, a majority of reductions have come from larger Clean Development Mechanism (CDM) projects in Latin America and Asia. Smaller projects and poorer countries within Africa appeared to have been bypassed as they lacked supportive national CDM approval systems and have significantly higher business costs and risks.

There has been and still is a pressing need in most African countries for improved access to modern energy services, services that usually require significant investment in new infrastructure. In areas where new energy systems emit less or no green house gas emissions, as per the status quo, there is now the possibility to secure carbon finance through the Clean Development Mechanism as part of the overall financing package. However, preparing and hosting CDM projects in a country is a complicated process that requires significant outside expertise and training in order to achieve project closure.

Building-off of several on-going World Bank and UNEP programmes in the carbon finance and enterprise development areas, a comprehensive project was proposed to help initiate/facilitate the first carbon market transactions in a selected number of African countries under the rules and procedures of the Kyoto Protocol's Clean Development Mechanism. The project's overall goal was stated as: *"To scale-up investment in the sustainable energy sector and begin addressing climate change through market approaches that internalise the environmental attributes of clean energy".*

In each country the programme's implementation strategy planned to:

1. Strengthen the capacity of local carbon experts, co-financiers and governmental authorities to engage in carbon project activity and
2. Put "theory into practice" by working with a number of project developers on specific promising carbon transactions.

The planned specific outcomes were:

- Legislative framework and operational capacity of governmental institutions to assess and approve CDM projects;
- Increased capacity of local/regional institutions to intermediate or facilitate CDM transactions;
- Increased capacity of developers to finance and build low carbon energy and infrastructure projects
-

### Executing Arrangements

UNEP Division of Technology, Industry and Economics (DTIE) will act as the Implementing UN Agency for the project, but will implement a joint approval process with the World Bank Carbon

Finance Business for programme planning, budget allocations and local partner consultant selection. In practical terms the project will therefore be overseen jointly by UNEP and the World Bank.
Project management will be carried out by two UNEP/WB teams, whereby the *Track* 1 - *Capacity Development* activities will be managed jointly by the UNEP Risoe Centre and the World Bank CF-Assist. The Track 2 - *Project Development* activities will be managed jointly by UNEP DTIE and the World Bank CDCFPlus.

**Legislative mandate**

- WSSD Plan of Implementation 8a (Improve access to environmentally sound energy services through innovative financing mechanisms.)
- UNEP GC 2213 (adaptation to climate change)
- UNEP GC 2217 (engaging business and industry)
- UNEP GC 16141 (assisting developing countries in identifying climate friendly technologies and technology needs)
- NEPAD Environment Initiative Framework Action Plan (promotion of the CDM)
- UNEP GC 20129 (policy and advisory services in the key area of economics, trade, and financial services)
- Agenda 2 1, Chapter 38 (creating capacity for sustainable development)

## Project Activities

The project duration was planned for 24 months starting on the 1st of November 2004 and ending on the 31st of October 2006. The project was granted "no-cost" grant extensions that lengthened the project first until the May 2007, followed by extensions to December 2007, and finally to October 2008. The extra time enabled UNEP to hold a project closure workshop in coordination with the "Carbon Finance Investment Workshop for Financial Institutions in Francophone Africa" in Dakar in February 2008 and develop the project website. The workshop provided an excellent opportunity to potentially match investors with CF-SEA project developers and share the lessons learned from CF-SEA with a wider audience; whereas the website includes key CF-SEA deliverables and reference material for project developers, DNAs, and the financial sector.

The project activities were organized into two tracks each of which with the planned following activities:

Track 1 – Capacity Development:
- Establishing DNAs and/or Developing Skills of DNA staff in Project Approval Procedures
- Identifying and building capacity of project developers and financial intermediaries
- Enabling Key Players to Integrate Carbon Finance in their Operations

Track 2 – Project Development:
- Selecting experienced national consultants per country able to successfully bring Project Idea Notes (PINs) and Carbon Finance Documents (CFDs) forward
- For each selected country, the consultants will have worked with project sponsors and other local project developers to assess the potential for projects
- developing and submitting successful PINS and CFDs from the selected countries

## Budget

The budget for the project was US$1,200,000[55]:
50% of which will be used to cover capacity development activities and
50% of which will be used to cover project development activities.

[55] The budget was 1 million USD plus 2 times 100.000 USD to be provided in kind by UNEP and by the World Bank CDCF.

## TERMS OF REFERENCE FOR THE EVALUATION

### 1. Objective and Scope of the Evaluation

The objective of this terminal evaluation is to examine the extent and magnitude of any project impacts to date and determine the likelihood of future impacts. The evaluation will also assess project performance and the implementation of planned project activities and planned outputs against actual results. The evaluation will focus on the following main questions:

a. To what extent has the project succeeded in strengthening the capacity of local carbon experts, co-financiers and governmental authorities to engage in carbon project activity?
b. Were CDM projects (Project Idea Notes and Carbon Finance Documents) developed and submitted for financial support as an outcome of this project?

### 2. Methods

This terminal evaluation will be conducted as an in-depth evaluation using a participatory approach whereby the UNEP Evaluation Office, UNEP DTIE Project Manager, key representatives of the executing agencies and other relevant staff are kept informed and regularly consulted throughout the evaluation. The consultant will liaise with the UNEP Evaluation Office and the UNEP/DTIE Project Manager on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered. The draft report will be circulated to UNEP/DTIE Project Manager, key representatives of the executing agencies and the UNEP Evaluation Office. Any comments or responses to the draft report will be sent to UNEP Evaluation Office for collation and the consultant will be advised of any necessary revisions.

The findings of the evaluation will be based on the following:

***a) Desk review of project documents, output, half-yearly progress reports, monthly financial reports, terminal report, minutes of meetings and relevant correspondence.***
***b) Review of specific products including publications, management and action plans, database and materials published on the project's web-site: http://fanibrowaru.pl/r4t090908/cfsea/index.***
***c) Telephone interviews with UNEP/DTIE project manager, UNEP/DTIE and UNEP Risø Project Coordinators, project Fund Management Officer, and other relevant staff in UNEP dealing with CDM.***
***d) Telephone interviews with relevant project partners in Cameroon, Ghana, Mali, Mozambique, and Zambia.***
***e) Telephone and personal interviews with relevant stakeholders involved including Designated National Authorities (DNAs) and project developers.***
***f) Field visits to Cameroon, Mali and Zambia and direct interviews with the project main beneficiaries.***

### Key Evaluation principles

In attempting to evaluate any outcomes and impacts that the project may have achieved, evaluators should remember that the project's performance should be assessed by considering the difference between the answers to two simple questions ***"what happened?"*** and ***"what would have happened anyway?"***. These questions imply that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. In addition it implies that there should be plausible evidence to **attribute** such outcomes and impacts **to the actions of the project**.

Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluator, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgements about project performance.

## 3. Project Evaluation Parameters and Ratings

The success of project implementation will be rated on a scale from 'highly unsatisfactory' to 'highly satisfactory'. In particular the evaluation shall **assess and rate** the project with respect to the eleven categories defined below[56].

It should be noted that many of the evaluation parameters are interrelated. For example, the 'achievement of objectives and planned results' is closely linked to the issue of 'sustainability'. Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts and is, in turn, linked to the issues of 'catalytic effects / replication' and, often, 'country ownership' and 'stakeholder participation'.

**A. Attainment of objectives and planned results:**

The evaluation should assess the extent to which the project's major relevant objectives were effectively and efficiently achieved or are expected to be achieved and their relevance.

- *Effectiveness:* Evaluate the **overall likelihood of impact achievement**, taking into account the "achievement indicators", the achievement of outcomes and the progress made towards impacts. UNEP's Evaluation Office advocates the use of the **Review of Outcomes to Impacts (ROtI)** method (described in Annex 7) to establish this rating.
    1. Evaluate the immediate impact of the project on national capacity necessary to develop legislative framework and operational capacity of governmental institutions to assess and approve CDM projects; increase capacity of local/regional institutions to intermediate or facilitate CDM transactions; and increase capacity of developers to finance and build low carbon energy and infrastructure projects.
    2. As far as possible, also assess the potential longer-term impacts considering that the evaluation is taking place upon completion of the project and that longer term impact is expected to be seen in a few years time. Frame recommendations to enhance future project impact in this context. Which will be the major 'channels' for longer term impact from this project at the national and international scales?
- *Relevance*: In retrospect, were the project's outcomes consistent with the focal areas/operational program strategies? Ascertain the nature and significance of the contribution of the project outcomes to the climate change subprogramme and the wider portfolio of UNEP CBD and the UNFCCC.
- *Efficiency*: Was the project cost effective? Was the project the least cost option? Was the project implementation delayed and if it was, then did that affect cost-effectiveness? Assess the contribution of cash and in-kind co-financing, and any additional resources leveraged by the project, to the project's achievements. Did the project build on earlier initiatives; did it make effective use of available scientific and / or technical information? Wherever possible, the evaluator should also compare the cost-time vs. outcomes relationship of the project with that of other similar projects.

**B. Sustainability:**

[56] However, the views and comments expressed by the evaluator need not be restricted to these items.

Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, e.g. stronger institutional capacities or better informed decision-making. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes. The evaluation should ascertain to what extent follow-up work has been initiated and how project outcomes will be sustained and enhanced over time. **Application of the ROtI method** described in Annex 7 will also assist in the evaluation of sustainability.

Four aspects of sustainability should be addressed: financial, socio-political, institutional frameworks and governance, environmental (if applicable). The following questions provide guidance on the assessment of these aspects:

- *Financial resources.* Are there any financial risks that may jeopardize sustenance of project outcomes and onward progress towards impact? What is the likelihood that financial and economic resources will not be available once the UNEP assistance ends (resources can be from multiple sources, such as the public and private sectors, income generating activities, and trends that may indicate that it is likely that in future there will be adequate financial resources for sustaining project's outcomes)? To what extent are the outcomes and eventual impact of the project dependent on continued financial support?
- *Socio-political:* Are there any social or political risks that may jeopardize sustenance of project outcomes and onward progress towards impacts? What is the risk that the level of stakeholder ownership will be insufficient to allow for the project outcomes to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project?
- *Institutional framework and governance.* To what extent is the sustenance of the outcomes and onward progress towards impacts dependent on issues relating to institutional frameworks and governance? What is the likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for, the project outcomes/benefits to be sustained? While responding to these questions consider if the required systems for accountability and transparency and the required technical know-how are in place.
- *Environmental.* Are there any environmental risks that can undermine the future flow of project environmental benefits? The TE should assess whether certain activities in the project area will pose a threat to the sustainability of the project outcomes. For example; construction of dam in a protected area could inundate a sizable area and thereby neutralize the biodiversity-related gains made by the project; or, a newly established pulp mill might jeopardise the viability of nearby protected forest areas by increasing logging pressures; or a vector control intervention may be made less effective by changes in climate and consequent alterations to the incidence and distribution of malarial mosquitoes. Would these risks apply in other contexts where the project may be replicated?

## C. Catalytic Role and Replication

The catalytic role is embodied in approach of supporting the creation an enabling environment, investing in activities which are innovative and show how new approaches and market changes can work, and supporting activities that upscale

new approaches to a national (or regional) level to sustainably achieve global environmental benefits.

In general this catalytic approach can be separated into three broad categories of activities: (1) "**foundational**" and enabling activities, focusing on policy, regulatory frameworks, and national priority setting and relevant capacity (2) **demonstration** activities, which focus on demonstration, capacity development, innovation, and market barrier removal; and (3) **investment** activities, full-size projects with high rates of cofunding, catalyzing investments or implementing a new strategic approach at the national level.

The three categories approach combines all the elements that have been shown to catalyze results in international cooperation. Evaluations in the bilateral and multilateral aid community have shown time and again that activities at the micro level of skills transfer—piloting new technologies and demonstrating new approaches—will fail if these activities are not supported at the institutional or market level as well. Evaluations have also consistently shown that institutional capacity development or market interventions on a larger scale will fail if governmental laws, regulatory frameworks, and policies are not in place to support and sustain these improvements. And they show that demonstration, innovation and market barrier removal do not work if there is no follow up through investment or scaling up of financial means.

In this context the evaluation should assess the catalytic role played by this project by consideration of the following questions:

- INCENTIVES: To what extent have the project activities provided incentives (socio-economic / market based) to contribute to catalyzing changes in stakeholder behaviours?
- INSTITUTIONAL CHANGE: To what extent have the project activities contributed to changing institutional behaviors?
- POLICY CHANGE: To what extent have project activities contributed to policy changes (and implementation of policy)?
- CATALYTIC FINANCING: To what extent did the project contribute to sustained follow-on financing from Government and / or other donors? (this is different from co-financing)
- PROJECT CHAMPIONS: To what extent have changes (listed above) been catalyzed by particular individuals or institutions (without which the project would not have achieved results)?

(Note: the ROtI analysis should contribute useful information to address these questions)

Replication approach is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects. Replication can have two aspects, replication proper (lessons and experiences are replicated in different geographic area) or scaling up (lessons and experiences are replicated within the same geographic area but funded by other sources).

Is the project suitable for replication? If so, has the project approach been replicated? If no effects are identified, the evaluation will describe the strategy / approach adopted by the projected to promote replication effects.

## D. Stakeholder participation / public awareness:

This consists of three related and often overlapping processes: information dissemination, consultation, and "stakeholder" participation. Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the project. The term also applies to those potentially adversely affected by a project. The evaluation will specifically:

- Assess the mechanisms put in place by the project for identification and engagement of stakeholders in each participating country and establish, in consultation with the stakeholders, whether this mechanism was successful, and identify its strengths and weaknesses.
- Assess the degree and effectiveness of collaboration/interactions between the various project partners and institutions during the course of implementation of the project.
- Assess the degree and effectiveness of any various public awareness activities that were undertaken during the course of implementation of the project.

**E. Country ownership / driven-ness:**

This is the relevance of the project to national development and environmental agendas, recipient country commitment, and regional and international agreements. The evaluation will:

- Assess the level of country ownership. Specifically, the evaluator should assess whether the project was effective in catalyzing action taken by the authorities in the country that received assistance from the project.
- Assess the level of country commitment to achieving a substantial reduction of greenhouse gasses emissions

**F. Achievement of outputs and activities:**

- Delivered outputs: Assessment of the project's success in producing each of the programmed outputs, both in quantity and quality as well as usefulness and timeliness.
- Assess the soundness and effectiveness of the methodologies used for developing the technical documents and related management options in the participating countries
- Assess to what extent the project outputs produced have the weight of scientific authority / credibility, necessary to influence policy and decision-makers, particularly at the national level.

**G. Preparation and Readiness**

Were the project's objectives and components clear, practicable and feasible within its timeframe? Were the capacities of executing institution and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in the project design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place?

**H. Assessment monitoring and evaluation systems**

The evaluation shall include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The Terminal Evaluation will assess whether the project met the minimum requirements for 'project design of M&E' and 'the application of the Project M&E plan' (see minimum requirements 1&2 in Annex 4). The projects must budget adequately for execution of the M&E plan, and provide adequate resources during implementation of the M&E plan. Project managers are also expected to use the information generated by the M&E system during project implementation to adapt and improve the project.

**I. Implementation approach:**

This includes an analysis of the project's management framework, adaptation to changing conditions (adaptive management), partnerships in implementation arrangements, changes in project design, and overall project management. The evaluation will:

- Ascertain to what extent the project implementation mechanisms outlined in the project document have been closely followed. In particular, assess the role of the various committees established and whether the project document was clear and realistic to enable effective and efficient implementation, whether the project was executed according to the plan and how well the management was able to adapt to changes during the life of the project to enable the implementation of the project.
- Assess the extent to which the project responded the mid term review / evaluation (if any).
- Evaluate the effectiveness and efficiency and adaptability of project management and the supervision of project activities / project execution arrangements at all levels (1) policy decisions: Steering Group; (2) day to day project management in each of the country executing agencies.
- Identify administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project.

**M&E during project implementation**

- *M&E design.* Projects should have sound M&E plans to monitor results and track progress towards achieving project objectives. An M&E plan should include a baseline (including data, methodology, etc.), SMART indicators (see Annex 4) and data analysis systems, and evaluation studies at specific times to assess results. The time frame for various M&E activities and standards for outputs should have been specified.

  The evaluator should use the following questions to help assess the M&E design aspects:

  SMART-ness of Indicators

  - Are there specific indicators in the log frame for each of the project objectives and outcomes?
  - Are the indicators relevant to the objectives and outcomes?
  - Are the indicators for the objectives and outcomes sufficient?
  - Are the indicators quantifiable?

  Adequacy of Baseline Information

  - Is there baseline information?
  - Has the methodology for the baseline data collection been explained?
  - Is desired level of achievement for indicators based on a reasoned estimate of baseline?

  Arrangements for Monitoring of Implementation

  - Has a budget been allocated for M&E activities?
  - Have the responsibility centers for M&E activities been clearly defined?
  - Has the time frame for M&E activities been specified?

  Arrangements for Evaluation

  - Have specific targets been specified for project outputs?
  - Has the desired level of achievement been specified for all Indicators of Objectives and Outcomes?

- *M&E plan implementation.* A Terminal Evaluation should verify that:
  - an M&E system was in place and facilitated timely tracking of results and progress towards projects objectives throughout the project implementation period (perhaps through use of a logframe or similar);
  - annual project reports and Progress Implementation Review (PIR) reports were complete, accurate and with well justified ratings;
  - that the information provided by the M&E system was used during the project to improve project performance and to adapt to changing needs;
  - and that projects had an M&E system in place with proper training for parties responsible for M&E activities.
- *Budgeting and Funding for M&E activities.* The terminal evaluation should determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.

## J. Financial Planning

Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. Evaluation includes actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co- financing. The evaluation should:

- Assess the strength and utility of financial controls, including reporting, and planning to allow the project management to make informed decisions regarding the budget and allow for a proper and timely flow of funds for the payment of satisfactory project deliverables.
- Present the major findings from the financial audit if one has been conducted.
- Identify and verify the sources of co- financing as well as leveraged and associated financing (in co-operation with the IA and EA).
- Assess whether the project has applied appropriate standards of due diligence in the management of funds and financial audits.
- The evaluation should also include a breakdown of final actual costs and co-financing for the project prepared in consultation with the relevant UNEP Fund Management Officer of the project (table attached in Annex 1 Co-financing and leveraged resources).

## K. UNEP Supervision and Backstopping

The purpose of supervision is to work with the executing agency in identifying and dealing with problems which arise during implementation of the project itself. Such problems may be related to project management but may also involve technical/substantive issues in which UNEP has a major contribution to make. The evaluator should assess the effectiveness of supervision and administrative and financial support provided by UNEP/DTIE including:

(i) the adequacy of project supervision plans, inputs and processes;
(ii) the emphasis given to outcome monitoring (results-based project management);
(iii) the realism / candor of project reporting and rating (i.e. are PIR ratings an accurate reflection of the project realities and risks);
(iv) the quality of documentation of project supervision activities; and
(v) financial, administrative and other fiduciary aspects of project implementation supervision.

In summary, accountability and implementation support through technical assistance and problem solving are the main elements of project supervision (Annex 6).

### L. Complementarity with UNEP Medium Term Strategy and Programme of Work

UNEP aims to undertake joint projects that are aligned with its strategy. Whilst it is recognised that UNEP projects designed prior to the production of the UNEP Medium Term Strategy (MTS)[57] / Programme of Work (POW) 2010/11 would not necessarily be aligned with the Expected Accomplishments articulated in those documents, comlementarity may exist nevertheless. For this reason, the complementarity of joint projects with UNEP's MTS / POW will not be formally rated, however, the evaluation should present a brief narrative to cover the following issues:

*Linkage to UNEP's Expected Accomplishments.* The UNEP Medium Term Strategy specifies desired results in six thematic focal areas. The desired results are termed Expected Accomplishments. Using the completed ROtI analysis, the evaluation should comment on whether the project makes a tangible contribution to any of the Expected Accomplishments specified in the UNEP MTS. The magnitude and extent any contributions, and the causal linkages should be fully described.

*Project contributions that are in-line with the Bali Strategic Plan (BSP)*[58]. The outcomes and achievements of the project should be briefly discussed in relation to the objectives of the UNEP BSP.

*South-South Cooperation* is regarded as the exchange of resources, technology, and knowledge between developing countries. Briefly describe any aspects of the project that could be considered as examples of South-South Cooperation.

The ***ratings for the parameters A - K will be presented in the form of a table***. Each of the eleven categories should be rated separately with **brief justifications** based on the findings of the main analysis. An overall rating for the project should also be given. The following rating system is to be applied:

HS = Highly Satisfactory
S = Satisfactory
MS = Moderately Satisfactory
MU = Moderately Unsatisfactory
U = Unsatisfactory
HU = Highly Unsatisfactory

## 4. Evaluation Report Format and Review Procedures

The report should be brief, to the point and easy to understand. It must explain; the purpose of the evaluation, exactly what was evaluated and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should be presented in a way that makes the information accessible and comprehensible and include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

[57] http://www.unep.org/PDF/FinalMTSGCSS-X-8.pdf

[58] http://www.unep.org/GC/GC23/documents/GC23-6-add-1.pdf

***The evaluation will rate the overall implementation success of the project and provide individual ratings of the eleven implementation aspects as described in Section 1 of this TOR.*** The ratings will be presented in the format of a table ***with brief justifications based on the findings of the main analysis.***

Evidence, findings, conclusions and recommendations should be presented in a complete and balanced manner. Any dissident views in response to evaluation findings will be appended in an annex. The evaluation report shall be written in English, be of no more than 50 pages (excluding annexes), use numbered paragraphs and include:

i) An **executive summary** (no more than 3 pages) providing a brief overview of the main conclusions and recommendations of the evaluation;

ii) **Introduction and background** giving a brief overview of the evaluated project, for example, the objective and status of activities; The GEF Monitoring and Evaluation Policy, 2006, requires that a TE report will provide summary information on when the evaluation took place; places visited; who was involved; the key questions; and, the methodology.

iii) **Scope, objective and methods** presenting the evaluation's purpose, the evaluation criteria used and questions to be addressed;

iv) **Project Performance and Impact** providing *factual evidence* relevant to the questions asked by the evaluator and interpretations of such evidence. This is the main substantive section of the report. The evaluator should provide a commentary and anlaysis on all eleven evaluation aspects (A – K above).

v) **Conclusions and rating** of project implementation success giving the evaluator's concluding assessments and ratings of the project against given evaluation criteria and standards of performance. The conclusions should provide answers to questions about whether the project is considered good or bad, and whether the results are considered positive or negative. The ratings should be provided with a brief narrative comment in a table (see Annex 1);

vi) **Lessons (to be) learned** presenting general conclusions from the standpoint of the design and implementation of the project, based on good practices and successes or problems and mistakes. Lessons should have the potential for wider application and use. All lessons should 'stand alone' and should:

- Briefly describe the context from which they are derived
- State or imply some prescriptive action;
- Specify the contexts in which they may be applied (if possible, who when and where)

vii) **Recommendations** suggesting *actionable* proposals for improvement of the current project. In general, Terminal Evaluations are likely to have very few (perhaps two or three) actionable recommendations.

*Prior to each recommendation*, the issue(s) or problem(s) to be addressed by the recommendation should be clearly stated.

A high quality recommendation is an actionable proposal that is:

1. Feasible to implement within the timeframe and resources available

2. Commensurate with the available capacities of project team and partners

3. Specific in terms of who would do what and when

4. Contains results-based language (i.e. a measurable performance target)

5. Includes a trade-off analysis, when its implementation may require utilizing significant resources that would otherwise be used for other project purposes.

viii) **Annexes** may include additional material deemed relevant by the evaluator but must include:

1. The Evaluation Terms of Reference,

2. A list of interviewees, and evaluation timeline

3. A list of documents reviewed / consulted

4. Summary co-finance information and a statement of project expenditure by activity

5. Details of the project's 'impact pathways' and the 'ROtI' analysis

6. The expertise of the evaluation team. (brief CV).

TE reports will also include any formal response / comments from the project management team and/or the country focal point regarding the evaluation findings or conclusions as an annex to the report, however, such will be appended to the report by UNEP Evaluation Office.

## ANNEX 2: INTRODUCTION TO THE THEORY OF CHANGE/ IMPACT PATHWAYS, THE ROti METHOD AND THE ROtI RESULTS SCORESHEET (Annex 6 of the Evaluation Terms of Reference)

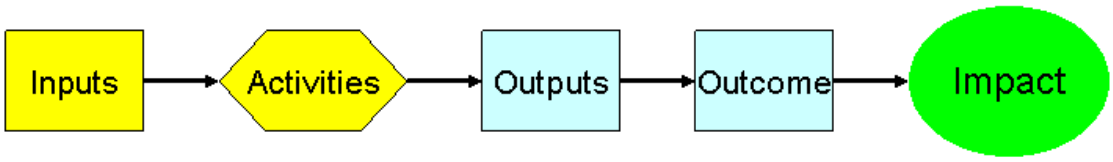
Terminal Evaluations of projects are conducted at, or shortly after, project completion. At this stage it is normally possible to assess the achievement of the project's outputs. However, the possibilities for evaluation of the project's outcomes are often more limited and the feasibility of assessing project **impacts** at this time is usually severely constrained. Full impacts often accrue only after considerable time-lags, and it is common for there to be a lack of long-term baseline and monitoring information to aid their evaluation. Consequently, substantial resources are often needed to support the extensive primary field data collection required for assessing impact and there are concomitant practical difficulties because project resources are seldom available to support the assessment of such impacts when they have accrued – often several years after completion of activities and closure of the project.

Despite these difficulties, it is possible to enhance the scope and depth of information available from Terminal Evaluations on the achievement of results **through rigorous review of project progress along the pathways from outcome to impact**. Such reviews identify the sequence of conditions and factors deemed necessary for project outcomes to yield impact and assess the current status of and future prospects for results. In evaluation literature these relationships can be variously described as 'Theories of Change', Impact 'Pathways', 'Results Chains', 'Intervention logic', and 'Causal Pathways' (to name only some!).

### Theory of Change (TOC) / impact pathways

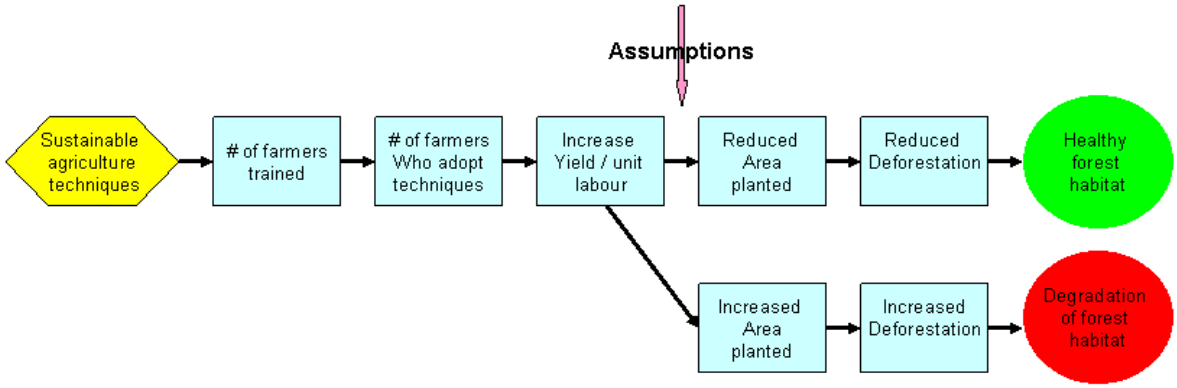
Figure 1 shows a generic impact pathway which links the standard elements of project logical frameworks in a graphical representation of causal linkages. When specified with more detail, for example including the key users of outputs, the processes (the arrows) that lead to outcomes and with details of performance indicators, analysis of impact pathways can be invaluable as a tool for both project planning and evaluation.

Figure 1. A generic results chain, which can also be termed an 'Impact Pathway' or Theory of Change.




The pathways summarise casual relationships and help identify or clarify the assumptions in the intervention logic of the project. For example, in the Figure 2 below the eventual impact depends upon the behaviour of the farmers in using the new agricultural techniques they have learnt from the training. The project design for the intervention might be based on the upper pathway assuming that the farmers can now meet their needs from more efficient management of a given area therefore reducing the need for an expansion of cultivated area and ultimately reducing pressure on nearby forest habitat, whereas the evidence gathered in the evaluation may in some locations follow the lower of the two pathways; the improved faming methods offer the possibility for increased profits and create an incentive for farmers to cultivate more land resulting in clearance or degradation of the nearby forest habitat.

Figure 2. An impact pathway / TOC for a training intervention intended to aid forest conservation.




The GEF Evaluation Office has recently developed an approach that builds on the concepts of theory of change / causal chains / impact pathways. The method is known as Review of Outcomes to Impacts (ROtI)[59] and has three distinct stages:

a. Identifying the project's intended impacts
b. Review of the project's logical framework
c. Analysis and modeling of the project's outcomes-impact pathways

The **identification of the projects intended impacts** should be possible from the 'objectives' statements specified in the official project document. The next stage is to **review the project's logical framework** to assess whether the design of the project is consistent with, and appropriate for, the delivery of the intended impact. The method requires verification of the causal logic between the different hierarchical levels of the logical framework moving 'backwards' from impacts through outcomes to the outputs; the activities level is not formally considered in the ROtI method[60]. The aim of this stage is to develop and understanding of the causal logic of the project intervention and to identify the key 'impact pathways'. In reality such process are often complex; they often involve multiple actors and decision-processes an are subject to time-lags, meaning that project impact often accrue long after the completion of project activities.

The third stage involves analysis of the 'impact pathways' that link project outcomes to impacts. The pathways are analysed in terms of the **'assumptions'** and **'impact drivers'** that underpin the processes involved in the transformation of outcomes to impacts via **intermediate states** (see Figure 3). Project outcomes are the direct intended results stemming from the outputs, and they are likely to occur either towards the end of the project or in the short term following project completion. **Intermediate states** are the transitional conditions between the project's immediate outcomes and the intended impact. They are necessary conditions for the achievement of the intended impacts and there may be more than one intermediate state between the immediate project outcome and the eventual impact.

[59] GEF Evaluation Office (2009). ROtI: Review of Outcomes to Impacts Practitioners Handbook. http://www.gefweb.org/uploadedFiles/Evaluation_Office/OPS4/Roti%20Practitioners%20Handbook%2015%20June%202009.pdf

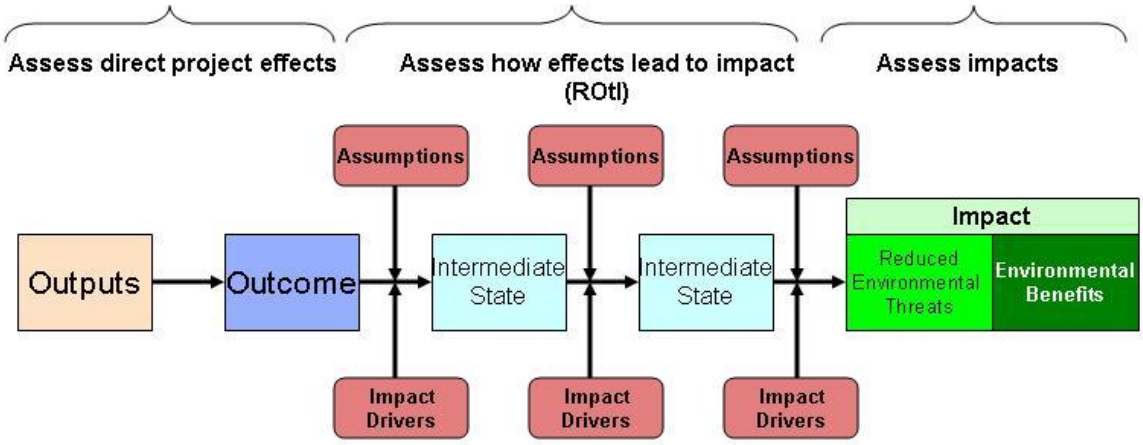
[60] Evaluation of the efficiency and effectiveness in the use of resources to generate outputs is already a major focus within UNEP Terminal Evaluations.

**Impact drivers** are defined as the significant factors that if present are expected to contribute to the realization of the intended impacts and **can be influenced** by the project / project partners & stakeholders. **Assumptions** are the significant factors that if present are expected to contribute to the realization of the intended impacts but are largely **beyond the control of the project** / project partners & stakeholders. The impact drivers and assumptions are ordinarily considered in Terminal Evaluations when assessing the sustainability of the project.

Since project logical frameworks do not often provide comprehensive information on the processes by which project outputs yield outcomes and eventually lead, via 'intermediate states' to impacts, the impact pathways need to be carefully examined and the following questions addressed:

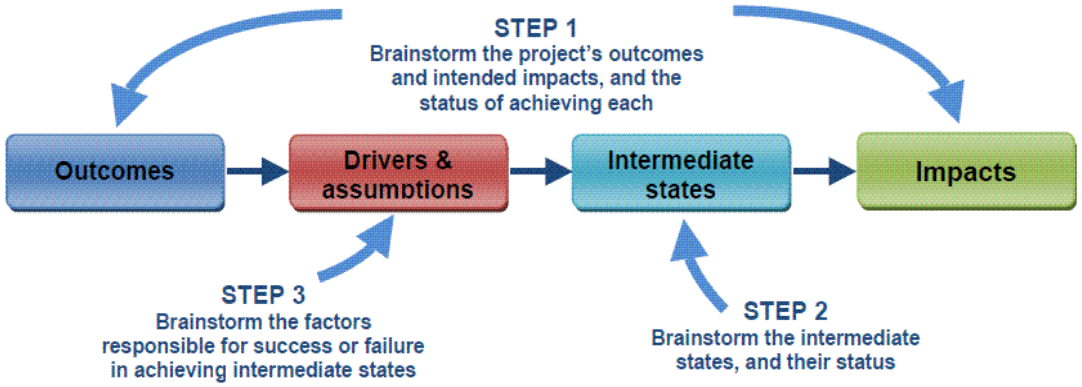
- Are there other causal pathways that would stem from the use of project outputs by other potential user groups?
- Is (each) impact pathway complete? Are there any missing intermediate states between project outcomes and impacts?
- Have the key impact drivers and assumptions been identified for each 'step' in the impact pathway.

Figure 3. A schematic 'impact pathway' showing intermediate states, assumptions and impact drivers (adapted from GEF EO 2009).




The process of identifying the impact pathways and specifying the impact drivers and assumptions can be done as a desk exercise by the evaluator or, preferably, as a group exercise, led by the evaluator with a cross-section of project stakeholders as part of an evaluation field mission or both. Ideally, the evaluator would have done a desk-based assessment of the project's theory of change and then use this understanding to facilitate a group exercise. The group exercise is best done through collective discussions to develop a visual model of the impact pathways using a card exercise. The component elements (outputs, outcomes, impact drivers, assumptions intended impacts etc.) of the impact pathways are written on individual cards and arranged and discussed as a group activity. Figure 4 below shows the suggested sequence of the group discussions needed to develop the TOC for the project.

Figure 4. Suggested sequencing of group discussions (from GEF EO 2009)




Once the theory of change model for the project is complete the evaluator can assess the design of the project intervention and collate evidence that will inform judgments on the extent and effectiveness of implementation, through the evaluation process. Performance judgments are made always noting that project contexts can change and that adaptive management is required during project implementation.

The ROtI method requires ratings for outcomes achieved by the project and the progress made towards the 'intermediate states' at the time of the evaluation. According the GEF guidance on the method; "*The rating system is intended to recognize project preparation and conceptualization that considers its own assumptions, and that seeks to remove barriers to future scaling up and out. Projects that are a part of a long-term process need not at all be "penalized" for not achieving impacts in the lifetime of the project: the system recognizes projects' forward thinking to eventual impacts, even if those impacts are eventually achieved by other partners and stakeholders, albeit with achievements based on present day, present project building blocks.*"

For example, a project receiving an "AA" rating appears likely to deliver impacts, while for a project receiving a "DD" this would seem unlikely, due to low achievement in outcomes and the limited likelihood of achieving the intermediate states needed for eventual impact (see Table 1).

Table 1. Rating scale for outcomes and progress towards 'intermediate states'

| **Outcome Rating** | **Rating on progress toward Intermediate States** |
|---|---|
| D: The project's intended outcomes were not delivered | **D:** No measures taken to move towards intermediate states. |
| C: The project's intended outcomes were delivered, but were not designed to feed into a continuing process after project funding | C: The measures designed to move towards intermediate states have started, but have not produced results. |
| B: The project's intended outcomes were delivered, and were designed to feed into a continuing process, but with no prior allocation of responsibilities after project funding | B: The measures designed to move towards intermediate states have started and have produced results, which give no indication that they can progress towards the intended long term impact. |
| A: The project's intended outcomes were delivered, and were designed to feed into a continuing process, with specific | A: The measures designed to move towards intermediate states have started and have produced results, which clearly indicate that they |

| | |
|---|---|
| allocation of responsibilities after project funding. | can progress towards the intended long term impact. |

Thus a project will end up with a two letter rating e.g. AB, CD, BB etc. In addition the rating is give a '+' notation if there is evidence of impacts accruing within the life of the project. The possible rating permutations are then translated onto the usual six point rating scale used in all UNEP project evaluations in the following way.

Table 2. Shows how the ratings for 'achievement of outcomes' and 'progress towards intermediate states translate to ratings for the 'Overall likelihood of impact achievement' on a six point scale.

| Highly Likely | Likely | Moderately Likely | Moderately Unlikely | Unlikely | Highly Unlikely |
|---|---|---|---|---|---|
| AA AB BA CA BB+ CB+ DA+ DB+ | BB CB DA DB AC+ BC+ | AC BC CC+ DC+ | CC DC AD+ BD+ | AD BD CD+ DD+ | CD DD |

In addition, projects that achieve documented changes in environmental status during the project's lifetime receive a positive impact rating, indicated by a "+". The overall likelihood of achieving impacts is shown in Table 11 below (a + score above moves the double letter rating up one space in the 6-point scale).

The ROtI method provides a basis for comparisons across projects through application of a rating system that can indicate the expected impact. However it should be noted that whilst this will provide a relative scoring for all projects assessed, it does not imply that the results from projects can necessarily be aggregated. Nevertheless, since the approach yields greater clarity in the 'results metrics' for a project, opportunities where aggregation of project results might be possible can more readily be identified.

| **Results rating of project entitled:** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Outputs** | **Outcomes** | **Rating (D – A)** | **Intermediary** | **Rating (D – A)** | **Impact (GEBs)** | **Rating (+)** | **Overall** |
| 1. | 1. | | 1. | | 1. | | |
| 2. | 2. | | 2. | | 2. | | |
| 3. | 3. | | 3. | | 3. | | |
| | **Rating justification:** | | **Rating justification:** | | **Rating justification:** | | |
| | | | | | | | |

## Scoring Guidelines

The achievement of **Outputs** is largely assumed. Outputs are such concrete things as training courses held, numbers of persons trained, studies conducted, networks established, websites developed, and many others. Outputs reflect where and for what project funds were used. These were not rated: projects generally succeed in spending their funding.

## Outcomes:

**Outcomes**, on the other hand, are the first level of intended results stemming from the outputs. Not so much the number of persons trained; but how many persons who then demonstrated that they had gained the intended knowledge or skills. Not a study conducted; but one that could change the evolution or development of the project. Not so much a network of NGOs established; but that the network showed potential for functioning as intended. A sound outcome might be genuinely improved strategic planning in SLM stemming from workshops, training courses, and networking.

Examples

> ***Funds were spent, outputs were produced, but nothing in terms of outcomes was achieved.*** People attended training courses but there is no evidence of increased capacity. A website was developed, but no one used it. (Score – D)
>
> ***Outcomes achieved but are dead ends; no forward linkages to intermediary stages in the future****.* People attended training courses, increased their capacities, but all left for other jobs shortly after; or were not given opportunities to apply their new skills. A website was developed and was used, but achieved little or nothing of what was intended because intended end users had no access to computers. People had meetings that led nowhere. Outcomes hypothesized or achieved, but either insignificant and/or *no evident linkages forward* to intermediary stages leading towards impacts. (Score – C)
>
> ***Outcomes plus implicit linkages forward.*** Outcomes achieved and have *implicit forward linkages* to intermediary stages and impacts. Collaboration as evidenced by meetings and decisions made among a loose network is documented that should lead to better planning. Improved capacity is in place and should lead to desired intermediate outcomes. Providing implicit linkages to intermediary stages is probably the most common case when outcomes have been achieved. (Score - B)
>
> ***Outcomes plus explicit linkages forward****.* Outcomes have *definite and explicit forward linkages* to intermediary stages and impacts. An alternative energy project may result in solar panels installed that reduced reliance on local wood fuels, with the outcome quantified in terms of reduced C emissions. Explicit forward linkages are easy to recognize in being concrete, but are relatively uncommon. (Score A)

## Intermediary stages:

The **intermediate stage** indicates achievements that lead to Global Environmental Benefits, especially if the potential for scaling up is established.

> ***"Outcomes" scored C or D.*** If the outcomes above scored C or D, there is no need to continue forward to score intermediate stages given that achievement of such is then not possible.

***In spite of outcomes and implicit linkages, and follow-up actions, the project dead-ends.*** Although outcomes achieved have *implicit forward linkages* to intermediary stages and impacts, the project dead-ends. Outcomes turn out to be insufficient to move the project towards intermediate stages and to the eventual achievement of GEBs. Collaboration as evidenced by meetings and among participants in a network never progresses further. The implicit linkage based on follow-up never materializes. Although outcomes involve, for example, further participation and discussion, such actions do not take the project forward towards intended intermediate impacts. People have fun getting together and talking more, but nothing, based on the implicit forwards linkages, actually eventuates. **(Score = D)**

***The measures designed to move towards intermediate states have started, but have not produced result, barriers and/or unmet assumptions may still exist.*** In spite of sound outputs and in spite of explicit forward linkages, there is limited possibility of intermediary stage achievement due to barriers not removed or unmet assumptions. This may be the fate of several policy related, capacity building, and networking projects: people work together, but fail to develop a way forward towards concrete results, or fail to successfully address inherent barriers. The project may increase ground cover and or carbon stocks, may reduce grazing or GHG emissions; and may have project level recommendations regarding scaling up; but barrier removal or the addressing of fatal assumptions means that scaling up remains limited and unlikely to be achieved at larger scales. Barriers can be policy and institutional limitations; (mis-) assumptions may have to do with markets or public – private sector relationships. **(Score = C)**

***Barriers and assumptions are successfully addressed.*** Intermediary stage(s) planned or conceived have feasible direct and explicit forward linkages to impact achievement; barriers and assumptions are successfully addressed. The project achieves measurable intermediate impacts, and works to scale up and out, but falls well short of scaling up to global levels such that achievement of GEBs still lies in doubt. **(Score = B)**

***Scaling up and out over time is possible.*** Measurable intermediary stage impacts achieved, scaling up to global levels and the achievement of GEBs appears to be well in reach over time. **(Score = A)**

**Impact:** Actual changes in environmental status

**"Intermediary stages" scored B to A.**

**Measurable impacts achieved at a globally significant level within the project life-span. (Score = '+')**

## ANNEX 3 LIST OF INTERVIEWEES

Cameroon project partners:

Dr. M'Gbra N'Guessan – PM for Cameroon team Econoler International
Director Alexis Kemajou – CETEF
General Inspector Christian Djeutcheu – HYSACAM Douala
Business development Manager Arlette Tchapoya - HYSACAM
CDM specialist Pascal Siegwart – Orbeo
Project development manager Guihem Pouillevet – Orbeo
Dr. Amougou Joseph Armathée - Chef for the CDM focus centre
Dr. Emmanuel Ngnikam – Polytechnic School, Civil Engineering depart.
Antoine Zinga Ngouma – representative for GIC – FAUCA
Auguste Ndzie Menye - representative for GIC – FAUCA
Guy Devienne – HYSACAM Yaoundé
Dr. Martin Zeh-Nlo – head of sustainable development dep. , ass. Rep.
Hans Winter Nielsen – Danish Consul in Cameroon

Mali project partners:

Philip Doyle – PM for Mali team Econergy now with ESB International)
Ibrahim Togola – Mali Folkecenter
Boubacar Sidiki Dembele – Permanent Technical Secretary of the DNA
Oumar Sidibe – Direction Nationale d'Energie
Karim Dembélé – Taoussa Development Authority
Technical Director Mountaga Diallo – project coordinator Félou HPP
Solomani Diakite – advisor to the Minister of Energy and Water.
Cyr M'po Kouagou – director for the West African Power Pool
Anne Hahn – technical advisor GTZ
Aida M'Bo Keita – UNDP program advisor and UNEP extention
Jens Gregersen – Danida advisor Royal Danish Embassy to Mali
Joergen Fennhan - UNEP URC project manager Green Facility

Zambia project partners:

Randal Spalding Fecher. PM for Zambia team ECON Analysis (Poyry)
Dr. Francis Yamba – Managing director CEEEZ
Mr. Makumba – acting Director of Environment and acting DNA
Mr. Shitima – secretary of the DNA and the CDM focal centre
Mellon Chinjila – environmental coordinator ZESCO
Rogers Sakwanda – Executive Director Grid Transmission Ltd.

Elijah Musonda – Sewerage manager Lusaka Water and Sewerage Comp

Iqbal Y. Alloo – Managing Director Kafue Sugar

Winnie Musonda – Environment adv. UNDP

Macleod G. Nyirongo – Resident Representative UNDP

Litumello Mate – Programme Officer Royal Danish Embassy to Zambia

Joergen Fennhan – UNEP URC project manager Green Facility

**Others:**

James Vener – Project officer UNEP DTIE Paris

Eric Usher – Programme Officer UNEP DTIE ( now Stockholm)

Andrea Pinna – Programme Officer CDCF (now with EIB)

Seth Baruch – PM for Ghana team Quality Tonnes ( stopped operation)

Kevin James – PM for Mozambique team Quality Tonnes (stopped)

Jan Kappen – PM CF-SEA programme ( now in Latin America)

Glenn Hodes – PM CF-SEA programme (now in South Africa)

Peter Skotner – Financial officer CF-SEA at UNEP URC

## ANNEX 4:LIST OF REPORTS/DOCUMENTS CONSULTED

- Project Summary issued and by United Nations Fund for International Partnerships 9 November 2004 – MT-4040-04-23 and UNFIP reference number UNE-RAF-04-326.

- Final narrative Project Report "Using Carbon Finance to Promote Sustainable Energy Services in Africa (CF-SEA) June 2009 with annexes.

- Letters of CF-SEA programme introduction to the respective ministries in the 5 countries issued and singed in coordination by the World Bank and UNEP June 2005.

- Tender documents – technical conditions, and the evaluation of the offers from the invited tendering consultant groups in points (no economic data disclosed).

- Complete packages of work shop reports from Cameroon provided by Econoler, from Mali provided by Philip Doyle and Zambia provided by Randall Spalding Fecher.

- Complete set of PINs for the same three countries and provided by the same persons and the World Bank Carbon Finance Unit. Complete set of PINs from projects in Ghana and Mozambique provided by World Bank.

- Complete documentation on approvals and rejection from the World Bank issued as instructions to the UNDP project management to release bonus payment.

- Annual Progress Reports for the CF-SEA Project covering the periods: August 2005 to January 2006, June 2006 to January 2007 and January 2007 to December 2007.

- Financial records and project extension applications of UNEP DTIE and UNEP URC, the later with break down of expenses for track 1 and track 2 service contracts.

- World Bank project paper on proposed additional financing for the Félou hydroelectric project as part of the West African Power Pool July 30, 2009.

- PDD for the CDM projects of Hysacam and for Cimentos do Mozambique.

- Documentations on Hydro Power projects in Mali remaining with the developper.

- Documentation of progress at the CDM Cameroon focal points illustrated by Annex5

## ANNEX 5 SUMMARIES OF PINS FOR MOZAMBIQUE AND GHANA

### Project Idea Note Mozambique 01

### Name of Project: Hulene Landfill
### Date of Submission: August 19, 2005

The objective of this project is to improve the current management situation at the Hulene Dump Site, in order (1) to reduce the significant environmental health impacts that nearby settlements and low-income communities are experiencing and (2) to utilize landfill gas from the site to generate electricity. Electricity generated will not only assist in reducing the frequency of power outages in Maputo – caused by spikes in peak demand – but will also provide the city with an additional source of revenue for a facility that is currently a net liability

The project, after a complete feasibility study, will install a collection system of pipes to recover the methane before it is vented into the atmosphere. The methane will in the first year simply be flared and in the second year a 0.5 MW electricity generator will be installed along with a gas-processing unit. At that point electricity will be generated, and any additional gas will be flared. The site has direct connection to the grid.

Hulene is a 25 year old Dump site without a liner, leachate treatment, or daily cover. The site is about 300m by 150m with a maximum depth of 15 meters and an average depth of 10 meters. There have been constant fires at the site. About 300 tonnes a day are added to the site; 55-60% of the waste is organic. It is planned to be closed in three or four years.

Emission Reductions:

Annual: max 38,000 tonnes per year (fluctuates each year as landfill ages)

Up to a period of 10 years: 286797tCO2-equivalent
Up to a period of 7 years: 218624 tCO2-equivalent
Up to a period of 14 years: 361825 tCO2-equivalent

Total project cost estimate:

| | |
|---|---|
| Development costs | 50,000 US$ |
| Installed costs | 1,140,000 US$ million |
| Other costs | |
| Total project costs | 1,190,000US$million |

More detailed estimates need to be prepared during feasibility study. Break down:

- 0.5MW power system = $500,000
- Cost of methane collection system is $20,000 * 25 collector = $500,000
- Cost of equipment to purify/treat methane = $140,000

As LFG is a fairly reliable technology, the technical risks from this project are fairly low. Some issues need to be clarified during the feasibility study, including the structural integrity of the landfill (one part of the landfill caved in during recent heavy rains). The study will also have to clarify the costs for connecting to the grid (e.g.: how far is the nearest convenient interconnection point).

Finally, the other issue is negotiating a PPA with the government-owned transmission company. A PPA is important to the success of this project (otherwise another use for the methane should be developed unless it is flared), and currently, the legal framework for sale of electricity into the grid is not yet set.

**EVALUATORS COMMENTS:**

The project is viable with a pay back period of 7-10 years (depending on CER prizes) with out taking the

revenue from power sales into consideration. Further development is advised.

**WORLD BANK:** PIN cleared for payment of consultant pre-approval by CFU the 05/04/2006.

**Project Idea Note Mozambique 02**

**Name of Project: Ethanol Substitution for Petrol**
**Date of Submission: February 2006**

The objective of this project is to utilize the local sugar producing capacity of Mozambique to produce Ethanol to replace at least 5% of Mozambique's petrol consumption.

Rather than Mozambique's sugar producers using the sucrose in C and B grade Molasses to produce additional crystalline sugar, ethanol can be distilled from these lower value materials. Ethanol can be substituted for petrol with little effect on most vehicles in concentrations of between 10-20% depending on the source of data.

This project will work with the government of Mozambique through the public petrol company PetroMoc to develop local capacity for ethanol production, upgrade existing storage and blending facilities in Beira, and implement an ethanol blending program nation-wide for petrol.

Pre-feasibility study phase complete. Some work has been done by CASENA (EU supported). Negotiations are underway between PetroMoc and the sugar producers. Issues such as ethanol production facilities and price were discussed the first week of October, 2005 between PetroMoc and the sugar growers association.

Estimate of Greenhouse Gases abated / CO2 Sequestered (in metric tons of CO2-equivalent)

Up to a period of 10 years: 750,000tCO2-equivalent
Up to a period of 7 years: 525,000 tCO2-equivalent
Up to a period of 14 years: 1,050,000 tCO2-equivalent

Total project cost estimate:

| | |
|---|---|
| Development costs | 150,000 US$ |
| Installed costs | 4 US$ million |
| Other costs | |
| Total project costs | 4.15 $million |

Turn-key ethanol plant rated for about 100,000 liters per day = $3,000,000
Upgrades to distribution and storage system =$1,000,000
Cost of technical analysis for terms of reference = $150,000

Equity $4.15 million (likely split between PetroMoc and sugar companies)
Carbon finance contribution sought US$2,625,000 over 7 years

Indicative CER/ERU or VER Price (subject to negotiation) $5
Total Emission Reduction Purchase Agreement (ERPA) Value

| | |
|---|---|
| A period of 10 years | US $3,750,000 |
| A period of 7 years | US $2,625,000 |
| A period of 14 years (2 * 7 years) | US $5,250,000 |

**EVALUATORS COMMENTS:**

The project is viable as a CDM project. For the FIRR calculation the transportation costs, the processing costs and the loss of sicker production should be measured against the revenue from the ethanol sales.

**WORLD BANK:**

PIN cleared for consultant payment, pre-approval by CDCF the 05/04/2006, Community Benefits requested.

**Project Idea Note Mozambique 03**

**Name of Project: Micro Hydro Project Bundle**
**Date of Submission: November 1, 2005**

The objective of this project is to rehabilitate several small hydro facilities damaged during the civil war that will provide power to villages, business and industries that are not currently connected to the grid, supplying reliable electricity to help spur local economic development and displacing polluting and expensive diesel fuel, as well as charcoal and fuel wood use.

Rural electrification in Mozambique only reaches about 6% of the population. Much of this generation is non-grid connected diesel. The rest of the population relies predominately on charcoal and wood as their only fuel sources. The project proposes to rehabilitate at least seven small run of the river hydro units with a total capacity of 6.5 MW. In addition, the World Bank funded ERAP program will fund an additional 3 MW of renewable generation much of which is expected to come from additional small hydro units. Several of these hydro units will directly eliminate diesel generation for small businesses including tea and coconut plantation operations and generate additional electricity for local villages.

| Hydro Unit | Province | District | Installed Capacity |
|---|---|---|---|
| 1. Majaua | Zambezie | Milange | 1000 kW |
| 2. Vanduzi | Manica | Manica | 700 kW |
| 3. Namaia | Zambezie | Namaia | 280 kW |
| 4. Tacuane | Zambezie | Tacuane | 600 kW |
| 5. Socone | Zambezie | Socone | 280 kW |
| 6. Gurue | Zambezie | Gurue | 1300 kW |
| 7. Cambine | Inhambane | Morrumbene | 20 kW |
| 8. Mbahu | Niassa | Mbahu | 2500 kW |

9. Additional Units of at least 1.5 MW to be determined through the ERAP program.

Estimate of Greenhouse Gases abated / CO2 Sequestered (in metric tons of CO2-equivalent)

| | |
|---|---|
| Up to a period of 10 years: | 357,000tCO2-equivalent |
| Up to a period of 7 years: | 250,000 tCO2-equivalent |
| Up to a period of 14 years: | 500,000 tCO2-equivalent |

Total project cost estimate

| | |
|---|---|
| Development costs | 100,000US$ |
| Installed costs | 3.8US$ million |
| Total project costs | 3.9 $million |

The project sponsor FUNAE – FUNDO DE ENERGIA will have agreement letters from all connected parties to be the owner of the CO2 funds. FUNAE will issue a tender for the management of these systems which may require some equity investment yet to be determined.

The project finance will come from three main sources:

World Bank Grant/Loan to the Government (plus ERAP)

DANIDA Loan (Soft Loan to the Gov. of Mozambique)

FUNAE Loan to implementing partner with interest rates between 3 to 6% in USD

**EVALUATORS COMMENTS**:

The mini-hydro fits perfectly the CDCF and the annual amount of CER should be sufficient for making the project interesting for the CDCF. The costs are heavily under-budgeted and the CER will be needed. Even if

the project was grant financed there would still be a need for financing the O & M and it should be possible to demonstrate the additionality criterias being fulfilled.

**WORLD BANK:**

PIN cleared for consultant payment, pre-approval by CDCF the 05/04/2006.

**Project Idea Note Mozambique 04**

**Name of Project: Corumana Hydro Generation Rehabilitation**
**Date of Submission: February, 2006**

The objective of this project is to upgrade the Corumana hydro facility that is currently operating at well below its potential capacity. Since Mozambique is directly connected to the South African electricity grid, the additional renewable electricity would be displacing predominately fossil fuel based generation in South Africa.

The Corumana plant lacks an appropriate flood gate. This project will install the appropriate flood gate to increase the generation potential and the capacity factor. Since there currently is no flood gate, water storage and head are not optimized to maximize the production potential of the existing turbine and generator. The plant located just outside Maputo is rated at 16.6MW, but currently operates at only 11MW. The capacity factor is currently around 45% but is expected to increase to 60% after the project

Estimate of Greenhouse Gases abated/CO2 Sequestered (in metric tons of CO2-equivalent)

Annual: max 44,000 tonnes per year

Up to a period of 10 years: 440,000tCO2-equivalent

Up to a period of 7 years: 308,000 tCO2-equivalent

Up to a period of 14 years: 616,000 tCO2-equivalent

Total project cost estimate:

Development costs 20.36 million US$

Installed costs N.A

Other costs 5.6 million US$

Total project costs 26.0 million US$

**EVALUATORS COMMENTS:**

Mozambique is supplied with electricity originating from hydropower. As long as no regional baseline originating from the South African Power Pool has been accepted by the UNFCCC it is to gamble on the emission reduction since the grid electricity emission coefficient is too low for making the contribution from CDM interesting. The development costs for increasing the capacity at the Corumana dam site is very high and unless other benefits than the increased electricity production can be documented the recommendation of the Evaluator is not to consider this project any further.

**WORLD BANK:**

Clearing has been given the project according to UNEP DTIE final report. No CBQ and exclusivity to the PIN was given to CDCF.

**Project Idea Note MOZAMBIQUE 05**

**Name of Project: Fuel Switching at Cimentos Cement Plant. Date of Submission: November 7, 2005**

The objective of this project is to reduce the carbon intensity of the production of cement by switching

from predominately coal and diesel fuel to natural gas.

Currently Cimentos uses about 97% coal and 3% diesel fuel to meet its process needs. It has the capacity to produce about .8 million tones of Cement per year. Mozambique has recently become a major producer of natural gas most of which it sends to South Africa. It is looking to take advantage domestically of this resource and limit its exposure fluctuating global fuel prices. The project will involve providing a natural gas hook up for the plant from the gas distribution network and installing high efficiency natural gas burners and all the appropriate control technology. NG to be delivered by the company MANTOLA.

Estimate of Greenhouse Gases abated / CO2 Sequestered (in metric tons of CO2-equivalent)

Annual: average of 50,000 tons per year for first 10 years

Up to a period of 10 years: 495,218 tCO2-equivalent
Up to a period of 7 years: 320,568 tCO2-equivalent
Up to a period of 14 years: 771,640 tCO2-equivalent

Total project cost estimate:

| | |
|---|---|
| Development costs | 0.5 US$ million |
| Installed costs | 2 US $ million |
| Total project costs | 2.5 US $ million |

PDD development:

As a direct consequence of the CF-SEA one of the other consultants (ECON Analyse) based locally in South Africa was given the task by the Mantola company in April 2007 to develop a PDD. The deal was signed July 2007 and a baseline study and PDD was developed 25 October 2008. The PDD was validated by Norsk Veritas and sent for registration the 22 October 2009. The annual emission savings has been calculated to 37,153 tonnes and the NPV using the WACC discount rate of 12.8% has resulted in -6,3 millon USD. The large deviation in the assessed costs in the PIN and the NPV of the PDD is principally due to the cost of the gas pipeline between the Mantola oil refinery and the Cimentos Mozambique.

**EVALUATORS COMMENTS:**

The development of this project to the state of creating a real impact a GEB in using the NG otherwise flared of as energy source in the cement production, can be attributed to the CF-SEA project and to the project only. PIN was financed CF-SEA and it was the project manager of the CF-SEA project in Zambia who took the initiative/was contacted to develop the PDD due to his local base in South Africa – the intermediary role.

**WORLD BANK:**

No pre-approval of the project was given by the CDCF as the risk -as it appears from the PIN - of not reaching an amicable and long term deal for the gas delivery should not be underestimated by an outsider. However in the right political environment the deal has both national economic value and impact on the security of energy supply. Basically the WORLD BANK Carbon Finance Unit was created in order to help the global society in implementing CDM projects, capitalizing in making the CO2 reductions where they are at least costs and transferring technologies from Annex 1 countries to non annex 1 countries. Success proof of IMPACT generation.

**Project Idea Note Mozambique 06**

**Name of Project: Chicamba and Mavuzi Hydro Generation Rehabilitation**
**Date of Submission: November 15, 2005**

The objective of this project is to rehabilitate two hydro facilities that are currently operating at only about half of their potential capacity. Since Mozambique is directly connected to the South African electricity grid, the additional electricity would be displacing generation in South Africa

The Mavuzi hydro plant was commissioned in 1949 and the Chicamba hydro plant was commissioned in 1967. These two main plants on the Rio Revue form the core of the central region's generation capacity. The two plants, however, are only rated at about half of their actual potential. Mavuzi has 52MW of potential but currently only delivers a maximum of 25MW.The existing head race tunnel at Mavuzi also limits the maximum generation to approx. 25-30 MW. Likewise, at Chicamba the installed turbine capacity is 2 x 17=34 MW and today, only one unit is operated.

The project proposes to rehabilitate existing units to the extent that the optimum financial and economic result is created. There are at present two potential options-"Option 1-1" and "Option 2-2". Both have high rates of return. The major difference between the options is that "Option 2-2" includes the construction of a new parallel headrace tunnel at Mavuzi with subsequent increase of the generation capacity. The increase in the yearly energy production from Option 1-1 to Option 2-2 is approx. 52 % or 120 GWh. The increase in costs is approx. 55 %.

Estimate of Greenhouse Gases abated / CO2 Sequestered (in metric tons of CO2-equivalent):

*Option 2-2*

Annual: max 323,000 tonnes per year (option 2-2)

Up to a period of 10 years: 2,923,150tCO2-equivalent

Up to a period of 7 years: 1,954,150tCO2-equivalent

Up to a period of 14 years: 4,215,150tCO2-equivalent

*Option 1-1*

Annual Max 208,000 tonnes per year (option 1-1)

Up to a period of 10 years: 1,882,400tCO2-equivalent

Up to a period of 7 years: 1,258,400tCO2-equivalent

Up to a period of 14 years: 2,714,400tCO2-equivalent

Total project cost estimate. All figures in Million US Dollars. The figures reflect option 2-2 with the totals for option 1-1 included in italics.

Development costs 0.5

Installation costs Chicamba Mavuzi

-electrical equipment-9.0 -electrical equipment -18.0

-mechanical -6.5 -mechanical equipment-7.5

-civil works-10.0

Total-15.5 Total – 35.5

Cost of Environmental measures: 2.0

Total costs (spread out through 10 years): 53.0 (Option 2-2)

Option 1-1, equivalent total installation costs are 35.0

**EVALUATORS COMMENTS:**

Baseline must be recognised by the UNFCCC as the regional baseline for the South African Power Pool.

The kWh to be traded at the SAPP, then the revenue from the CDM would make an investment attractive and thereby alleviate the barriers against such a project.

**WORLD BANK:**

The project was pre-approved according to the final report by UNEP DTIE, However, a letter of exclusivity to the PIN and CBQ was not transmitted to the CDCF.

**Project Idea Note Mozambique 07**

**Name of Project: Distribution System Extension**
**Date of Submission: November 1, 2005**

The objective of this project is to eliminate several dirty diesel generators from operation in currently non-connected areas in Northern Mozambique by connecting them to the hydro generation capacity of the Northern Grid of Mozambique.

Rural electrification in Mozambique only reaches about 6% of the population. Much of this generation is non-grid connected diesel. The project proposes to expand the northern grid, which is based almost completely on hydro resources, and eliminate the use of several diesel generators. Electricidade De Mocambique (EDM) has estimated that the new grid system will supply twice as much electricity since the current existing diesel sets neither reach nor meet existing demand. About 9 MW of installed capacity of diesel will be eliminated and at least 14 MW of capacity will be supplied through the new grid connections.

Estimate of Greenhouse Gases abated / CO2 Sequestered (in metric tons of CO2-equivalent)

Up to a period of 10 years: 600,000tCO2-equivalent

Up to a period of 7 years: 420,000 tCO2-equivalent

Up to a period of 14 years: 840,000 tCO2-equivalent

Total project cost estimate

Development costs 0.5US$ million

Installed costs 108.8US$ million

Total project costs 109.3US$ million

Northern Transmission System Investment:

1. Power lines: USD 77 million

2. Transformers & Substations: USD 26,8 million

3. New connections: 20.000 @ USD 250 = USD 5 million

Sources of finance to be sought or already identified:

Equity 12 US$ Million

Debt – Long-term 97.3 US$ Million

SIDA, the Swedish International Development Agency; The Islamic Bank; and, the BADEA are all financiers in this effort.

**EVALUATORS COMMENTS:**

It can bee seen that the revenue from the CER hardly will cover 10 % of the project financing or more precisely the mortgage of a loan. It is consequently difficult to argue that the emission reductions are the reason for alleviating the financial barrier. It is possible to make a case of the CER being the leverage making the project viable this however depends on the electricity tariff supplying the Northern grid and it hardly likely this will be sufficient.

**WORLD BANK:**

The project was pre-approved according to the final report of UNEP DTIE, but no letter of exclusivity nor the CBQ was received by the CDCF.

**Project Idea Notes Ghana 01**

**Name of Project: Accra's Oblogo Landfill in Ghana**
**Date of Submission: September, 2005**

The objective of this project is to capture the landfill gas currently being emitted from the Oblogo landfill in Accra, thereby reducing methane emissions and utilizing the landfill gas to generate electricity – helping to meet the ever-growing power demand in Ghana. The electricity could also provide the city with an additional source of revenue, since the landfill is currently a net liability for the Accra municipal authority.

| **Year** | **LFG output M3/hr (est.)** | **TCO2/eq[61] Reduced** | |
|---|---|---|---|
| 2007 | 900 | 49305 | |
| 2008 | 900 | 49305 | |
| 2009 | 900 | 49305 | |
| 2010 | 850 | 46565 | |
| 2011 | 805 | 44,100 | |
| **2012** | 760 | 41,635 | **280,215** |
| **2013** | 715 | 39,170 | **319,385** |
| 2014 | 680 | 37,252 | |
| 2015 | 655 | 35,883 | |
| **2016** | 605 | 33,143 | **425,663** |
| 2017 | 545 | 29,857 | |
| 2018 | 500 | 27,391 | |
| 2019 | 465 | 25,474 | |
| **2020** | 430 | 23,557 | **531,942** |

[61] The table indicates the reductions had the project been implemented in 2006.

As LFG is a fairly reliable technology, the technical risks from this project are fairly low. Some issues need to be clarified during the feasibility study, including the structural integrity of the landfill (one part of the landfill caved in during recent heavy rains). The study will also have to clarify the costs for connecting to the grid (eg: how far is the nearest convenient interconnection point).

Finally, the other issue is negotiating a PPA with the government-owned transmission company. A PPA is important to the success of this project (otherwise another use for the methane should be developed unless it is flared), and currently, the legal framework for sale of electricity into the grid is being developed by Energy Foundation, Ghana and IT Power, UK. The Electricity Company of Ghana (ECG) and the Volta River Authority (VRA), the only electricity distributor in the southern part of Ghana and generator respectively, will be more interested in getting power during peak times only. This risk will be mitigated once the framework for PPAs is clarified by the government and a PPA is signed.

Total project cost estimate

Development costs $50,000 (feasibility study)

Installed costs $3,240,000 (includes cost of generating electricity – if only flaring is employed the cost is reduced significantly)

Other costs

Total project costs $3,290,000

**COMMENT OF THE EVALUATOR:**

The project is likely to be feasible if CER value is fixed at 8 USD or above. If PPA cannot be reached in the first phase the development costs flaring only will reduce the cost and the emission reductions will not be reduced proportionally with the investment costs. **The project deserves to be implemented.**

**WORLD BANK:**

**P**IN Cleared with the Carbon Finance Unit 05/04/2006 for payment of consultant. Further steps are pending.

**Project Idea Notes Ghana 02**

**Name of Project: Essipon Gas to Energy Project**
**Date of Submission: November, 2005**

Estimate of Greenhouse Gases abated / $CO_2$ Sequestered (in metric tons of $CO_2$-equivalent
*NOTE: The Essipon site is about the same size and depth as the Oblogo site in Accra – thus, the emission and project costs estimates listed below are about the same as in the Oblogo PIN*

Emission reductions:

Up to a period of 10 years: 425,663 $tCO_2$-equivalent
Up to a period of 7 years: 319,385 tCO2-equivalent
Up to a period of 14 years: 531,942 $tCO_2$-equivalent

- The open waste dump at Essipon has serious environmental and social impacts or implications since it is a not properly engineered and operated landfill.

The site also has a severe leachate problem, which is particularly serious after rainfall, when leachate can be seen to be gushing out into the existing drains and gutters and spreading away. These leachates contain pathogens. Housing developments are springing up in the neighborhood and they could be exposed to flooding with leachate since there are no storm drains in the area. Leachate will also contaminate groundwater and surface water. This is a potential risk for drinking water wells and streams. The site was not lined with any bottom liner before usage.

As part of a letter of No objection the mitigation measures will likely include:

- Reducing leachate generation by preventing entering stormwater, intermediate cover and final cover with low permeability;

- Collecting leachate at the toe of the landfill and controlled drainage at the perimeter to one point (i.e. the eastern end of the landfill);
- Treatment of the leachate by recirculation, discharge to a sewer or treatment ponds on site.

In addition, the Essipon site will be capped, which will accomplish the following:

- Reduce the ingress of rainfall water into the waste and thereby reducing the formation of leachate
- Protect the entire site area against vermin and allow natural vegetation to re-colonize
- thereby helping to improve the aesthetic quality of the area;
- Control the emissions of gas.

Recovery and combustion of LFG will reduce emissions of organic compounds that would otherwise be released from the site. Possibly the biggest health and environmental concerns are related to the uncontrolled surface emissions of LFG into the air.

Total project cost estimate:

Development costs $55,000 (feasibility study)

Installed costs $3,350,000 (includes cost of generating electricity – if only flaring is employed the cost is reduced significantly)

Total project costs $3,405,000

**COMMENT OF THE EVALUATOR:** Probably feasible as for the Accra Land field LFG capture project.**The project deserves to be implemented.**

**WORLD BANK:** The PIN was cleared by the Carbon Finance Unit for payment of the consultant 05/04/2006. Further development is pending.

**Project Idea Notes Ghana 03**

**Name of Project: Kumasi Landfill in Ghana**
**Date of Submission: September, 2005**

The objective of this project is to capture the landfill gas currently being emitted from the Kumasi landfill, thereby reducing methane emissions and utilizing the landfill gas to generate electricity – helping to meet the ever-growing power demand in Ghana. The electricity could also be able to provide the city with an additional source of revenue, since the landfill is currently a net liability for the Kumasi municipal authority.

Waste management is one of the biggest problems for all Ghanaian cities. They spend nearly half their total revenues on it. Kumasi estimates that their annual cost of solid management is around Cedis 40 billion (US$4.5 million).

Kumasi is one of the cities covered under the World Bank's Second Urban Environmental Sanitation Project (UESP-2), which was approved by the Bank's board in April, 2004. The project has a solid waste component that includes support for effective operation of a landfill in Kumasi, which was constructed under UESP-1. This support involves monitoring for environmental compliance and the involvement of local private operators in their operation. Collection of landfill gas is not a part of the project as outlined in the Project Appraisal Document (PAD).

According to the PAD for UESP-2, the Kumasi landfill was designed to meet environmentally sound standards. The operation therefore required good management, including the optimum utilization of the equipment that was supplied through UESP-1. The resulting cost is difficult for the Kumasi Assembly to afford under the current revenue generating arrangements. There is a risk that the landfill will revert to a dump and will fill up much faster in a shorter period if the operating principles of sectional filling, compaction and covering are not followed. This project will bring in carbon revenues and partners (including rigorous annual monitoring) that will help provide the funding needed to deal with all of these challenges.

Emission Reduction:
Annual: 115,000 TCO2/yr

The combined long term effects are as follows:
Up to a period of 10 years: 1,150,000 $tCO_2$-equivalent
Up to a period of 7 years: 805,000 $tCO_2$-equivalent
Up to a period of 14 years: 1,610,000 $tCO_2$-equivalent
Total project cost estimate**:**
Development costs $50,000 (feasibility study)
Installed costs $5,250,000 (includes cost of generating electricity – if only flaring is employed the cost is reduced significantly)
Total project costs $5,300,000

**EVALUATORS COMMENT:**

The development cost is considerably higher than the costs for the Accra Land Fill CDM project, but so are the expected annual $CH_4$ reductions. The project appears feasible and provided long term project financing is achievable might contribute to the annual operation cost of the land fill. If only commercial short loan are available the project cannot be implemented. Since the original project was part of a World Bank sector loan it would be worth considering a future loan from the W B.

**WORLD BANK:** The project PIN was cleared with the Carbon Finance Unit for payment of the consultant 05/04/2006. Further development is pending.

**Project Idea Notes Ghana 04**

**Name of Project: Optimization of Hydropower Facilities in Ghana**

**Date of Submission: February 2006**

The objective of this project is to use an information technology product to collect both hydrologic data and other information, which can be used to increase the efficiency and output of the Volta River Authority's hydropower assets. Even an improvement of output of a few percentage points will generate a significant amount of additional MWH, which can displace fossil fuel generation. This project is based on a methodology currently working its way through the Methodology Panel (and given the most recent feedback, it appears likely the methodology will eventually be approved).

The optimal operating conditions for each unit in a hydropower dam may differ based on design or other variables. By determining the optimal operating conditions for each unit – and trying to match up the actual operation of the units with their optimal operation point – an operator can increase the total electricity generation from the same amount of water flowing under the same conditions. This is especially true when you calculate the optimal generation scenario for multiple generating units using all the available data including likely weather conditions, reservoir capacity, head, and other variables.

Two to ten percent increases in electricity generation have been realized for example in the reasonably well managed operations in Manitoba Hydro (Canada) and Idaho Power (USA) simply by implementation of a Decision Support system to better manage water resource decision making.[62]

Emission reductions:

Assuming a 2.5% improvement in output (this is deemed to be conservative), and given that the hydropower assets in Ghana are expected to generate about 4,800 GWH per year, we can assume an additional output of 120,000 MWH. At 0.7 TCO2/MWH (also deemed to be conservative), that would be

[62] For additional examples and technical papers please see http://www.synexusglobal.com/product_generators_vista_papers_sched.html and http://www.synexusglobal.com/product_generators_vista_success.html

84,000 TCO2 reductions per year.

The combined long term effects are as follows;
Up to a period of 10 years: 840,000 $tCO_2$-equivalent
Up to a period of 7 years: 588,000 $tCO_2$-equivalent
Up to a period of 14 years: 1,176,000 $tCO_2$-equivalent

Total project cost estimate:
Development costs 15,000 US$ (feasibility study)
Installed costs 1,000,000 US$ million
Other costs 20,000 US$ operating costs 5 years annually (estimated) Assistance from DSS designer, other contingencies

Total project costs 1,250,000 US$ million

**EVALUATORS COMMENT:** The project is highly feasible even without CDM as the extra revenue from the power generation has not been taken into the cost benefits assessment. There is likely to be problems in defending additionallity - except from a lack of technology and risk point of view.

**WORLD BANK:** The PIN has been cleared by the Carbon Finance Unit for payment of the consultant 05/04/2006. Further development waiting for a letter of exclusivity, LoNO and project financing plan.

**Project Idea Note Ghana 05**

**Name of Project: Ghana Transmission and Distribution Project**
**Date of Submission: February, 2006**

The objective of this project is to improve the efficiency of transmission and distribution systems in Ghana, through a proposed World Bank program, which will reduce MWH losses by about 120 GWH per year. This fits in with the development objectives for Ghana, which are to: (i) improve the transmission and distribution networks to enhance reliability and efficiency of power to existing customers;(ii) provide increased access to affordable, reliable and adequate electricity; and (iii) improve the efficiency and security of fuels such as LPG, wood, and charcoal.

**1: Transmission.** This part of the project will be implemented by VRA and will reduce transmission losses and enhance the reliability of supply. Requirements in transmission include, for example, the construction of the second Kumasi Bulk Supply Point (BSP), the third Accra BSP, a 120 km 69 kV Network Extension between Kpando and Kedjebi, and a Substation upgrade effort.

**2: Distribution.** This component will be implemented by ECG, and will build on the ongoing work under the Distribution System Upgrading Project (DSUP). Key investments focus on the improvement of energy service quality and implementing loss reduction measures. Major investments in network rehabilitation include upgrades of the Mallam BSP and additional switchgear (in support of the second Kumasi BSP and the third Accra BSP project), and assistance for substations, switching stations, and/or primary stations. Additional measures will likely include: enforcement of distribution transformers, upgrades of existing overhead lines, replacement of capacitors, computerization of commercial operations, secondary network automation, rural SCADA, prepayment metering, voltage regulators on long feeders, an energy conservation and safety program, and additional service centres, vehicles, computers, software, tools and instruments

Emission Reductions:

According to the PAD for this project, the project will reduce annual losses of approximately 120,000 MWH. Assuming the West African Gas Pipeline is completed on time, the emissions factor for the Ghanaian grid will be about 65 TCO2/MWH. If the project reduced 120,000 MWH in losses, when multiplied by .65, the annual reduction in CO2 should be approximately 78,000 tons.

Up to a period of 10 years: 780,000 tCO2-equivalent
Up to a period of 14 years: 1,092,000 tCO2-equivalent

Project costs:

According to the PAD, the total cost of the project is about $160 million, although the cost of the specific components that affect MWH losses are less.

**EVALUATORS COMMENTS:**
Since the project finance source is the World Bank a theoretical possibility existed in combining the financing conditions as to the repayment of the loan to CER being put up as guaranty. It is however likely both baseline and additionality would pose problems for having the project accepted and registered as a CDM project. To date no such project has been registered and it is seen the World Bank regional office has not found it realistic to include the CDM aspects in the project.

**WORLD BANK:**
The PIN has been cleared with the Carbon Finance Unit for payment of the consultant 05/04/2006. A further development awaits LoNO, exclusivity agreement, baseline study and additionallity clearance (methodology) and finally a commitment of one of the World Bank administered Carbon Funds for taking the risk of developing a PDD for registration with the UNFCCC.

**Project Idea Note Ghana 06**
**Name of Project: Energy Efficiency and Fuel Switching in Volta Aluminium Company**
**Date of Submission: March 2006**

Improve energy efficiency by minimizing overall electrical energy power consumption 15% and switch from using residual fuel oil in boilers and plants to natural gas for energy generation. Reducing electricity demand from VALCO, the largest energy user in the country, will free up electricity to be used in other areas of Ghana's strained electricity grid. The project will also reduce VALCO's own dependence on potentially unreliable hydropower in the country.

VALCO is a government-owned Aluminum smelter plant, which supplies aluminum ingots to aluminum producing companies in Ghana and the sub-region.

The company uses approximately 2,564,672 MWH/yr of electricity from the national grid for its lines operation and plant utilities and total 19,896,029 liters/month of residual fuel oil for plants and boiler operations.

Emission Reductions:
Annual: 204,384 +83,351 = 287,735 tCO2- equivalent
Up to a period of 10 years: 2,877,360 $tCO_2$-equivalent
Up to a period of 7 years: 2,014,145 $tCO_2$-equivalent
Up to a period of 14 years: 4,028,290 $tCO_2$-equivalent

- It can be assumed that this project would not be implemented and that the smelter company would continue to use residual fuel oil electricity from the national grid.
- There are many barriers prohibiting the implementation of this project, and the key issue is financing.
- The project owner does not have the resources at its disposal to undertake the identified project
- The security of a carbon finance project will help bring about the funds needed. Without this CDM activity, the financing would most likely not be available for a cash-strapped company to undertake the identified project.

Total project cost estimate:

| | |
|---|---|
| Development costs | US$ 0.1 million (for feasibility studies) |
| Installed costs | US$ 35 million |
| Other costs | US$ 7 million |
| Total project costs | US$ 42.1million |

**EVALUATORS COMMENTS:**
This can be translated into a break even at app 6 USD/tones $CO_2$ (depending on actual interest). As the savings in energy comes on top of this the project presents good opportunities for development and implementation and it is a mystery to the evaluator why this project was not chosen by the Danish Green Facility Fund for further feasibility study and a draft PDD development.

**WORLD BANK:**
The PIN was cleared by the Carbon Finance Unit for payment of the consultant the 05/04/2006. No further actions has been taken issuing LoNO by the DNA,or giving W B exclusivity for development of PDD.

**Project Idea Note Ghana 07**

**Name of Project: Restoration and Expansion of Refinery Gas Electricity Generation System at the Tema Oil Refinery**
**Date of Submission: January 30, 2006**

The Tema Oil Refinery is the only refinery in Ghana and provides the country with much of its gasoline. Like most refineries, Tema emits a good deal of methane in the form of refinery gas. The facility currently uses some of this gas for on-site thermal and electricity generation, but much of the refinery gas is flared. This project would recover all of the refinery gas currently being flared and use it for more on-site electricity generation, thus avoiding flaring and displacing electricity currently bought from the grid. The project will also enable some export to the grid. The project will repair an existing generator that is currently not in use (6.5 MW) and build an additional generator (5.5 MW). A total of 12 MW of additional capacity will be added, in addition to the 5.5 MW that is already in use. The total on-site generation will thus equal 17.5 MW.

Emission Reductions:

Estimation: There is enough refinery waste gas with the joule content in place to operate an additional 12MW of generating capacity. Assume each MWH avoids the emission into the atmosphere of 0.65 tones of CO2 – whether avoided flaring or displaced electricity (CFD can confirm these numbers). 12 MW * .80 capacity factor * 8760 * .65 = 54,662. (NOTE: This assumes a grid baseline of gas, since the West African Gas Pipeline should be completed soon).

Annual: 54,662 tones per year
Up to a period of 10 years: 546,662 tCO2-equivalent
Up to a period of 14 years: 765,268 tCO2-equivalent

Project costs:
If the additional 5.5 MW generator is estimated to cost 5 million USD and the rehabilitation of the 6.5 MW to cost 2.5 million the total costs can be estimated to be app 7.5 million USD.

**EVALUATORS COMMENTS:**
The carbon credit in itself would not be sufficient to finance the project. However the power if sold on the West African power pool which are about to be extended towards Mali, Senegal and Mauritania the revenue expected would be app 10 USc/kWh delivered minus the charges for grid extensions /wheeling through charges. This could generate revenue of up to 7 million USD. The project would have a very short pay back period and it is possible to defend the additionality of the project as a CDM project by the CER being necessarily as a guaranty against a commercial bank-loan since the marked conditions in the power pool might give quite fluctuating energy prices. With the power pool under establishment it makes good sense to further pursue the project. As DANIDA has had the power sector on their development program in West Africa it is a mystery why this PIN was not selected by the Green Facility for funding a draft PDD development.

**WORLD BANK:**
The PIN was cleared by the Carbon Finance Unit for payment of the consultant 05/04/2006. No further development has taken place. The project would either be a BOT or financed by the Tema Oil Refinery, obtaining credits on the commercial marked/ soft loan marked.

**Project Idea Note Ghana 08**

**Name of Project: Tema Wind Farm Project**
**Date of Submission: December 12, 2005**

The project will construct a grid connected wind farm within a new embedded/distributed generation

framework developed by the utility regulators. The capacity of the wind farm is 52 MW and will generate about 85 GWH per year based on wind speeds measured in the wind resource assessment.

Within the Embedded Generation framework wind farms can be connected to the electricity grid through which electricity generated by small independent power generators can be sold on the national grid. Such a framework is being developed in Ghana and it could become possible to connect the proposed wind farm to the grid if the necessary interconnection equipment and metering system is acquired and a power purchase agreement is signed.

In an interview with the project developer – NEK of Switzerland – the only outstanding issue is the PPA. With the introduction of the new Energy Minister in Ghana, the PPA issues, which have languished for several years, looks to be solved in the next few months, according to NEK. The new minister and the government is general seems to be very much pushing renewable energy, and this would be the biggest such project.

Emission Reductions**:**
The wind farm is expected to generate 85,000 MWH per year (Note: this amount is due to a capacity factor of .187, which is relative low by wind standards. This is due to the relatively average winds speeds computed during the wind resource study as compared to other wind farms. The Ghanaian grid, the fossil fuel portion of which is expected to be converted to natural gas once the West African Gas Pipeline is completed, will have an estimated combined margin CEF of 0.68 TCO2/MWH 85,000 * 0.68 = 57,800 TCO2/year.

Annual: 57,800 TCO2/year
Up to a period of 10 years: 578,000 tCO2-equivalent
Up to a period of 14 years: 809,200 tCO2-equivalent

Project costs:
Most of these costs have already been incurred (feasibility, wind assessments, permitting fees, etc.). UNEP financed a first round of project assessment in 2000, including the installation of wind measurement equipment at three prospective sites.
APPROX. $62,400,000

**EVALUATORS COMMENTS:**
The wind regime has been investigated and has not changed much since, however the costs of the wind turbines have increased. It is generally know the value of the CER generated by a wind project will not contribute with more than 15% to the project finance. For Ghana the baseline does not give a high emission coefficient for the grid and as the power tariff is relatively low the fact that the capacity factor is low makes the project not feasible. The indication that the Danish Green Facility fund did not chose to develop the PIN further to a draft PDD support this as UNEP Risoe executing the Green Facility in Ghana is assumed to have a detailed knowledge on wind farm projects.

**WORLD BANK:**
The PIN was not cleared by the Carbon Finance Unit meaning the project did not meet the Bank's target.

ANNEX. 6

**REPUBLIQUE DU CAMEROUN**

**MINISTERE DE L'ENVIRONNEMENT ET DE LA PROTECTION DE LA NATURE**

**CN-MDP – COMITE NATIONAL MDP**

_ _ _ _ _ _ _ _ _

# SITUATION DE LA MISE EN ŒUVRE AU CAMEROUN DU MECANISME DE DEVELOPPEMENT PROPRE DU PROTOCOLE DE KYOTO

## 1. Quelques rappels

Adoptée en 1992 et entrée en vigueur en 1994, la **« Convention cadre des Nations Unies sur les Changements Climatiques – CCNUCC »** est un dispositif ayant pour objectif – parmi d'autres – de stabiliser la concentration des **« gaz à effet de serre – GES »** responsables majeurs des changements climatiques.

Adopté dans le cadre de cette convention et entré en vigueur en février 2005, le **Protocole de Kyoto** prévoit des engagements de réductions d'émissions et des mécanismes de flexibilité.

En termes d'engagements, les pays industrialisés ont prévu à l'époque de réduire leurs émissions de GES en moyenne de 5,2% sous leurs niveaux de 1990 d'ici 2012.

En termes de flexibilité, le **« Mécanisme de développement propre – MDP »** est un instrument permettant aux pays ou entités industrielles du Nord d'investir dans des projets de diminution des émissions ou de séquestration de carbone dans les pays du Sud et de recevoir des **« Réductions d'émission certifiées – CER** (*Certified emission reductions*) **»**, couramment appelés **'crédits carbone'**.

- Pour le **« marché 'Kyoto' »** (*marché financier des CER*), des projets conduits dans les pays du Sud génèrent des crédits carbone pouvant êtres vendus dans les pays industrialisés à des opérateurs 'émetteurs soumis à réduction' ; ainsi, au-delà de mesures techniques permettant une réduction de leurs émissions, ces opérateurs peuvent acheter des crédits carbone qui deviennent des 'droits d'émettre'.
  Les facteurs qui influencent les prix des CER sont :
  - ✓ l'avancement du cycle de projet,
  - ✓ les externalités sociales et environnementales,
  - ✓ le type de contrat,
  - ✓ les délais de livraison et
  - ✓ l'expérience du développeur de projet.

  Dans le cas de projets forestiers, les prix varient de 2,5 à 9 € la tonne de $CO_2$, contre 10 à 15 € la tonne de $CO_2$ pour les crédits non forestiers (*en bioénergie par exemple*). Ces prix plus bas pour les crédits forestiers s'expliquent notamment par leur spécificité (*court terme ; plus compliqués en méthodologie et suivi*), et cela contribue à leur faible développement.

- En ce qui concerne les **« marchés volontaires »**, des organisations ou des individus cherchent à acheter des crédits carbone pour compenser leurs émissions, pour des raisons éthiques ou d'image publique.
  Ces marchés sont caractérisés par une grande diversité d'acteurs, de procédés et de types d'intervention (*du classique achat de crédits produits par un tiers au financement de la production de ces crédits*). Les transactions font l'objet d'accords, généralement de gré à gré.

Il faut bien noter que, hormis un engagement volontaire d'un partenaire qui achète des crédits carbone en préfinançant leur production, l'instrument MDP ne peut venir qu'en complément de financements à mobiliser au préalable.

Les financements MDP (*vente de crédits carbone)* doivent aussi avoir un caractère additionnel, les projets concernés ne devant pas être possibles sans leur concours. Il existe deux types d'arguments relatifs à l'additionnalité, (i) l'argument financier : sans l'effet levier du MDP, le projet ne serait pas rentable, ou (ii) l'argument des barrières technologiques, culturelles, légales, financières… Il faut démontrer que le MDP permet de passer ces barrières.

## 2. Comment s'approprier l'instrument MDP ?

Géré par un Conseil exécutif – CE/MDP – auprès du secrétariat de la CCNUCC, l'instrument MDP comprend un certain nombre de conditions d'accès qui doivent être remplies, d'une part, par les états signataires de la convention cadre et, d'autre part, par les porteurs de projet.

☞ **Au niveau gouvernemental**, les conditions sont les suivantes :

✓ Créer et rendre fonctionnelle une **« autorité nationale désignée – AND »** ;

La mise en place d'une AND MDP est requise par décision n°17/CP7 de la Conférence des parties tenue au Maroc en 2001 ; cette AND est seule habilitée à évaluer au niveau national les projets présentés par les porteurs et à émettre les « avis de non objection » nécessaires à la prise en compte des projets par le CE/MDP, à Bonn (Allemagne) ;

Elle peut aussi contribuer à la mise en place d'un réseau d'experts MDP, à son bon fonctionnement et à l'établissement de partenariats efficaces.

✓ Arrêter une **« définition de la forêt »** adaptée pour les projets forestiers (*boisement/ reboisement*), prenant en compte les spécificités écologiques et les objectifs de développement du pays ;

Les Pays doivent définir leur forêt dans le cadre du MDP selon trois critères :
- **(i)** couverture végétale (*entre 10 et 30%*) ;
- **(ii)** surface minimum de la forêt (*de 0,05 à 1 ha*) et
- **(iii)** hauteur des arbres à maturité (*de 2 à 5 mètres*).

Cette définition détermine **l'éligibilité** au MDP :
- des terres, d'une part, pour porter un projet forestier MDP, en rapport avec la question : « *La terre était-elle occupée par 'une forêt' avant le 1er janvier 1990* ? » ;
- des projets, d'autre part, selon qu'ils peuvent être ou non qualifiés de 'forestiers'.

Les stratégies des pays qui ont déjà déposé leur définition ont été assez variées. Globalement, la réflexion est la suivante : plus les valeurs choisies pour les critères sont élevées, plus les surfaces éligibles pour des reboisements seront importantes. C'est à dire que quelques arbres dispersés au milieu d'une savane ne constitueront pas une forêt et le terrain pourra donc être éligible au reboisement.
A contrario, plus les critères sont bas, plus il est possible de comptabiliser n'importe quelle plantation comme un reboisement, ce qui augmente les possibilités de projets, particulièrement en agroforesterie.
Pour le CE/MDP, **« la forêt »** est une étendue de terre **(i)** d'une superficie minimale comprise entre 0,05 et 1 ha, portant des arbres **(ii)** dont le houppier couvre plus de 10 à 30 % de la surface (*ou ayant une densité de peuplement équivalente*) et **(iii)** qui peuvent atteindre une hauteur minimale de 2 à 5 mètres.
La définition nationale doit fixer des valeurs comprises entre ces bornes pour les trois paramètres.

☞ **Au niveau des porteurs de projets**, il convient :

✓ D'élaborer dans les normes des fiches d'identification de projet – NIP – ou Project identification note – PIN (*modèle en français joint en annexe*) ;
Cette fiche synthétise le projet aux niveaux des critères d'éligibilité et évalue en première approche les grandes données économiques, les « crédits carbone » attendus et le montage financier envisagé. Elle permet objectivement à un conseil d'administration (*ou à toute instance dirigeante d'un porteur de projet*) d'avoir les éléments stratégiques indispensables pour se prononcer sur la poursuite de l'instruction du dossier MDP ou de son arrêt, et permet aussi la prospection de partenaires financiers.

Plusieurs facteurs seront pris en compte pour l'évaluation de ces fiches PIN :

- Type d'activité (*utilisation des terres et foresterie* ; *production d'énergie à partir de biomasse* ; *réduction d'émissions de GES liées aux activités humaines*)
- Additionnalité, niveau de référence, émissions et fuites (*Bilan carbone du projet*)
- Non permanence (*dont la question de sécurité foncière*)
- Méthodologies (*plutôt développées dans le PDD*)
- Cycle de projet (*dont un plan de financement*)

✓ Après approbation des fiches PIN par l'AND, élaborer des documents de projet détaillés (*Project detailed document* – PDD), à soumettre pour non objection à l'AND et à faire valider par un certificateur indépendant (*agréé par le CE/MDP*) appelé « Entité opérationnelle désignée – EOD », avant transmission au CE/MDP pour enregistrement.

## 3. Engagements du Cameroun

➢ Le Cameroun a ratifié la Convention cadre des Nations-Unies sur les Changements climatiques le **19 octobre 1994.**

➢ Le Cameroun a adhéré au Protocole de Kyoto le **23 juillet 2002.**

➢ Le **Ministère de l'Environnement et de la protection de la Nature – MINEP –** représente le Gouvernement pour toutes les activités relatives à la CCNUCC et au Protocole de Kyoto, selon le décret n° 2005/117 du **14 avril 2005** modifié et complété par le décret n° 2005/496 du **31 décembre 2005**.

➢ Une AND a été créée au sein du MINEP sous le nom de **« Comité national MDP »**, par décision n°003/MINEP/CB du **16 janvier 2006**.

**Les missions** confiées au CN-MDP sont les suivantes :

1. **Réglementation des activités de projets MDP au Cameroun**
   - ✓ définition des critères de développement durable devant servir de base d'évaluation des projets ;
   - ✓ actualisation des critères nationaux de développement durable et des modalités de leur mise en œuvre ;
   - ✓ création et tenue d'un registre de projets MDP au Cameroun ;
   - ✓ élaboration d'un rapport annuel sur les activités MDP au Cameroun (*à adresser au Conseil exécutif du MDP*).
2. **Promotion du MDP au Cameroun**
   - ✓ élaboration de la stratégie nationale de promotion du MDP ;
   - ✓ information et sensibilisation ;
   - ✓ promotion des activités liées au MDP dans tous les secteurs de l'économie nationale
   - ✓ activités de renforcement des capacités en MDP;
   - ✓ promotion de l'implication du secteur bancaire local et des capitaux étrangers dans le financement des projets MDP, en proposant au gouvernement les mesures de facilitation requises ;
   - ✓ représentation du Cameroun aux manifestations internationales pour y vendre les potentiels de projets MDP du pays.

**L'organisation** du CN-MDP est la suivante :

- **Président :** le Directeur du Développement des politiques environnementales au ministère chargé de l'Environnement ;
- **Chef du Secrétariat :** le Point focal 'Climat' au ministère chargé de l'Environnement ;
- **Membres :**
  - ✓ un représentant de la direction chargée du Développement durable au ministère chargé de l'Environnement ;
  - ✓ un représentant de la direction chargée de la Conservation des ressources naturelles au ministère chargé de l'Environnement ;

- ✓ un représentant de la division des Études, des projets et de la coopération au ministère chargé de l'Environnement ;
- ✓ un représentant du ministère chargé de l'Économie ;
- ✓ un représentant du ministère chargé des Finances ;
- ✓ un représentant du ministère chargé des Forêts ;
- ✓ un représentant du ministère chargé de l'Énergie ;
- ✓ un représentant du ministère chargé de l'Industrie ;
- ✓ un représentant du ministère chargé de l'Agriculture ;
- ✓ un représentant du ministère chargé de l'Elevage ;
- ✓ un représentant des ONGs spécialisées en développement durable ;
- ✓ un représentant du GICAM, groupement inter patronal du Cameroun ;
- ✓ un représentant de SYNDUSTRICAM.

Les membres désignés par leur structure au Comité national MDP doivent détenir les compétences requises pour évaluer les projets MDP. A ce jour, tous les membres du CN-MDP ont été désignés[63]. Un séminaire de renforcement des capacités de ces membres a eu lieu à Douala en **août 2006**.
Le président peut inviter, à titre consultatif, toute personne physique ou morale à prendre part aux travaux du CN-MDP en raison de ses compétences ou de son expérience sur les questions à examiner.

**Pour son fonctionnement**, le CN-MDP se réunit en session ordinaire une fois par trimestre et, le cas échéant, en session extraordinaire.

- ➢ Enfin, en **novembre 2008** s'est tenu à Yaoundé un **« atelier pour la définition de la forêt »** avec des représentants des secteurs de l'environnement, des forêts et de la recherche ainsi que de partenaires au développement.
  A l'issue des travaux, la définition suivante a été retenue pour le MDP au Cameroun :

  **« La forêt est une terre d'une superficie minimale de 0,1 hectare, portant des arbres et végétaux arborescents dont le houppier couvre plus de 30% de la surface (*ou ayant une densité de peuplement équivalente*) et qui peuvent atteindre à maturité une hauteur minimale de 5 mètres ".**

  Cette définition n'attend plus que sa transmission officielle au CE/MDP.

## 4. Engagements de partenaires

Un appui au Cameroun pour le développement d'une expertise locale et pour le montage de projets MDP a pu être acquis auprès de plusieurs partenaires au développement, comme exposé ci-après.

### ❖ Projet PFBC-MDP de la Coopération française

Ce projet s'est achevé en fin 2007. Il s'est agi d'un projet régional (PFBC =*Partenariat pour les forêts du bassin du Congo*) conduit sous la tutelle de la COMIFAC (*Commission des forêts d'Afrique centrale*), avec deux objectifs principaux à satisfaire :

- Renforcer les capacités des pays du bassin du Congo pour exploiter les opportunités du MDP dans les filières 'Forêt' et 'Bio-énergie' (*valorisation de déchets industriels par la cogénération*) ;
- Accompagner la création d'un réseau d'experts nationaux permettant l'émergence d'une force de proposition régionale dans le cadre de la CCNUCC et du Protocole de Kyoto.

Un consortium CIRAD/ONFi (*Centre de coopération internationale en recherche agronomique pour le développement / Office national des Forêts-International*) a été créé pour entreprendre ce projet.

Concrètement, deux ateliers régionaux ont été organisés :

---

[63] **Remarque :** Sans chercher à gonfler exagérément la composition de cet organe, il peut y être regrettée l'absence d'un représentant de l'Agence nationale d'appui au développement forestier – ANAFOR – en charge de l'appui public aux activités de reboisement.

- ✓ **A Kinshasa, en juin 2007 ;** les experts nationaux choisis pour représenter leurs pays respectifs (*4 pour le Cameroun*) ont été formés à la définition et à la construction de projets pilotes, selon des thématiques prioritaires (*4 pour le Cameroun ; Cf. § 5*) ; ils ont eu ensuite 4 mois de retour chez eux pour formuler les fiches PIN ;
- ✓ **A Douala, en octobre 2007 ;** les experts ont présenté leurs projets pour sélection et, le cas échéant, transmission à un partenaire financier comme le BioCf ci-après.

❖ **Carbon Funds**, **Carbon Facilities** et programme **'AfricaAssist' de la Banque mondiale**

La Banque mondiale gère à ce jour 10 fonds alimentés par des partenaires publics et privés qui s'engagent à acheter des CER (*Certified Emission Reductions*) générés par des projets enregistrés au MDP. Les 10 fonds s'élèvent à environ 2 milliards $. Certains fonds ont déjà été entièrement consommés et d'autres reçoivent toujours de nouvelles participations financières.

Aujourd'hui fermé (*engagement de toutes les ressources*), le Community development Carbon Fund (CDCF) était doté de 128,6 millions $, dédié aux projets MDP à petite échelle dans le secteur de l'énergie (*Cf. § 5*), avec retombées sur les communautés les plus pauvres.
Dans le secteur forestier ('LULUCF' = *Land use, land use change & forestry*), le Bio Carbon Fund (BioCf) en est déjà à sa 2e tranche. La 1e tranche, dotée de 23,8 millions $, est aujourd'hui pratiquement close. La 2e tranche est ouverte depuis 2007 et s'élève à 38,1 millions $. Le BioCf achète des crédits générés par des projets d'Afforestation et Reforestation et de dégradation et déforestation évitée (REDD), et s'intéresse à des projets innovants de « carbone agricole ». Dans le cas du BioCf, ce sont des projets MDP ou des projets enregistrés dans le circuit volontaire.

La Banque mondiale a lancé en 2008 deux nouvelles facilités qui supportent des projets à long terme dans un contexte d'incertitude sur le post protocole de Kyoto. La Carbon Patnership Facility (CPF) devrait s'élever à terme à 5 millions $. Cette facilité a vocation à financer quelques programmes qui généreront des crédits carbone principalement après 2012. La Forest Carbon Partnership Facility (FCPF) supporte des initiatives nationales REDD. La FCPF est en phase « readiness » (environ 100 millions $), pour laquelle les pays bénéficiaires ont déjà été identifiés. Une seconde phase de mise en œuvre de projet s'en suivra.

Vous pouvez soumettre votre projet à l'unité 'Carbon Finance' sous la forme d'une note d'intention de projet (NIP). Si votre projet est accepté, la Banque Mondiale peut préfinancer tout ou partie de l'instruction du dossier, ces frais étant généralement déduits des paiements des crédits carbone futurs. Les termes du partenariat sont fixés dans une lettre d'intention. Lorsque le projet est suffisamment avancé, l'achat des 'crédits carbone' (*pour le compte d'un fond carbone spécifique*) est formalisé dans un « Contrat d'achat de réductions d'émissions vérifiées (CAREV) », sous réserve que le dossier soit définitivement agréé par le CE/MDP. Plus d'une centaine de CAREV étaient signés début 2009.

Enfin, le programme de renforcement de capacités 'AfricaAssist' est disponible pour appuyer les cadres nationaux dans le montage de projets ou toute autre forme de renforcement de capacité.

❖ **Coopération allemande**

La Coopération allemande (KfW et BMU) est engagée à plusieurs niveaux dans la lutte contre les changements climatiques, mais principalement sur l'évaluation de scenarii dans le bassin du Congo et sur la préparation d'une stratégie relative au processus REDD pour les pays de la COMIFAC (*feuilles de route nationales et position commune*).

Néanmoins, dans le cadre des activités de son antenne régionale de l'Est, le programme ProPSFE de la GTZ s'engage dans un appui aux partenaires privés pour la cogénération d'électricité à partir de déchets industriels de bois et pour le développement des biocarburants de 2ème génération.

❖ **Initiative CASCADe « *Crédits carbone pour l'Agriculture, Sylviculture, Conservation et Action contre la Déforestation* »**

Le projet PFBC-MDP a été relayé en 2007 par cette initiative gérée par le **Programme des Nations-Unies pour l'Environnement – PNUE –** et financée par le **Fonds français pour l'Environnement mondial – FFEM –**, avec les mêmes objectifs, mais qui, en plus, prend en compte certains pays soudano-sahéliens (Sénégal, Mali, Bénin), Madagascar et trois pays d'Amérique latine.

Cette initiative apporte un soutien aux porteurs de projets atténuant les émissions de gaz à effet de serre dans les secteurs de l'agriculture, de la bioénergie et de la forêt. Elle vise à faire participer ces projets au **Mécanisme de Développement Propre** (MDP) du protocole de Kyoto, à travers l'accompagnement de porteurs de projets déjà identifiés sous forme de fiches PIN, pour :

- ☞ la formulation et la validation des PDD,
- ☞ la mise en relation de ces porteurs avec des partenaires (*financiers acquéreurs de crédits carbone ou acteurs du marché volontaire*).

Déjà opérateur dans des projets relatifs au MDP au Cameroun, ONFi a été choisi par le PNUE pour y administrer l'initiative, et les porteurs potentiels de projets ont été invités à un atelier de lancement à Yaoundé, en **juillet 2008**. 25 participants nationaux ont assisté à cet atelier, porteurs potentiels d'une vingtaine de projets (*Cf. § 5*). Les fiches PIN présentées ont été révisées par les experts et amendées avant soumission à un comité de sélection.

Quinze dossiers complets ont pu être identifiés, parmi lesquels trois ont été retenus pour la poursuite de leur montage (*élaboration et validation des PDD, recherche de partenaires*) et trois autres présélectionnés pour la finalisation de leur fiche PIN (*Cf. § 5 ; six projets seulement au total, CASCADe étant limitée dans ses capacités d'intervention*). Néanmoins, en raison de son caractère innovant, un projet agroforestier d'alternative au vieillissement des cacaoyères sera appuyé pour l'amélioration de son montage institutionnel et la recherche de partenaires.

❖ **Secrétariat exécutif de la COMIFAC**

Que ce soit dans le cadre du MDP ou dans celui de la négociation engagée sur le processus REDD, les pays du Bassin du Congo sont tenus de réaliser des « communications nationales » dans lesquelles sont calculées ou reportées les émissions de gaz à effet de serre (GES) par secteur. Mais la qualité des données de base n'a souvent pas pu être assurée par manque de références récentes ; ainsi en ce qui concerne le Cameroun, de nombreuses données utilisées en 2004 pour la rédaction de la Communication nationale initiale (CNI) du Cameroun dataient de 1994.
Les pays doivent actuellement réaliser le suivi des émissions et absorptions de GES liées au secteur forestier mais également aux autres secteurs d'émission (*industrie, secteur énergétique, agriculture, transport*), afin d'en évaluer correctement la contribution (*positive ou négative*) aux émissions nationales de GES.

Dans cette perspective, le Secrétariat exécutif de la COMIFAC a organisé un atelier de formation sur **les inventaires de GES en septembre/octobre 2008** à Paris. Avec l'appui de la coopération allemande (GTZ) et le concours du CITEPA (*Centre interprofessionnel et technologique d'études des pollutions atmosphériques*) et d'ONFi, l'atelier a été organisé par le Ministère français de l'Ecologie, de l'énergie, du développement durable et de l'aménagement du territoire (MEEDDAT).
Trois cadres du MINEP y ont représenté le Cameroun.

## 5. Initiatives de projets

La stabilisation de concentration des gaz à effet de serre peut être atteinte à travers différents types de projets dont plus d'une vingtaine connaissent des initiatives d'élaboration ou de mise en œuvre au Cameroun (*Cf. tableaux ci-après*) dans trois secteurs principaux :

❖ **Secteur de l'« Energie »**

C'est le premier grand secteur concerné, au Cameroun comme partout dans le monde ; ainsi, 49% des projets enregistrés auprès du BioCf sont des projets de production d'énergie.

Les projets « énergie » ont pour but :

- soit de diminuer la consommation des énergies fossiles (*par exemple, avec l'usage de foyers ou de fours améliorés*),
- soit de substituer la consommation d'énergie fossile par de l'énergie renouvelable ;
  c'est le cas de la valorisation énergétique de déchets des unités industrielles de transformation du bois (*biomasse ligneuse pour génération d'électricité ou cogénération*) ainsi que de biomasse agricole.

il ya aussi la production de 'biocarburant' – ou 'agrocarburant' – pour se substituer à la consommation de carburant fossile à partir de plantations de palmier à huile ou de toutes autres cultures susceptibles de fournir de l'huile végétale.

Ces projets donnent droit à des **crédits carbone permanents**. Ils sont généralement moins complexes à monter que les projets du type « plantation ».

Ce sont **13 idées de projets** qui sont enregistrées pour le secteur de l'énergie, dont 3 ont reçu l'avis de non objection du CN-MDP (*sous quelques réserves à corriger*) et 4 ont des fiches PIN disponibles pour amélioration, dont 2 ont été soumises au CN-MDP sans succès...

Le thème de la **cogénération d'électricité à partir de déchets industriels de bois** concerne 2 des 3 fiches PIN avancées. Il est stratégiquement important pour le Cameroun, eu égard au volume de déchets concernés et à l'effet d'entrainement que pourrait avoir le démarrage d'un projet de ce type. En outre, il contribue à répondre au souci de gestion des déchets qui se pose aux industriels.

Bien avancé, le projet de **fumoirs améliorés** en zone de mangrove est lui aussi stratégiquement important, car il concerne une bonne partie du littoral, de la réserve de Douala Edéa jusqu'à la péninsule de Bakassi, où des mesures de développement sont attendues. Afin d'assurer la diffusion de ce type de fumoirs, CWCS devra, par exemple, chercher à mettre en place un système de micro-crédits.

**Tableau 1 : Initiatives de projets dans le secteur de l'« Energie »**

| N° | Type de projet | Idée / Titre de projet | Porteur du projet | Région | Observations & statut du projet | |
|---|---|---|---|---|---|---|
| **1** | **Production d'électricité par cogénération à partir de déchets d'unités de transformation du bois** | **Valorisation des déchets de scierie par cogénération sur le site de la SFID à Mbang** | **SFID - Groupe Rougier** | EST - Dépt de la Kadéï | ✶✶ | Projet de petite échelle, porté par une société solide, techniquement faisable et pertinent, sur des bases économiques et financières bien développées ; **sélectionné à l'atelier CASCADe**. Fiche PIN soumise au CN-MDP ; **avis de non objection émis** ; précisions demandées sur aspects sociaux et transfert de technologie. |
| **2** | | Valorisation des déchets de scierie par cogénération sur site industriel | ALPICAM | EST | ✶ | Projet de petite échelle, porté par une société solide, techniquement faisable, mais sur base économique et plan de financement peu développés. Fiche PIN non validée à l'atelier CASCADe. |
| **3** | | **Production d'électricité à partir de sciure et déchets de bois à Libongo, Lomié, Ngoro, Nsimalen et Péla Nsem** | **GIC FAUCA** | EST, CENTRE & LITTORAL | ✶✶ | Projet de grande échelle, présenté initialement avec une fiche par site et reformulé en 1 seule. Fiche PIN soumise au CN-MDP ; **avis de non objection émis.** |
| **4** | Production d'électricité à partir de biomasse d'origine multiple | « Projet Bioéner (biomasse/énergie) » – Production d'électricité et de chaleur à partir de déchets forestiers, agro-industriels et de déchets des municipalités rurales (20 petites centrales) | GIC SAPROX | CENTRE, SUD, EST, LITTORAL & OUEST | ✶ | Projet de grande échelle, porté par une ONG sans expérience avérée en cogénération, et présentant des risques techniques et financiers liés à son ampleur avec multiplicité des acteurs. **Fiche PIN soumise au CN-MDP** et présentée à l'atelier CASCADe, mais non validée. |
| **5** | Production d'électricité à partir de biomasse d'origine agricole | Valorisation des déchets de noix et fibre de palme pour production d'énergie | Sous-direction des Agro-industries (SDAI – MINADER) | LITTORAL | ✶ | **Fiche PIN** disponible. |
| **6** | | Valorisation de déchets de culture de maïs pour production d'énergie | MaïsCam | ADAMAOUA | ✶ | Projet de petite échelle, porté par une société solide, à préciser techniquement, sur base économique et plan de financement (avec SNI) peu développés. **Fiche PIN soumise au CN-MDP** et présentée à l'atelier CASCADe, mais non validée. |

**Tableau 1 *suite* « Energie »**

| N° | Type de projet | Idée / Titre de projet | Porteur du projet | Région | Observations & statut du projet | |
|---|---|---|---|---|---|---|
| **7** | Production d'électricité à partir de biomasse d'origine agricole | Production d'électricité à partir de déchets de noix de palme | SOCAPALM | LITTORAL | | Contact à suivre ; projet non soumis à ce jour pour approbation |
| **8** | | Production d'électricité à partir de la bagasse | SOSUCAM | | | Contact à suivre ; projet non soumis à ce jour pour approbation |
| **9** | **Amélioration du rendement énergétique de l'utilisation de combustibles** | Promotion de foyers améliorés | APELD – *Association pour la protection de l'environnement et lutte contre la désertification* | EXTRÊME-NORD | | Projet de petite échelle, porté par une association expérimentée, techniquement réaliste, mais peu avancé pour son plan de financement. |
| **10** | | | SWCFN – *projet 'eco stoves'* | SUD-OUEST | | Projet de petite échelle, porté par une association expérimentée, techniquement réaliste, mais manquant de plan de financement. |
| **11** | | **Mise en place de fumoirs améliorés à poissons plus économes en bois de mangrove dans la Réserve de Douala-Edéa** | **CWCS –** *Cameroon wildlife conservation society* | LITTORAL – Dépt de la Sanaga maritime | ✶✶ | Projet de petite échelle, porté par une association solide et expérimentée, techniquement simple et faisable, sur bases économique et financière bien développées ; **sélectionné à l'atelier CASCADe.** Fiche PIN soumise au CN-MDP ; **avis de non objection émis** ; précisions demandées sur autres projets régionaux et transfert de technologie. |
| **12** | Hydroélectricité | Production d'électricité en milieu forestier par mini centrale hydroélectrique | CAFD – ROLD (ONG) | EST – Dépt du Haut-Nyong | | En cours d'élaboration ; données à collecter ; incitation au promoteur à présenter le projet |
| **13** | Energie solaire | Projet d'électrification villageoise | Global village Cameroun (ONG) | | | Contact à suivre ; projet non soumis à ce jour pour approbation |

❖ **Secteur de l'« Utilisation des terres, changement d'utilisation des terres et foresterie »**

C'est un secteur dans lequel beaucoup d'attentes ont été placées mais où, en Afrique notamment (*seulement 9 des projets du BioCf, soit 3%, mais encore aucun 'enregistré'*), se posent des problèmes sur le plan du montage institutionnel (*unicité de l'opérateur, sécurisation foncière*) ou des capacités financière (*manque de ressources initiales*) et technique (*plan de suivi*).
Souvent improprement appelés « puits de carbone », les projets concernent essentiellement les boisements, les reboisements ou l'agroforesterie – « les plantations » au sens MDP du terme –, et donnent droit à des **crédits temporaires** (*car les séquestrations ne sont pas permanentes*).

Dans ce secteur, ce sont jusqu'à **16 idées de projet** qui sont enregistrées, dont 1 a reçu sa non objection du CN-MDP (*malgré des difficultés au niveau du financement et du montage institutionnel*), 3 ont des fiches PIN bien élaborées qui ont été soumises au CN-MDP pour non objection et 4 ont des fiches PIN disponibles pour amélioration.
Certains projets ont même connu des débuts de mise en œuvre (*plantations communales*), ce qui reste **compatible** avec le processus MDP, **l'intention d'enregistrement** ayant été clairement manifestée au démarrage des projets. Cela a été rendu notamment possible dans le cadre d'un partenariat de communes camerounaises avec la Ville de Paris qui, pour des raisons d'éthique, s'est engagée volontairement sur le thème de la lutte contre les changements climatiques, tant par des mesures de réductions d'émissions, in situ, que par des compensations par séquestration de carbone en plantations forestières dans des pays du Sud (*Cameroun & Madagascar*).
Il faut noter aussi l'intérêt de travailler dans un cadre communal, car cela est un atout en termes de sécurisation foncière, chaque commune pouvant facilement devenir propriétaire des terres destinées au reboisement.

En termes de stratégie nationale, le ministère espère une plus grande orientation des efforts vers les régions du Nord, où les actions doivent être conjuguées avec la lutte contre la désertification et la satisfaction des besoins des populations en bois de feu et bois de service.
Enfin, le thème de l'agroforesterie en appui à la filière cacao est important stratégiquement car il peut contribuer à la réduction de la pauvreté en milieu rural. Des efforts doivent être faits pour répondre aux difficultés de financement initial et de multiplicité des acteurs individuels.

❖ **Secteur des « Déchets »**

A titre d'information, il s'agit du deuxième secteur en importance pour le BioCf avec 24% des projets.

Au Cameroun, les projets visent à réduire les émissions de GES, ou leur nocivité relative, et concernent trois types de déchets (*déchets ménagers, eaux usées et déchets industriels spéciaux*). Ils peuvent être couplés avec des projets de type « énergie ».

Sur les 7 projets enregistrés, 1 a déjà reçu on avis de non objection, a démarré ses activités et poursuit les étapes vers l'enregistrement.

Enfin, si l'aboutissement rapide de ces diverses initiatives est bien sûr souhaitable en termes de contribution à la lutte contre les changements climatiques, il faut aussi noter que la vente des premiers crédits carbone après vérification des réductions d'émissions ouvrira (*par taxation des CER*) des perspectives en termes de moyens pour le CN-MDP, qui ne dispose aujourd'hui d'aucune ressource propre.

**Tableau 2 : Initiatives de projets dans le secteur de l'« Utilisation des terres, changement d'utilisation des terres et foresterie »**

| N° | Type de projet | Idée / Titre de projet | Porteur du projet | Région | Observations & statut du projet | |
|---|---|---|---|---|---|---|
| **14** | **Plantations forestières industrielles** (*Ayous, fromager et teck*) | **Projet de reboisement ALPICAM – STBK, département de la Kadéï, arrondissement de Batouri** | **ALPICAM** | EST – Dépt de la Kadéï | ✶ | Projet de petite échelle, porté par une société solide, techniquement pertinent, mais sur base économique et plan de financement peu développés ; **pré-sélectionné par CASCADe**.<br>Fiche PIN soumise au CN-MDP ; **avis de non objection émis** ; précisions demandées sur questions foncières, gestion des feux de brousse et méthodologie MDP. |
| **15** | **Plantations forestières communales** | **Projet de reboisement de 500 ha dans la Région de l'Ouest** (*Communes de Foumban & Tonga*) | **Ville de Paris / AIMF -** *Association internationale des Maires francophones* | OUEST – Dépts du Noun et du Ndé | ✶✶ | Projet de petite échelle, **financé en engagement volontaire par la Ville de Paris**, sous maîtrise d'ouvrage de l'AIMF et maîtrise d'œuvre d'ONF international.<br>Fiche PIN soumise au CN-MDP ; **avis de non objection émis** ; précisions demandées sur appropriation et bénéfices attendus au niveau des communes.<br>**Travaux initiés** à Foumban et Tonga en 2008.<br>Au niveau de Foumban, un projet complémentaire de promotion de foyers améliorés est en préparation. |
| **16** | | **Projet de reboisement de 500 ha dans les Régions du Centre** (*Commune de Ngambé Tikar*) **et de l'Est** (*Commune de Mandjou*) | **Ville de Paris / AIMF -** *Association internationale des Maires francophones* | EST – Dépt du Lom & Djérem & CENTRE – Dépt du Mbam & Kim | ✶✶ | Projet de petite échelle, **financé en engagement volontaire par la Ville de Paris**, sous maîtrise d'ouvrage de l'AIMF et maîtrise d'œuvre d'ONF international.<br>Fiche PIN soumise au CN-MDP ; **avis de non objection émis** ; précisions demandées sur appropriation et bénéfices attendus au niveau des communes.<br>**Travaux initiés** à Mandjou en 2009. |

| | | | | | | |
|---|---|---|---|---|---|---|
| **17** | | **Reboisement communal à usage multiple en zone des savanes de la Région de l'Adamaoua** | **Commune de Meiganga** | ADAMAOUA – Dépt du Mbéré | ✶✶ | Projet de très petite échelle, porté par une commune appuyée par le CTFC, techniquement réaliste *bien que complexe à mettre en œuvre*, mais peu avancé pour son plan de financement ; **pré-sélectionné par CASCADe** (*pour fiche PIN & PDD*).<br>Fiche PIN soumise au CN-MDP ; **avis de non objection émis** ; précisions demandées sur financement et méthodologie. **Travaux de plantation initiés** en 2009. |

**Tableau 2 suite « Utilisation des terres, changement d'utilisation des terres et foresterie »**

| N° | Type de projet | Idée / Titre de projet | Porteur du projet | Région | Observations & statut du projet | |
|---|---|---|---|---|---|---|
| **18** | **Plantations forestières communales** (suite) | Création d'une plantation communale à Bokito *(avec cultures intercalaires*) | ANAFOR – *Agence nationale d'appui au développement forestier* | CENTRE – Dépt du Mbam & Inoubou | ✶ | Projet de grande échelle pertinent, porté par un organisme étatique expérimenté en reboisement, bon techniquement, mais manquant de réalisme sur le plan institutionnel et de précision sur le plan financier ; **intéressant pour le marché volontaire**. Fiche PIN pré-sélectionnée à l'atelier CASCADe pour son caractère **innovant**. |
| **20** | | Reboisement en savane sèche avec cultures vivrières intercalaires, en extension d'une forêt communale (Gashiga / Garoua 3) | ANAFOR – *Agence nationale d'appui au développement forestier* | NORD – Dépt de la Bénoué | ✶ | Projet de petite échelle pertinent, porté par un organisme étatique expérimenté en reboisement, techniquement faisable, mais manquant de précision sur le plan financier ; **intéressant pour le marché volontaire.** Fiche PIN pré-sélectionnée par CASCADe. |
| **19** | **Reboisement communautaire** | Programme stratégique de Lutte contre la déforestation et les changements climatiques | GASD - *Global Action for Sustanability Development* | SUD | | Projet disponible, mais non traduit sous la forme 'fiche PIN' |
| **21** | | Reboisement de la ville de Meyomessala et enrichissement des forêts exploitées du Dja & Lobo | GASD - *Global Action for Sustanability Development* | SUD – Dépt du Dja & Lobo | | Projet disponible, mais non traduit sous la forme 'fiche PIN' |
| **22** | | Projet 'BUI RESTOR' | CENDEP | NORD-OUEST – Dépt de Bui | | Projet de très petite échelle, porté par une association locale peu expérimentée, techniquement incertain et sans sources sûres de financement. |

| | | | | | | |
|---|---|---|---|---|---|---|
| **23** | | Projet 'SAHEL VERT' | MINEP - *Ministère de l'Environnement et de la protection de la Nature* | EXTRÊME-NORD | ✶ | Projet de grande échelle pertinent, porté par un département ministériel, bon techniquement (*y compris un volet « foyers améliorés »*), mais manquant de réalisme sur le plan institutionnel et de précision sur le plan financier. |
| **24** | | FORCOM - Forêts communautaires et villageoises | ANAFOR | NORD & EXTRÊME-NORD | | Contacts à suivre ; projet non soumis à ce jour pour approbation |
| **25** | | Projet de développement de plantation d'acacias gommiers | GIC Gommab | NORD – Dépt de la Bénoué | | Contacts à suivre ; projet non soumis à ce jour pour approbation |

**Tableau 2 suite « Utilisation des terres, changement d'utilisation des terres et foresterie »**

| N° | Type de projet | Idée / Titre de projet | Porteur du projet | Région | Observations & statut du projet | |
|---|---|---|---|---|---|---|
| **26** | **Agroforesterie** | **Alternative au déclin des vieilles cacaoyères par plantation mixte sur savane** (*cacaoyer/arbres fruitiers/acacias océaniens*) **et reboisements communautaires d'essence à moyenne révolution** (*teck*) | **ANAFOR / FUPROCAM -** *Fédération des unions de producteurs de cacao du Mbam* | CENTRE – Dépt du Mbam & Inoubou | ✶✶ | Projet de grande échelle innovant et très pertinent, porté par un organisme étatique expérimenté en reboisement, bon techniquement, mais manquant de réalisme sur le plan institutionnel et de précision sur le plan financier ; **intéressant à plus petite échelle et pour le marché volontaire**.<br>Fiche PIN soumise au CN-MDP ; **avis de non objection émis**. |
| **27** | | Restauration de vieilles cacaoyères | CEDC | CENTRE & SUD | | Projet de grande échelle pertinent, porté par une structure inexpérimentée dans la filière, mais manquant de précision sur le plan technique, institutionnel et financier. |
| **28** | | Plantations d'anacardier | SNI – *Société nationale d'investissement* | NORD | | Projet de grande échelle, porté par un organisme étatique, techniquement faisable, mais manquant de réalisme sur le plan institutionnel et de précision sur le plan financier. |
| **29** | | Projet de développement de plantations paysannes d'hévéa sur jachères de vivriers | IRAD - *Institut de recherche agronomique pour le développement* | SUD-OUEST, LITTORAL & SUD | | Contacts à suivre ; projet non soumis à ce jour pour approbation |

**Tableau 3 : Initiatives de projets dans le secteur des « Déchets » et Divers** (n° 38)

| N° | Type de projet | Idée / Titre de projet | Porteur du projet | Région | Observations & statut du projet | |
|---|---|---|---|---|---|---|
| **30** | **Captage et destruction du gaz méthane émis en décharge de déchets solides** | **Valorisation des déchets ménagers sur la décharge de Nkol-Foulou** (Yaoundé) | **HYSACAM** | CENTRE – Dépt de la Méfou & Afamba | ✶✶✶ | Un projet initial prévoyait une valorisation énergétique des gaz collectés ; les conditions requises pour la réussite d'un tel projet n'étant pas remplies, il a été limité au captage et destruction du gaz méthane. **Avis de non objection émis pour le draft de PDD ;** précisions demandées sur EIE et aspects sociaux. Partenaire financier identifié (*Groupe ORBEO*) et travaux initiés. |
| **31** | | Valorisation des déchets ménagers sur la décharge de Ngombé (Douala) | HYSACAM | LITTORAL – Dépt du Wouri | | Fiche PIN disponible, non validée. |
| **32** | Production de compost à base de déchets solides | Valorisation de déchets ménagers et de bouses de vaches pour production de compost | ENVIROPROTECT | EXTRÊME-NORD | | Contacts à suivre ; projet non soumis à ce jour pour approbation. |
| **33** | | | FEICOM | ? | | Contacts à suivre ; projet non soumis à ce jour pour approbation. |
| **34** | … / … | Valorisation des déchets d'abattoirs | SODEPA | ? | | Contacts à suivre ; projet non soumis à ce jour pour approbation. |
| **35** | Déchets liquides | Traitement des boues sanitaires vidangées (eaux usées) | Communauté urbaine de Douala | LITTORAL | | Contacts à suivre ; projet non soumis à ce jour pour approbation. |
| **36** | | Traitement des boues sanitaires vidangées (eaux usées) | Communauté urbaine de Yaoundé | CENTRE | | Contacts à suivre ; projet non soumis à ce jour pour approbation. |
| **37** | Valorisation énergétique de déchets spéciaux | Extension de l'unité d'incinération de déchets industriels spéciaux avec récupération de la chaleur pour la production d'électricité | BOGOM International | ? | | Fiche PIN disponible ; projet éligible. |
| **38** | Maintenance du matériel technique | Contribution à la protection de l'environnement à travers la rationalisation de la gestion et la maintenance du matériel roulant et connexe | SAPM - Société africaine de Promotion de la maintenance | ? | | Projet disponible, mais non traduit sous la forme 'fiche PIN'. |

# Modèle de Fiche NIP (*note d'identification de projet*)

## pour projet relatif à l'« Utilisation des terres, changement d'utilisation des terres et foresterie »

## Préambule

La fiche NIP constitue un document de 5 à 15 pages qui fournit les principales informations relatives au projet. Au regard des critères de sélection du projet, il vous est demandé de mettre l'accent sur :

- le type de projet : secteur d'activité, taille du projet, technologie utilisée, maîtrise technique, itinéraire et échéancier de mise en œuvre ;
- la localisation ;
- les participants aux projets, leur niveau d'implication, leur expérience et compétence, la répartition des rôles entre eux, leur apport financier (évalué même en nature) ;
- l'évaluation anticipée des quantités de Gaz à Effet de Serre réduites ou séquestrées par rapport au scénario de référence correspondent à l'hypothèse "au fil de l'eau" (dont période d'accréditation, type de tonnes escomptées et au prix propose de la tonne $CO_2$eq) ; vous citerez tant que faire ce peut les sources des valeurs que vous avancez ;
- le montage financier du projet en analysant au moins sommairement la structure des coûts et des revenus ainsi que l'échelonnement de ces coûts/revenus tout comme leur pourvoyeur/bénéficiaire ;
- les bénéfices sociaux et environnement en lien direct avec les « critères et indicateurs de développement durable du Cameroun ».

**Toutes les informations fournies devront être aussi précises, complètes et synthétiques que possible. Il est néanmoins entendu qu'il ne sera pas demandé aux candidats un niveau de renseignement exhaustif de chacune des rubriques à l'étape de la fiche NIP.**

**En rouge gras :** les rubriques les plus importantes / En rouge : les rubriques importantes

**Exemples de types de projets**

| Code | Boisement et reboisement[64] |
|---|---|
| **1** | Restauration de terres dégradées (e.g. savanes à *Imperata)* en |
| **1a** | forêt |
| **1b** | système agroforestier |
| **2** | Reboisement de prairies dégradées ou de terres arides par plantation d'arbres |
| **3** | Etablissement d'arbres d'ombrage sur des cultures existantes (e.g. café) |
| **4** | Plantations de production |
| **4a** | à petite échelle par les propriétaires fonciers |
| **4b** | à échelle commerciale |
| **5** | Restauration du paysage par plantation de haies ou bandes boisées, etc. |
| **6** | Plantations de bois-énergie à une échelle commerciale |
| | Aménagement forestier |
| **7** | Améliorations sylvicoles par fertilisation, régénération assistée, etc. |
| **8** | Défense et lutte contre les feux |
| **9** | Exploitation à impact réduit |
| **10** | Alternatives au bois-énergie pour protection de la forêt/de l'environnement |
| | Gestion des terres agricoles |
| **11** | Agriculture avec travail du sol réduit |
| **12** | Autres systèmes agraires durables |

[64] Seule catégorie d'activités acceptées durant la première période d'engagements dans le MDP

| | |
|---|---|
| | Gestion des pâturages |
| **13** | Re-végétalisation de terres semi-arides et arides avec des arbustes ou des herbacées |
| **14** | Gestion du bétail favorable à une restauration de la végétation et des sols |
| **15** | Bio-carburants : Utilisation de biomasse pour produire de l'énergie |
| **16** | Autres |

## Annex 7 CV Bernt Frydenberg

Curriculum Vitae

---

Name : Bernt Frydenberg

Profession : M.Sc., Civil Engineering, B. Com, Finance and Banking

Date of Birth : 09.21.1945

Years with Firms : 15 ELSAM/EP 5 Mercapto Consult (personally owned company)
Nationality : Danish

Membership in Professional Societies :Member of the Society of Civil Engineering, the Energy group, the Environmental group and the Management Group. Chairman for Energy Technologies on low to Zero $CO_2$ emission PowerGen Europe. London Business School Association

**Key Qualifications:**

Mr. Bernt Frydenberg has since 2004 performed his services as an independent senior energy expert to World Bank and EU projects and as an advisor and evaluator to the European Power Gen Conferences, the Danish Energy System Operator. He has assisted the World Bank Carbon Finance Unit and the East Asia and Pacific Unit in developing CDM project pipelines, PINs, baseline studies, monitoring plans and Project Design Documents (PDDs). In particular he assisted in CHP and district heating projects and the integration thereof in the power system in Mongolia and China where he in 2009 developed PDDs for Yingkou and Dashiqiao Cities DH systems. Presently he is assisting UNEP in evaluating a program for implementing RE projects/Environmental projects in Afrika.

From January 2008 he has been appointed external evaluator on the 2 programmes supporting development of new solutions to energy systems including system development, new technologies, renewable demonstration projects and energy conservation - the ,Forsk EL for power systems and the ForskNG forNatural gas systems).

He has since 1995 been member of the planning committee for the annual Power Gen Europe conferences responsible for introduction of renewable energy into the forum and since 2001 Chairman for the Low to Zero CO2 emission policy and technology conference track now focussed on Carbon Capture and Sequestration (CCS).

He was member of the EU –ASEAN Panel on Energy where he assisted in transferring EU experiences on grid integration and HVDC among others. He established the framework for EU-ASEAN Energy Facility Programme. He has in this programme from 2005 to 2007 assisted RISØ in developing wind projects as CDM projects in Vietnam, Philippines and Cambodia. An important element in the 4 case studied was the integration of wind generated power on the grid.

In his 15 years with ELSAM he has as coordinator of EU supported energy programmes and project activities such as the PHARE, Tacis, Synergy, Thermie, gained substantial energy sector knowledge. For Elsam he was member of the Eurelectric working group on external cooperation. During this period he assisted in the co-operation between Eurelectric and the Electric Power Counsel of the CIS and he was responsible for EU assisted project on transmission projects in the CIS countries the synchronisation and reliability thereof. In Poland as Board member of Elsam Project Polska he had good working relationships with the Polish Power Grid company on system development and integration of wind and CHP. Result of his work as Business Development Manager are: Wind farm Poland, CFB boilers Poland, EU support to 3x1MW pilot wind turbines at Tjæreborg Enge, Bellacoric wind farm Ireland, Tarifa wind farm Spain, Paul da Serra wind farm Madeira, EU support to Grenå straw fired CHP, Madsnedsø straw thermal gasification unit and Assens Bio-gasification plant (a 38 mio DKK grant which was withdrawn as the project did not materialise).

As Project and Construction Manager in the Danish Oil and Gas Company DONG in 1980 to 1983 he was responsible for the design of the first Danish Natural Gas Storage at Lille Thorup. The storage is established in a salt dome and the design was made with assistance of the company constructing the first compressed air power storage in Europe at Hündorff , Kavernen Bau und Betrieb in Hanover. He introduced the evaluation model of he suppliers of high pressure pumps based on combined investment and NPV of operation cost in order to minimise the power consumption costs. The Lille Thorup storage is of a peak load service type, the project management responsibility further included the investigation for seasonal gas storage at Tønder and Steen Lille.

In the two periods of employment with I. Krüger (now Veolia) the relevant experience in Energy are an pectin industry waste water treatment plant at Redon France constructed in 1977-78 with a methane production of 200-300 $m^3$ /h and the Ribe biogas plant.

**Education:**

Education in Engineering : M.Sc., Civil Engineering, Technical University of Denmark 1969

Education in Economy : B. Com, Finance and Banking, Copenhagen School of Economics and Business Administration, 1972 Civil Economist (4 years educational program)

London Business School, Executive Management Programme, 1973 .

**Employment Record:**

**Since 2004 Independent Consultant and CEO for Mercapto Consult.**

Special focus areas are System optimisation, New RE technologies, Energy conservation and CDM.

**January 2010 appointed external evaluator** of the CF-SEA programme by UNEP and World Bank in Zambia, Mali, Cameroon, Ghana and Mozambique..

**From July 2008 he is assisting the World Bank** as STC in establishing Project Design Documents for CDM projects for Yingkou EDZ and Dashiqiao cities district heating and CHP systems. The projects are ongoing and likely to expand to other cities in China.

**Januar 2008 appointed evaluator of new energy technology development** projects to be supported financially by the Danish Government trough the TSO EnergiNet Denmark. On going in the field of Biomass and Wave Energy. The services has as a spin of resulted in similar services being performed on biogas projects for the Danish Energy Agency.

He is the Danish member of Power Gen Europe conference committee. Power Gen Europe is an annual event consisting of a 3 day conference and the largest exposition in Europe of power equipment. In 2008 and 2009 he was chairman for the conference track on low to zero CO2 emission energy policies and technologies including CCS.

**From June 2007 internal STC** for the World Bank assisting in the "Clean

Air for Ulaan Baatar" project. The package of projects to finance in order to reduce air pollution contained CDM projects (*reference Gdraugelis@worldbank.org*)

**2005 to 2007 in a consortium with Risoe** and IED France, PNOC Philippines, Institute of Energy Vietnam and MIME Cambodia developing wind projects having the overall responsibility for integrating CDM issues in the projects. The study was supported 50% by the EU ASEAN Energy Facility Program and included several work shops and capacity building in order to enable the ASEAN partners to develop wind energy projects as CDM projects.

**From September 2005 as STC for the W B** assisting the project proponent establishing a model PDD for "A Retrofit Programme for Decentralised Heating Stations in Mongolia" which was registred 28 August 2006. And establishing a package of CDM PINs for ERPA between the World Bank and the Mongolian government..

(*reference: Rcandoysekse@worldbank.org ; Jsteele@worldbank.org*)

Advisor to Foster Wheeler on implementation of Coal Biomass co-firing projects in Thailand as CDM projects September 2005.

*(reference: janne.lujala@fwfin.fwc.com )*

**From December 2004 and ongoing STC** for the World Bank East Asia and Pacific establishing CDM project pipeline in Mongolia, and developing PIN's for energy conservation/efficiency portfolio in Ulaan Baatar, Choibalsan and Chutul. *( reference: Arivera2@worldbank.org )*:

**Internal consultant in the Carbon Finance Unit** of the World Bank for the CDCF (2003 and 2004) *(ref Kenn Newcombe, Apinna@worldbank.org)*:

**2000-2004** **ELSAM**

Marketing Manager for Business Strategy and Development within EU, Eastern Europe and South East Asia and Danish representative in Eurelectric NE International Energy Cooperation

Member of the standing conference committee in Power-Gen Europe on new energy technologies and chairman for the track on Renewable Energy and Zero $CO_2$ emission technologies.

**1989-2000** **DANISH POWER CONSULT A/S (100% owned by ELSAMPROJEKT A/S/ Elsam Engineering)**

EU-coordinator for ELSAM on matters relating to EU external cooperation, energy policy, effiency and new technology development. (Clean Coal, Gas, Electricity, Renewable Energy Saving). The function included establishment of a network with the Danish Energy Agency and the staff in DG 12 and 17 for obtaining financial support to energy demonstration projects (*reference: Carl Hilger)*

Market and project developer and co-ordinator for energy projects in Southern and Eastern Europe and CIS (in particular wind and CHP).

Organiser of international conferences with the Electric Power Council of the CIS for Eurelectric. Chairman of Eurelectric conferences on energy policy from 1993 to 1996 and Power-Gen conferences on renewable energy from 1996 to 2000 (for Elsam).

**1983-1989** **I. KRÜGER A/S, Copenhagen, Denmark**
Regional manager and market co-ordinator of projects financed or supported by the EU and EIB. Among these development of a biogas production plant at Ribe, Denmark and wind farms in Ireland, Spain, Portugal and Greece (later executed when joining Elsamprojekt A/S).

**1981–1983** **DONG (Danish Oil and Natural Gas Company)**

Project manager for the basic and detailed design of the Natural Gas Storage project with 200 engineers reporting to him through the organisation. Construction manager of the structures related to thegas storage project, leaching facilities and development of 6 caverns in the salt dome at Lille Thorup for storing 200 Mio. m3 NG at the cost of 55 Mio. EUR. As Operation manager he was responsible for the selection and capacity building of the gas storage operational staff. The project gave a thorough experience in design of natural gas systems. He was further responsible for the evaluation of alternative gas storage projects at Tønder and Steen Lille – both aquifer type of storages projects being of the seasonal storage types where as Lille Thorup with high extraction rates is of the peak storage type.

**1973-1981** **I. KRÜGER A/S**
Project engineer, project economist and project manager in Nigeria/Denmark, France/Denmark, Togo/Denmark, Niger/Denmark, Burkina Faso/Denmark, Vietnam, Denmark, Iran and Tanzania.

Erection, start-up and optimisation of one of the world's first large-scale industrial wastewater denitrification and anaerobic treatment plants, producing 300 m3/h biogas on waste from pectine production.

**1971-1973** **The Danish Engineering Academy, Copenhagen**
Professor and tutor in hydraulics, wave hydraulics, hydrology, coastal engineering and harbour construction.

**1969-1973** **Bigum & Steenfos, A/S / GTO (Technical Organization for development of Greenland)**

Survey leader for rural development in Jacobshavn (Ilulissat), Frederikdshåb and Julianehåb (Greenland), summer 1971, 1972, and 1973.