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MENA Region
Carbon Finance Assist Program

Support for Capacity building and development of CDM activities in Lebanon

Mission Report

May 7, 2008 to May 13 , 2009

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ABBREVIATIONS

AUCBM : Arab Union for Cement and Building Materials

BOD_5 : Five days Biological Oxygen Demand

CDM : Clean Development Mechanism

CDR : Council for Development and Reconstruction

CER : Certified Emissions Reduction

CF : Carbon Finance Unit – World Bank

CFL : Compact Florescent Lamps

Clk : Clinker

CM : Council of Ministers

COD : Chemical Oxygen Demand

DGoE : Directorate General of Environment

DNA : Designated National Authority

DOE : Designated Operational Entity

EB : CDM Executive Board

EDL : Electricité du Liban

EE : Energy efficiency

EIA : Environmental Impact assessment

ER : Emission Reductions

GBA : Greater Beirut Area

GEF : Global Environment Fund

GHG : Green House Gases

GJ : Giga Joule (10^9 Joule)

GLS : General Lighting Service

GWh : Giga Watt hour (10^9 Watt hour)

IIEC : International Institute for Energy Conservation

IPCC : Intergovernmental Panel on Climate Change

kcal : 1000 calories

KP : Kyoto Protocol

kWh : kilo Watt hour (10^3 Watt hour)

LBP : Lebanon Pounds
LCEC : Lebanese Centre for Energy Conservation
LCECP : Lebanese Centre for Energy Conservation Project
LFG : LandFill Gas
LNG : Liquefied Natural Gas
LoA : Letter of Approval
m^3 : Cubic meter
MENA : Middle East and North Africa region
METAP : Mediterranean Environmental Technical Assistance Program
MEW : Ministry of Energy and Water
MoE : Ministry of Environment
MSW : Municipal Solid Waste
MW : Mega Watt (10^6 Watt)
MWh : Mega Watt hour (10^6 Watt hour)
NGO : Non Governmental Organization
NHV : Net Heating Value
PDD : Project Design Document
Petcoke : Petroleum Coke
PIN : Project or Program Idea Note
RE : Renewable Energy
SD : Sustainable Development
SNC : Second National communication (to the UNFCC)
SWH : Solar Water Heaters
TJ : Téra Joule (10^{12} Joule)
TORs : Terms Of Reference
UNDP : United Nation Development Program
UNFCCC : United Nations Framework Convention on Climate Change
WB : World Bank
WBI : World Bank Institute

Currency exchange rate:

1 $ = 1 500 LBP

EXECUTIVE SUMMARY

1- A two days CDM workshop was organized in Lebanon in June 2007 by the MoE in collaboration with the Mediterranean Environmental Technical Assistance Program (METAP) of the World Bank. The organization of this milestone workshop just after the DNA establishment has marked the effective launch of the CDM in Lebanon. Despite the fact that CDM awareness has been raised, many projects' holders are interested in CDM (EDL, CDR, municipalities, LCPC, Cimenterie Nationale, etc.) consulting companies (Mores, Green Enterprises, SES, etc.) have embarked in the CDM development services, PINs have been prepared, etc. CDM in Lebanon did not reached yet the expected development pace after two years of the DNA establishment. Lebanon does not have yet of a formalized CDM portfolio. This is more noteworthy that Lebanon has highly qualified human resources and that the CDM potential is promising and still untapped.

2- The World Bank Institute (WBI), responsible for the CF-Assist program management, has hired Dr. Abdelmourhit Lahbabi, as short term consultant, to provide technical assistance for DNA institutional capacity development in Lebanon and to assess the CDM local potential. A field mission to Lebanon was organized from May 7 to May 13, 2009. Most of the mission time has been spent with DNA working on the assessment of DNA role and organization, CDM projects validation process, capacity development needs and CDM development recommended action plan. Potential CDM projects' ideas proposed by the DNA were assessed during the mission and meeting were held with the concerned stakeholders.

3- The mission has help achieved three main objectives: i) Capacity building and awareness raising on CDM through the organisation of a CDM workshop ii) Review of DNA organization and CDM approval procedures and recommendation of pertinent measures for further CDM activities in Lebanon and iii) Identification of new CDM projects ideas and assessment of current projects under development. This report summarizes the results of the mission tasks, presents CDM projects and procedures assessment and highlights the recommendations for the development of CDM activities in Lebanon.

4- The current situation is critical for the future of CDM development in Lebanon. The legal set up and the favourable development environment already exist. But the approval procedures are too complex for this start-up phase and they are thus hindering the potential of CDM initiatives and project's development. In fact, within the available capacities and resources, the proposed simplifications measures could help trigger the full CDM potential development in the country.

5- The report analyses the main institutional barriers to CDM development and proposes pertinent measures for the DNA to foster CDM activities in Lebanon. Given the available limited resources and the current initial phase of CDM development process, DNA role should be limited to a simple role of CDM catalysis and development. Most of the first CDM developed projects are usually clean development projects that should not have any problems complying with the SD criteria of the country (RE, EE, waste management, etc.). For these projects, the DNA approval should be a simple formality.

6- At this initial stage of the CDM development process in Lebanon, the recommended core mandate of the DNA should be limited to:

- ✓ CDM awareness raising and capacity development;
- ✓ CDM projects' development facilitation by providing up to date pertinent information, advice, contacts etc.
- ✓ Publication of updated information on CDM activity in Lebanon
- ✓ Development of a CDM portfolio for Lebanon;
- ✓ An active assistance and support role for the development of public CDM projects
- ✓ International resources mobilization for CDM national capacity building;
- ✓ SD validation of CDM projects and LoA issuance.

7- The detailed analysis of the CDM approval procedures is beyond the scope of the present mission. However a rapid review of the adopted procedures shows that they are complex and not adapted to the initial CDM development phase. In fact the judicious approach should be a pragmatic one starting from a very simple approval process and complementing it through acquired experience**.** Based on this the current approval procedure should be completely reviewed and simplified to create the favourable environment for CDM development.

8- Partnership fostering is crucial for the development of the CDM activities. Good collaboration relations with the technical centres such as the LCEC, universities, public institutions and municipalities are essential for CDM projects identification and carbon credits development. Similarly, the technical expertise is vital for the CDM projects development. The DNA should build and maintain a network of experienced local consultants that can help develop CDM projects. On the international front, DNA should nourish partnerships with countries in the MENA region, international financial institutions, CDM institutional developers, carbon funds and ERs buyers, etc.

9- The CDM projects or ideas of projects discussed in this report were either provided by the DNA or gathered through the meetings held or the workshop organized during the field mission. They are at different CDM development stages. The report analyzes the CDM feasibility and potential of the different projects ideas identified during the mission. CDM risks and requirements are presented for each identified project along with recommendations on the project's CDM development.

10- A country wide potential CDM program on Municipal Solid Waste (MSW) was discussed with the DNA and data and information on the MSW sector in Lebanon and on the waste management planned program was gathered from the CDR and the MoE Service of Protection of Urban Environment. Preliminary information on the status of three landfills projects were also evoked during the mission meetings namely Naameh, Zahlé and Tripoli landfills.

11- Since 1998, Lebanon has opted for an integrated MSW management policy. The practice of integrated waste management has been reinforced in 2006 by the adoption of the Municipal Waste Master Plan reconfirming the strategic choice of the integrated MSW management for Lebanon by fixing the options and selecting nationwide sites for the transferring, sorting, composting and landfilling. Under these

conditions, the integrated MSW management option and the practice of LFG capture and flaring constitute the baseline for any CDM MSW project to be developed in Lebanon. Consequently, the CDM additionality, will be hard if not impossible, to justify for biogas LFG flaring and for composting CDM projects. CDM options of electricity generation and LFG capture efficiency improvement are discussed in the report for the Naameh and Zahle landfills.

12- During the mission CDM opportunities in the electricity sector were discussed with Electricité du Liban (EDL). Three projects ideas were considered for evaluation: i) Fuel switch to natural gas at Zahranni power plant, ii) EE Rehabilitation project of the Zouk power plant and ii) Rehabilitation of Richmaya hydro power plant. A part from the first project that is highly dependent of natural gas imports, the two remaining projects are very profitable and could have been developed under CDM. In fact the real issue is not CDM itself but rather the technical and financial problems that the electricity sector is experiencing and the limited capacity of EDL to mobilize the required investment capital to implement the projects.

13- Two additional CDM projects were discussed with Lebanese Centre for Energy Conservation (LCEC) i) Nation wide program for the replacement of General Lighting Services (LGS, incandescent lamps) by Florescent Compact Lamps (FCL) and ii) Solar water heaters program. The details of the CDM assessment of both projects are provided in the report.

14- The efficient lighting program aims at the replacement of 3.44 millions incandescent 100 W lamps by 23 M CFL for a total of 1,15 millions households in Lebanon. The total program cost is estimated at 5,73 millions $. A PIN has been prepared by the LCEC for the program. Based on the assumptions made, the efficient lighting program will generate around 931 000 CERs over the period 2011-2018 of which 184 000 CERs are up 2012.

15- From the information gathered during the mission, it looks like Lebanon is at start of a self sustainable large scale Solar Water Heaters (SWH) market deployment. The timing is perfect for the development of a CDM program on SWH. This is a golden opportunity that should be urgently grasped. Indeed, to preserve its additionality, the CDM program should absolutely be developed at this critical market phase.

16- Finally, a feasibility of an energy saving project in the Cimenterie Nationale cement plant was discussed with the project proponent during the mission. The results of the project's CDM assessment are provided in the report. Given the fact that the project is very profitable, its CDM additionality could be an issue and in any case, would be hard to justify. Considering the limited expected ERs (7 140 tCO2/year), there is a concern about the low CDM benefits and their capacity to compensate for the CDM development costs that should be engaged by the cement company.

17- The different recommendations made for the DNA organization and approval process speedup are summarized below along with other pertinent proposed measures for CDM development in Lebanon. They can be considered as outlines for CDM action plan to be developed subsequently by the DNA.

OUTLINES OF A CDM DEVELOPMENT ACTION PLAN IN LEBANON

Institutional tasks
Establishment of a CDM development strategy and action plan for awareness raising and financial resources mobilization
Reorientation of DNA missions and simplification of the CDM project approval procedures
Reinforcement of the CDM team by affecting a full time junior staff member to the development of CDM activities under the supervision of an experienced senior staff
Design a specific web site dedicated to CDM activities in Lebanon
Implement the CDM awareness raising and financial resources mobilization action plans
Local, regional and international partnerships fostering.
At a further CDM development stage, establish a **consultative** steering committee for the CDM activities development (concerned public institutions, private sector stakeholders, CDM experts, NGOs etc)
Technical tasks
Engage a consultant or a consulting company for the build up of CDM portfolio for Lebanon
Establish the official emission factor of the electricity grid according to the CDM EB procedures.
Entrust the CDM development of the Naameh and Zahle landfills to a private developer
Implement a SWH CDM program with LCEC as coordinating entity
Refine the concept of the nationwide CDM CFL program promoted by the LCEC - Make a survey for the households lighting patterns and baseline establishment and develop the PDD of the program

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1- INTRODUCTION

Carbon Finance Assist (CF-Assist) is a capacity building and technical assistance program established by the World Bank to help develop national capacities of developing countries on carbon finance and CDM activities.

The World Bank Institute, responsible for the CF-Assist program management, has hired Dr. Abdelmourhit Lahbabi, as short term consultant, to provide technical assistance for DNA institutional capacity development in Lebanon and to assess the CDM local potential and develop the PINs for the most promising identified projects. The ToRs of the mission are provided in appendix A.

A field mission to Lebanon was organized from May 7 to May 13, 2009. Most of the mission time has been spent with DNA working on the assessment of DNA role and organization, CDM projects validation process, capacity development needs and CDM development recommended action plan. Potential CDM projects' ideas proposed by the DNA were assessed during the mission and meeting were held with the concerned stakeholders: Council for Development and Reconstruction (CDR), Ministry of Finance, Electricité du Liban (EDL), Lebanese Center for Energy Conservation (LCEC), Cimenterie Nationale and two consulting companies: Mores and Green Enterprises (See annex B for the list of persons met or interviewed during the mission). The meetings with the concerned stakeholders focused on potential CDM projects development and on the required data/information gathering. Special attention was given to the scope of projects activities, projects objectives, projects status, expected implementation schedule, cost and financing, potential emissions reduction and projects' CDM additionality.

Furthermore a CDM capacity building workshop was organized for more than forty participants: Ministries, Municipalities, Utilities, local consultants, financial partners and private sector potential projects' holders. The presentations provided a general overview on the national, regional and international CDM contexts and covered the following topics: Climate Change and CDM, State and perspectives of Carbon market, CDM cycle, PINs and PDD development, methodologies, additionally concept etc. A special session was held on CDM opportunities in cement sector and individual meetings with potential projects were also organized during this session.

A restitution closing meeting was organized with the MoE technical team. The preliminary findings of the mission were presented and discussed with the concerned MoE staff namely: i) DNA missions and organization ii) CDM promising projects and sectors iii) DNA action plan for CDM development in Lebanon, etc.

The preliminary findings and recommendations discussed during the closing meeting are presented in Annex C.

This report summarizes the results of the mission tasks, presents CDM projects and procedures assessment and highlights the recommendations for the development of CDM activities in Lebanon.

2- CDM CAPACITY BUILDING WORKSHOP

The objective of the workshop was to raise the awareness of the public institutions, municipalities and private potential projects holders on the benefits of CDM, help identify projects ideas and develop the capacity of local consultants.

Overall, more than forty public and private sectors stakeholders and consultants have participated in the workshop (see annex D for the participants list)

The workshop agenda is provided in the following page and the presentations are given in annex E.

Workshop minutes:

Welcome opening speech was made by Dr. Berj Hatjian, Director General of the Ministry of Environment, who summarized the Ministry of Environment achievements with regard to Climate Change and CDM and stressed the need for Lebanon to develop the CDM activities as a tool for clean projects' development.

Mr. Gael Grégoire, the Middle East and North Africa Regional Carbon Finance Coordinator at the World Bank, made a keynote presentation on the international and regional context of the CDM, the state of the carbon market and gave some insights on the post-2012 perspectives of the CDM and other carbon mechanisms.

A presentation on the CDM concept was made as introduction to the workshop. It outlined the modalities and requirements of the UNFCCC, Kyoto Protocol (KP), Marrakech accords and the CDM. An overview of carbon finance and CDM market was offered during the first session of the workshop.

The CDM context was covered in two presentations made by the DNA. They outlined the CDM activities in Lebanon, the DNA role and procedures for CDM projects' evaluation by the DNA.

The last two presentations focussed on the CDM rules, modalities and procedures. The CDM projects' development cycle was presented and explained step by step. CDM methodologies, baselines and additionally were illustrated with many examples from various sectors: solid waste, renewable energy, energy efficiency, fuel switching, transport systems, etc.

After the morning presentations, a special session was organized in the afternoon for individual meetings with potential projects' holders and a presentation on the CDM opportunities for the cement sector was made during this session.

The overall appreciation of the workshop is very positive. Most of the 46 registered participants attended all the workshop presentations. They had the chance during the workshop to get exposed to all aspects of the CDM projects development. Special attention was given in the workshop to the practical modalities of CDM development, the importance of the Carbon Market and CDM projects examples in the MENA Region.

Capacity Building on
"Clean Development Mechanism (CDM)"

May 11, 2009

8:45-9:00	**Registration**	
9:00-9:10	Welcome opening remarks by Dr. Berj Hatjian, Director General of the Ministry of Environment Opening Statement by M. Gael Gregoire Regional Carbon Finance Coordinator Middle East & North Africa Region – MNSSD-World Bank Objective and Agenda of the Workshop Mr. Naddaf Ministry of Environment	
9:10-9:30	1- World Bank Carbon Finance Activities Carbon potential and opportunities in the MENA region	Mr. Gael Grégoire World Bank
9:30-9:50	2- Kyoto Protocol, CDM State of the carbon market	Mr. Lahbabi World Bank Consultant
9:50- 10:10	3- CDM in Lebanon – Role of the DNA	Mr. Naddaf /DNA
10 :10-10 :25	4-CDM Project Cycle	Mr. Lahbabi
10:25-10h40	5-Project Evaluation Process at the DNA	Mr. Naddaf /DNA
10:40-11:00	Coffee Break	
11 :00-11:30	6-CDM in Practice – Examples (Renewable Energy, Energy efficiency, Solid waste, Cement industry, etc.)	Mr. Lahbabi
11:30-11h50	7-Questions- Clarifications- Discussion	Open session
11:50-12:20	8-Priority actions for CDM development in Lebanon Promising CDM projects	Open session animated by MM. Naddaf/Grégoire
12 :20-12 :30	Registration for individual meetings	
12:30-14:00	Lunch	

After noon

14:00-17:00	Individual meetings with interested participants (30 mn max per meeting) Presentation on CDM opportunities for cement sector

3- DNA CAPACITY DEVELOPMENT

3-1 CDM local context

The technical assistance mission has provided an analysis on the current situation of CDM in Lebanon and the DNA institutional organization and projects' evaluation procedures. Despite the particular institutional and political situation of Lebanon, the limited resources and the overwhelming pollution problems that the MoE had to face, Lebanon has set up the required framework for the CDM development. The following table presents the milestones of the legal CDM framework set up in Lebanon.

CDM legal framework build-up in Lebanon

- On 15 May 2006, the Lebanese Parliament passed Law 738 (Accession to Kyoto Protocol)
- On 15 June 2006, the CDM Committee was established under Decision 22/1
- In November 2006, a report was submitted to DGoE
- In February 2007, a technical report was submitted according to Decision 10/2 (January 11, 2007)
- In May 2007, the Presidency of Council of Ministers granted approval to establish the DNA at MoE

Source MoE/DNA

Considering the institutional CDM framework, Lebanon chose rightly the one Ministry model: the DNA managed under the MoE authority is responsible for the host country approval and issuance of the LoA required for CDM projects registration.

Besides the legal framework build-up, an important CDM workshop was organized the 25 and 26th June 2007 by the MoE in collaboration with the Mediterranean Environmental Technical Assistance Program (METAP) of the World Bank. The organization of this milestone workshop just after the DNA establishment has marked the effective launch of the CDM in Lebanon. Despite the fact that CDM awareness has been raised, consulting companies have embarked in the CDM, many projects' holders from private and public sectors are interested in CDM (EDL, CDR, municipalities, LCPC, Cimenterie Nationale, etc.) , PINs and even PDDs have been prepared and some project's holders have received commercial offers for their CDM projects, the CDM in Lebanon did not reached yet the expected development pace after two years of the DNA establishment. This is more noteworthy that Lebanon has highly qualified human resources and that the CDM potential is promising and still untapped.

3-2 Overall assessment

The current situation is critical for the future of CDM development in Lebanon. The legal set up and the favourable development environment already exist. But the approval procedures are too complex for this start-up phase and they might be hindering the potential of CDM initiatives and project's development. In fact, within the available capacities and resources, some simplifications measures, could help trigger the full CDM potential development in the country.

The following paragraphs analyse the main institutional barriers to CDM development and propose pertinent measures for the DNA to foster CDM activities in Lebanon.

3-3 DNA role and tasks

Given the limited available resources and the current initial phase of CDM development process, DNA role should be limited to CDM catalysis and development. In fact, this is more than the minimal role envisioned by the KP for the host countries involvement. Moreover, most of the first CDM developed projects are usually clean development projects that should not have any problems complying with the SD criteria of the country (RE, EE, waste management, etc.). For these projects, the DNA approval should be a simple formality.

It is important to stress the fact that the DNA should not have any technical role/responsibility in the CDM validation process. The provided LoA of the host country to a project developer does not imply the technical, financial or commercial viability of the CDM project. By providing the LoA, the underlying DNA responsibility is limited to the conformity of the project with the country SD criteria. The technical, financial and commercial responsibility etc. of the project lies with the project promoter. The CDM validation of the project lies also with the project proponent and the DOE hired by him for the project's CDM validation according to the EB procedures.

However, besides the awareness raising role, the MoE/DNA should provide technical CDM support and advice to public institutions for the development of their CDM projects. This technical support should be limited since CDM project development is a very specialized activity that should be undertaken by professional experts. The DNA should not take the role of the CDM developer for the public projects but rather help hire professional consultants and supervise their work.

Concerning the issuing the LoA, special attention should be given to the project ownership. The Approval Letter should be delivered to the legal owner of the project or his legally designated representative.

Contents of the letter of approval

In the letter of approval, the designated national authority (DNA) must confirm that it has ratified the Kyoto Protocol, that it approves the participation of the project proponents in the project activity, and in the case of the host Party letter of approval, that the project will contribute to sustainable development in that country. These requirements are set out in EB 16, Annex 6:

The designated national authority (DNA) of a Party involved in a proposed CDM project activity shall issue a statement including the following:

- The country has ratified the Kyoto Protocol.
- The approval of voluntary participation in the proposed CDM project activity.
- Host Parties: statement that the proposed CDM project activity contributes to sustainable development (EB 16, Annex 6, paragraph 1).

The Executive Board has also confirmed that Parties cannot give conditional approvals to project participants:

The written approval shall be unconditional with respect to the above (CDM Glossary of Terms, Version 03).

The Executive Board noted in EB 25, paragraph 95 that there had been problems in obtaining complete written approvals from host Parties:

The Board reiterated that DNAs, in preparing a letter of approval, should include all the required elements as requested by the Board and reflected in the Glossary of CDM terms under the term "Approval by Parties involved", in particular that: the country has ratified the Kyoto Protocol, the approval of voluntary participation in the proposed CDM project activity and, in cases of host country letter of approval, that the proposed CDM project activity contributes to sustainable development (EB 25, paragraph 95).

However, the Executive Board has decided to retain some flexibility when the ratification status of the host Party was inadvertently omitted from the letter of approval, since this information is available to it anyway (EB 25, paragraph 125).

Last updated on 27 March 2008

Source: CDM Rulebook, Baker&McKinsie, http://cdmrulebook.org/PageId/95

Recommendations:

At this initial stage of the CDM development process in Lebanon, the recommended core mandate of the DNA should be limited to:

- ✓ CDM awareness raising and capacity development;
- ✓ CDM project's development facilitation by providing up to date pertinent information, advice, contacts etc.
- ✓ Publication of updated information on CDM activity in Lebanon
- ✓ Development of a CDM portfolio for Lebanon;
- ✓ An active assistance and support role for the development of public CDM projects
- ✓ International resources mobilization for CDM national capacity building;
- ✓ SD validation of CDM projects and LoA issuance.

3-4 DNA institutional set up

Concerning the institutional set up, Lebanon chose the one Ministry model: the DNA managed under the MoE authority. Given the complex institutional and political situation of the country, the choice of this model is judicious. The CDM approval decision making process lies within the MoE and it should be thus, prompt and more efficient.

At current CDM initial development phase, this simple set-up is appropriate. no technical or inter ministerial committee is needed to achieve the DNA CDM development sought objectives. Based on this, there is no need for the MoE to form a CDM technical committee for the projects' approval.

However, at a further development stage, a consultative steering committee could be established for the CDM development strategy, awareness raising, etc. Besides concerned public institutions, such committee should be open to private sector stakeholders, CDM experts, NGOs etc. More importantly, the role of this committee should be limited to a consultative body to support the MoE/DNA activities.

Recommendations:

- ✓ At a further CDM development stage, establish a consultative steering committee for the CDM activities development. This committee should be chaired by the DGoE and include besides concerned public institutions, private sector stakeholders, CDM experts, NGOs etc.

3-5 – CDM approval procedures

The CDM approval procedures currently used by the DNA are presented in the technical report submitted to the DGoE in November 2006 based on the Ministerial decision 22/1 dated June 15, 2006 (see reference 1). They have been legally adopted by the Ministry of Environment in under Decision 12/1 dated 7th of March 2009 (reference N°2).

The CDM approval procedures are also summarized in the workshop DNA presentation (see annex C). The detailed analysis of the CDM approval procedures is beyond the scope of the present mission. However a rapid review of the adopted procedures shows that they are complex and not adapted to the initial CDM development phase. **In fact the judicious approach should be a pragmatic one starting from a very simple approval process and complementing it through acquired experience.**

Based on this the current approval procedure should be completely reviewed and adopted to the current context of CDM start up activity and initial development phase of CDM in Lebanon.

Some preliminary remarks inspired by the rapid review of the current approval procedures:

- The PIN should not be an official required document for the DNA approval. As its name indicates, it is a notification to the DNA of the development of an idea of a project. Based on this, no endorsement letter should be provided to the promoter based on a PIN. The PIN submission helps the DNA keep track at early stages of the CDM ideas under development in the country. It also offers the DNA the opportunity to express a reserve on certain aspects of the project or provide eventually, specific development advice to the promoter.

- The SD analytical evaluation based on weighted criteria is too sophisticated and certainly hard to apply. In fact it might be, for some projects, more subjective than say a direct qualitative approach. Here also the golden rule is simplicity. In this regards, it is recommended to adopt five to eight inclusive criteria for the SD approval such as: clean technology; rational use of local resources, environment protection, positive economic and social benefits, climate change mitigation and adaptation, job creation, etc.

Recommendations:

Review and simplify the adopted CDM approval procedure to create the favourable environment for CDM potential fostering at the current initial development phase of CDM in Lebanon.

3-6 – Human resources

By virtue of Law 690 dated 26th of August 2005, the Ministry of Environment in Lebanon is comprised of six services under the authority of the Minister of Environment and the supervision of the DGoE (see following organisational chart). Overall around forty staff members are working on the environment protection mandate of the MoE.

Currently, the CDM technical activities are carried out by a technical committee established at MoE comprised of senior and junior staff members that are associated to specific CDM tasks or activities implementation. The CDM projects' review is undertaken by this technical committee and the approval decisions are made by MoE.

Source: Ministry of Environment Website; http://www.moe.gov.lb

The DNA mandate is undertaken by the Service of Prevention from Technological impacts and Natural Hazards in collaboration with others MoE services. However the absence of dedicated CDM/DNA staff makes the CDM management somehow diffuse among the service technical staff members. This can be explained by the limited number of the MoE human resources and by the importance of the workload and responsibilities of the technical staff. But still at least one dedicated junior staff member should be affected to CDM development and to the consolidation of the CDM activities under the supervision of a senior experienced staff member.

Recommendation :

Reinforce the CDM team by affecting a full time junior staff member to the development of CDM activities under the supervision of an experienced senior staff (20% time load)

The job description, responsibilities and requirements of the CDM staff member are summarized in the following table.

Position	**CDM Development manager**
Job Description	Responsible for the management of the CDM at the MoE and the implementation of its development strategy
Profile	Highly qualified CDM specialist (20% time load)
Main responsibilities	Focal point of the DNA Implementation of CDM development action plan Supervision of the administrative, technical and awareness raising activities of the MoE Review of the submitted PINs and PDDs Recommendation of CDM approval decisions Support to public entities for the development of their CDM projects Financial resources mobilization for CDM development programs
Requirements	Environment or engineering degree with a minimum of five years experience in CDM projects development

Position	CDM specialist
Job Description	Undertake all CDM development activities of the MoE
Main responsibilities	Perform all CDM support duties for the MoE CDM manager Prepare preliminary reviews of submitted PINs and PDDs Help implement and coordinate all DNA activities Develop and implement CDM awareness raising action plan Design and develop awareness raising materials for the MoE CDM activities Maintain an updated MoE CDM web site Handle the organization duties and the logistics for all CDM related internal and outsides meetings, workshops, exhibitions, staff missions, etc
Requirements	Bachelor degree in environment, engineering or an MBA, preferably with a two year experience in similar post– Experience in CDM desirable

3-7 – Financial resources

Mobilization of financial resources for the development of CDM activities in Lebanon shouldn't be a problem. With a clear marketing and action plans for resources mobilization, the MoE could attract the ample needed resources for the establishment of a CDM strategy development, for a CDM projects portfolio build-up and for hiring additional short term experts for the technical assistance and support of the DNA activities.

3-8 – Partnerships fostering

Partnership fostering is crucial for the development of the CDM activities. Hence, partnerships nurturing should be perceived as a primary tool for CDM activities development.

On the international front, DNA should nourish partnerships with countries in the MENA region, international financial institutions, CDM institutional developers, specialized carbon funds buyers, etc.

On the local front, good collaboration relations with the technical centres such as the LCEC, universities, public institutions and municipalities etc. are fundamental for CDM projects identification and carbon credits development. Similarly, the technical expertise is essential for the CDM projects development. The DNA should also build and maintain a network of good local consultants that can help develop CDM projects.

4- CDM PROJECTS ASSSESSMENT

4-1 Introduction

Lebanon does not dispose yet of a formalized CDM portfolio. The CDM projects or ideas of projects discussed in this paragraph were either provided by the DNA or gathered through the meetings held or the workshop organized during the field mission. They are at different CDM development stages with PINs developed for two projects:

- Replacement of GLS by CFL nationwide, established by LCEC;
- Bsarma El Koura Solar Steam project, established by Zeeni Trading Agency

Besides the CFL project, an interesting project idea was discussed with the LCEC on Solar Water Heaters (SWH). This project idea, analyzed in the following paragraphs, should be developed by LCEC as a CDM Program.

A country wide potential CDM program on Municipal Solid Waste (MSW) was discussed with the DNA and data and information on the MSW sector in Lebanon and on the waste management planned program was gathered from the CDR and the MoE Protection of Urban Environment Service. Preliminary information on the status of three landfills projects were also evoked during the mission meetings namely Naameh, Zahlé and Tripoli landfills.

During the mission CDM opportunities in the electricity sector were discussed with Electricité du Liban (EDL). Three projects ideas were considered for evaluation:

- Fuel switch to natural gas at Zahranni power plant ;
- EE Rehabilitation project of the Zouk power plant;
- Rehabilitation of Richmaya hydro power plant.

Finally, a feasibility of an energy saving projects in the Cimenterie Nationale cement plant was discussed with the project proponent during the mission.

The following paragraphs analyze the CDM feasibility and potential of the different projects ideas identified during the mission. CDM risks and requirements are presented for each identified project along with recommendations on the project's CDM development.

4-2 CDM feasibility of the MSW projects

4-2-1 Overview of the MSW sector in Lebanon

An overview of the MSW management in Lebanon is summarized in the following Table.

Solid Waste Management in Lebanon

Background Information

- Population: 4.4 million
- Municipal Solid Waste (MSW) Generation: 1.55 million tons per year
- Per Capita MSW Generation: 0.75-1.1kg/day (urban areas)
  0.5-0.7 kg/day (rural areas)
- MSW Generation Growth: 6.5% per year (Greater Beirut)

Technical performance

- MSW Collection Coverage: 95% in rural areas
  100% in urban areas
- MSW Final Destination: 8% composted
  8% recycled
  46% landfilled
  38 % open dumped
- Lebanon has two controlled landfills (Naameh and Zahle), a compost unit and 2 sorting/balling plants in Greater Beirut.

Legal and Policy Environment

- There is no national solid waste management policy or strategy. However, the Ministry of Interior and Municipalities has prepared a comprehensive national solid waste management plan. Furthermore, there is a draft framework law under preparation for solid waste management in Lebanon
- Law 64 dated 12th of august 1988 which is concerned with the protection of the environment from toxic and hazardous wastes
- Law 444 dated 29th of July 2002 (Environment Code)
- Decree 13389 dated 18th of September 2004 which deals with the categorization and disposal of medical wastes

Institutional Framework

- The Ministry of Environment is responsible for establishing and monitoring environmental standards and for developing a SWM strategy. The Ministry of Interior and Municipalities is involved indirectly in SWM as it is the "competent authority" responsible for supervising the activities of municipalities.
- Municipal unions deal with common interest projects benefiting all municipalities, in particular common garbage treatment projects. Outside Beirut, municipalities are responsible for waste collection.
- Under the authority of the Prime Minister, the Council for Development and Reconstruction (CDR) is in charge on behalf of the Minister of Interior and Municipalities of the treatment and landfilling of MSW.

Source : METAP 2003, updated.

Mediterranean Environmental Technical Assistance Program

According to CDR, some 1 530 000 t/year of MSW are generated in Lebanon representation an average per capita ratio of 0,93 kg/day. The following table shows the past and projected MSW quantities in Lebanon.

Past and projected MSW generated quantities in Lebanon in 1000 t

MSW quantities	2005	2010	2015	2020
Beirut/Mount Lebanon	854	896	939	987
South + Nabatieh	196	206	217	229
North	266	282	299	319
Bakaa	158	164	173	180
Total	**1 474**	**1 548**	**1 628**	**1 715**

Source CDR

Municipal Solid Waste management in Lebanon differs greatly between among municipalities. It has reached a good level of professionalism in the GBA with recycling, composting and sanitary land filling (Naameh and Bsalim). To a lesser extent the municipalities of Tripoli and Zahle have also improved MSW management with sanitary landfills. However in the rest of the country, most of the generated waste is disposed off in open waste dumps.

In 2003, the Council of Ministers (CM) decided to mandate the CDR for the treatment and landfilling of the MSW in Lebanon. Under this mandate, the CDR is responsible for the supervision of the MSW treatment services transfer to specialized private companies. For this purpose Lebanon was divided in four service areas:

- Beirut and Mount Lebanon;
- North Lebanon and Akkar;
- South Lebanon and Nabatiyeh;
- Bekaa and Baalbeck-Hemel.

The services to be contracted are divided into two parts: i) Street cleaning, waste collecting, transfer and transport to the designated landfill ii) disposal of MSW including sorting, recycling, composting and landfilling.

In 2004, a designed technical commission issued for the four service areas its report on the sites selection for sorting, composting, landfilling and bulky items landfilling (see reference N°12).

In 2006, the Government approved a nationwide municipal waste master plan fixing the sites of MSW transfer, sorting, composting and landfilling.

Since then, most the technical and environmental studies on the selected sites have been finalized. According to the Solid Waste Management Section of the MoE most of the MSW disposal and treatment sites are to be constructed and equipped during the period 2010-2012.

4-2-2 CDM opportunities in the MSW sector

The MSW sector offers an interesting CDM potential development. In landfills, the organic component in waste is degraded under anaerobic conditions and produces a type of biogas, known as landfill gas. The LandFill Gas (LFG) can be recovered and either flared or utilized. Gas recovery can be a low-cost and relatively low-technology option. Typical recovery efficiencies are around 50%. But with the appropriate equipment and technology used, they can reach 70%.

Landfill biogas comprises mainly methane (40 to 60%), CO_2 (20 to 60%), traces of H_2S (around 1%) and water vapor. Methane is a potent greenhouse gas, 21 times stronger than carbon dioxide. Thus capturing and flaring/using methane has the advantage of mitigating global warming, by avoiding the emission of the gas that would otherwise have been released into the atmosphere.

The captured LFG has a high calorific value. It has various potential end uses, most importantly its use as source of energy. Direct on-site use of minimally treated LFG offers good opportunities for energy generation (electricity or thermal energy) and CDM development.

The MSW disposal and treatment offer three main opportunities for CDM projects' development:

- Capture and flare of the LFG;.
- Use of the LFG as fuel in substitution of fossil fuels or grid based electricity;
- Composting of the sorted organic waste.

Over the 1 660 CDM registered projects more than 350 are related to waste disposal sector[1]. The sector also benefit from an important number of existing approved methodologies.

[1] Including waste water. As of June , 2009. Source www.unfccc.int

4-2-3 Feasibility of CDM development for the MSW sector in Lebanon

Lebanon generates some 1,55 millions tons a year of MSW of which around 60% is disposed off and treated after sorting in the GBA (Naameh and Bsalim landfills and Coral composting facility), Tripoli and Zahleh Sites. According to the draft of Lebanon Second National Communication (SNC) to the UNFCCC, 31% of the collected MSW in Lebanon is characterized as *unmanaged deep* (IPCC default emission factor 0,8) , 57% managed semi-aerobic (IPCC default emission factor 0,5) and the rest is uncategorized.

Since 1998, Lebanon has opted for an integrated MSW management policy. The most important landfill, namely the Naameh landfill servicing the GBA, has been delegated to private operator for the sorting, recycling, composting and landfilling services. Moreover, the landfill is equipped with capturing and flaring installations and biogas flared quantity has been increasing since 1998. According to Lebanon SNC (reference N°4), around 12 300 t of methane have been flared in 2006 in the Naameh and Zahleh landfills. **This represent some 258 000 missed CERs for Lebanon**! The composting adopted practice also limits considerably the biogas generation potential and thus possible GHG emissions reduction and CDM opportunities.

The practice of integrated waste management has been reinforced in 2006 by the adoption of the Municipal Waste Master Plan reconfirming the strategic choice of the integrated MSW management for Lebanon by fixing the options and the nationwide sites for the transferring, sorting, composting and landfilling.

Under these conditions, the integrated MSW management option and the LFG capture and flaring constitute the baseline for any CDM project developed for the MSW sector in Lebanon.

Consequently, the CDM additionality, will be hard if not impossible, to justify for biogas LFG flaring and for composting CDM projects in Lebanon.

Another particularity of the MSW sector in Lebanon is the relative rapid landfill stability and early biodegradation and LFG generation. According to the CDR document (reference N°7):

> *At the Naameh landfill site, BOD level dropped from a high of 50 000 mg/l to a low of 1 000 mg/l within a period of two years after disposal at the site started. Similarly and within the same period, COD levels dropped from a high of 100 000 mg/l to a low 3000 mg/l. …Such data are a clear indication of premature landfill stability because the onset of the methanogenic phase appears to have been rapid. Parameters correlated to "age" of the landfill exhibit a shift towards methanogenic activity characteristics within a relatively short period after waste deposition. Around 14 months after the start of the operations in Naameh landfill, the PH had risen above 7 indicating a decline of acetogenic activity and BOD/COD ratio has fallen below 0,3 further confirming that the waste is well into the "moderately stable" state.*

Under these conditions, CDM development opportunities for the MSW sector remain limited in Lebanon and in any case should not be considered for old small or medium landfills.

For the three main existing landfills cited (Naameh, Zahle and Tripoli) the option of generating electricity from biogas could be envisioned. In any case from the CDM point of view, the project additionality will depend mainly on the project's profitability, hence on the investment and more importantly, on the electricity selling price. If such investment project is not economically viable for the promoter and if the carbon credit additional revenues could make it more attractive for the promoter to invest in, then the CDM project additionality could be justified.

Given the current situation of the electricity sector and the importance of the grid losses[2], electricity generation projects should be limited to self use or if electricity regulation permitting, to mini-grid local distribution.

The CDM possibilities for the three main landfills (Naameh, Zahle and Tripoli), are analyzed in the following paragraphs based on the very limited information provided.

Naameh landfill: LFG has been captured and flared in this landfill since 1998. Currently, some 12 300 tons of methane a year are flared. According to MoE, commercial offers from private CDM developers have been received by the CDR. The offers were not provided to assess the CDM projects considered. However, as it was discussed above, such projects have certainly a high CDM development risk resulting from the current flaring practice. To minimize this risk, the considered project should be based on the implementation of a more efficient LFG extraction technique. Another possibility is the use of the LFG for electricity generation. But here also the project's economic viability should be established considering the required investment and the expected electricity revenues. In any case, based on the current methane captured and flared, the results of a preliminary assessment of the

[2] Grid losses are estimated at 15% technical losses and 20% losses unaccounted for.

potential of electricity generation and corresponding CERs are presented in the table below.

Naameh Landfill
Evaluation of the Electricity generation and CERs potential

Parameter	Unit	Value
Recovered methane	t/year	12 300
	1000 m3/an	17 159,6
Electricity generation efficiency	%	38%
Methane NVH	kWh/m3	9,72
Electricity generation	MWh/year	63 381
Operational period	Days/year	300
Required power	kW	8 803
Emission coefficient factor	t CO2/MWh	0,742
Emissions reductions	**t CO2/year**	**47 028**

At the current methane rate production, a biogas based 8,8 MW power plant could be operated at the landfill. The expected electricity production is estimated at 63,38 GWh/year. The corresponding emission reduction potential is evaluated at 47 000 t CO2/year.

Zahle landfill: Here also the CDM opportunities are limited to the electricity generation considering the national context of the MSW management in Lebanon. According to the preliminary information gathered, Zahle landfill receives some 100 to 140 t/day of MSW. Biogas is flared since 2003 at a current rate of 2 000 Nm^3 CH_4/day. The results of the preliminary assessment of the potential of electricity generation and the corresponding CERs are presented in the table below.

Zahle Landfill
Evaluation of the Electricity generation and CERs potential

Parameter	Unit	Value
Recovered methane	t/year	1 434
	1000 m3/an	2 000
Electricity generation efficiency	%	38%
Methane NVH	kWh/m3	9,72
Electricity generation	MWh/year	7 387
Operational period	Days/year	300
Required power	kW	1 026
Emission coefficient factor	t CO2/MWh	0,742
Emissions reductions	**t CO2/year**	**5 481**

At the current methane rate production, a 1 MW power plant could be operated at the landfill using the recovered LFG. The expected electricity production is estimated at 7,4 GWh/year. The corresponding emission reduction potential is evaluated at 5 480 t CO2/year.

Here also, it looks like the Zahle Municipality received a commercial offer for a CDM potential project. Information on the type of the proposed project could not be gathered for assessment.

Tripoli Landfill: The Tripoli landfill receives around 350 t/day of MSW. A private developer prepared a PDD for a CDM project for the landfill and submitted it to the DNA. The PDD could not be obtained and no information on the landfill and the biogas possible recovery was provided. The proposed CDM project could not be assessed.

4-3 CDM feasibility of electricity sector projects

Electricity in Lebanon is supplied through Electricité du Liban (EDL), an autonomous state owned entity under the authority of the Ministry of Energy and Water. EDL operates nine thermal power plants and five major hydroelectric plants. The current electricity consumption is around 12 870 GWh a year and its expected to reach 20000 GWh by 2015.

According to a recent World Bank report (reference N°17), *the Lebanese electricity sector is at the heart of a deep crisis. The sector is unable to supply the reliable electricity needed by homes, offices and industry….The sector accumulates huge debt with little to show for it. …Power outages are a daily occurrence in Lebanon and in some regions of the country the quality of electricity supply is particularly poor*.

The average efficiency of thermal generation is around 33% and the grid distribution losses are estimated also at 35%: 15% technical losses and 20% unaccounted for.

Three potential CDM projects were discussed with EDL during the mission:

1. Fuel switch to natural gas in Zahranni power plant;
2. Energy saving from the Zouk power plant rehabilitation project;
3. Upgrade of Richmaya hydro-electric power plant.

Fuel switch in the Zahranni power plant: Switching from the gas oil currently used in the the Zahranni power plant to a less carbon intensive fuel such as natural gas reduces GHG emissions and is thus perfectly suited to benefit from the CDM. A specific approved CDM methodology exists and could be readily applied to the project:

ACM11 : Fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation.

It should be noted here that the project presents a high implementation uncertainties considering that the pipeline is already constructed but the natural gas imports from Syria are not ensured for political reasons. Use of LNG could be envisioned but the economic viability of such option is still to be established.

According to EDL, commercial offers from CDM developers has evaluated the project's emission reduction potential at 50 000 t CO2/year.

Rehabilitation of Zouk power plant: with a nominal capacity of 600 MW (to be checked), Zouk is the most important power plant in Lebanon providing around 35% of the total electricity produced in EDL thermal power plants.

A detailed economic and environmental rehabilitation assessment has been prepared in 2003 for the Zouk power plant by the E7 Network of Expertise for the Global Environment (reference N°10). According to EDL, the rehabilitation project could reduce the power plant's specific consumption from the current 260 g/kWh to less than 235 g/kWh. At an assumed fuel cost of 350$/t, the project implementation could generate an energy bill savings of 12 million US$ a year. Considering the investment cost evaluated at 6 to 7 millions $, the project has a very attractive pay out time of 6 months! Concerning the potential emission reductions, EDL estimates the CDM project potential at 30 000 t CO2/year.

Here also, the project is suited to benefit from the CDM using the perfect matching approved methodology *AM61: Rehabilitation and/or energy efficiency improvement in existing power plants.* However, with such high profitability the project has a daunting CDM additionality risk.

Moreover, the project has certainly also a high implementation risk. The fact that the project has not been implemented since the rehabilitation study done in 2003 (reference N°7) despite its very attractive profitability confirms EDL's current financial difficulties.

Upgrade of Richmaya hydro-electric power plant: Richmaya is an old hydro power plant built with a nominal capacity of 13 MW. The hydro plant is currently operating at 3 MW. According to EDL the project rehabilitation could upgrade the station power to 9 MW and help save some 13 000 t fuel a year. The savings are estimated at 3 million $ for an investment of 1,5 millions US$. Here also the project is very profitable and the investment is relatively not high. With a 6 months investment return period, the project should have been implemented years ago!. From the CDM point of view, the project is eligible and the approved methodology AM61 can be used for the project development.

EDL received commercial offers from three private companies to develop the CDM projects.

In fact the real issue is not CDM itself but rather the capacity of EDL to mobilize the required investment capital to implement the projects. The EDL is heavily indebted and its financing capacity is very limited. **But this constraint can be put to use for the CDM additionality justification. Indeed, the projects are highly profitable and their CDM additionality should be justified by the investment barrier and the constraint of the limited EDL's financing capacity.**

4-4 CDM feasibility of the LCEC projects

4-4-1 Introduction

The Lebanese Centre of Energy Conservation Project (LCECP) was created in 2002 on a grant from GEF and the Ministry of Energy and Water (MEW). The main objective of the project is to assist the Lebanese energy consumers (tertiary, public buildings and industrial plants) in the management of their energy use. Since its creation the LCECP has performed more than 85 energy audits, helped implement various energy conservation projects and had carried five nationwide energy conservation campaigns.

The LCECP will terminate its activities as a GEF/UNDP project by the end of 2009 and a Lebanese Center for Energy Conservation (LCEC) will be created under the authority of the MEW to continue the energy conservation activities.

During the mission a meeting was organized with the LCEC and two potential CDM projects were discussed:

1. Nation wide program for the replacement of General Lighting Services (LGS, incandescent lamps) by Florescent Compact Lamps (FCL)
2. Solar water heaters program

The two CDM potential projects are discussed in the following paragraph.

4-4-2 Efficient lighting program

The LCEC has prepared a PIN for a CDM efficient lighting nationwide program in Lebanon. The CDM assessment of the proposed program is presented below.

Project consistence

The program aims at the replacement of 3.44 millions incandescent 100 W lamps by 23 M CFL for a total of 1,15 millions households in Lebanon. The total program cost is estimated at 5,73 millions $.

The following table summarizes the regional repartition of the planned program.

Areas	Households	CFLs	Cost $
1. Beirut area	153 586	460 758	790 000
2. Chiah area	192 986	578 958	970 000
3. Antelias and Bekfaya areas	194 330	582 990	980 000
4. Aley, BeitEddine and Jounieh	211 429	634 287	1 015 000
5. North and Bekaa areas	195 791	587 373	980 000
6. South.	199 799	599397	1 000 000
Total	**1 147 921**	**3 443 763**	**5 735 000**

Management plan and financing

The program will be implemented by the LCEC as coordinating entity. At this stage of the program design, the financing is not yet secured and the GLS replacement modalities and financing model is not defined yet.

Recommendation: **undertake a study on program implementation schemes and financing**

Project baseline:

The project baseline is the current situation of the continuing use of the GLS contributing to GHG emissions associated with the generation of the electricity consumed.

Recommendation: **undertake a survey on households lighting patterns for the baseline characterization**

CDM Project rational:

Using efficient CFL will save electricity and reduce the GHG emissions associated with the electricity generation and thus can benefit from the CDM.

Project emissions:

The project expected emissions are limited to those associated with the electricity generation of the power that is used by the new CFLs.

Methodology:

The small scale approved methodology AMS II-J is perfectly suited to use for the CFL program:

AMS-II.J: Demand-side energy efficiency activities for efficient lighting technologies[3]*.*

Additionality justification:

The Households could have continued to use the inefficient incandescent lamps. There is no law or regulation compelling households to use CFLs. Without CDM, the lamps replacement is not economically attractive. The efficient lighting program economical model is based on the benefits of the carbon credits. Without CDM, the LCEC would not have implemented the project and the targeted households would have continued on using inefficient GLSs.

[3] www.unfccc.int

Emissions Reduction evaluation:

The methodology AMS II-J provides the approach for the expected ER calculations. The following table presents the ER evaluation details.

Assumptions:

Parameter	Unit	Value
Number of lamps		3 500 000
Deployment period	years	4
	%/year	25%
Start date		2010
First crediting year		2011
Lamps power		
Incandescent lamps	W	100
LFC	W	23
CFL life period	h	6000
Lighting period	h/day	3,5
	h/year	1277,5
Falling rate	%	11%
Net to Gross adjustment factor		0,95
Emission factor	kg CO2/kWh	0,742
Grid technical losses	%	15%

Program's expected CERs

Year	ERU t CO2
2011	63 780
2012	119 961
2013	168 543
2014	209 526
2015	169 004
2016	112 823
2017	64 241
2018	23 258
Total	
up 2012	**183 741**
post 2012	**747 396**
Total crediting period	**931 137**

According to the AMS II-J approved methodology, the efficient lighting program as defined above will generate around 931 000 CERs over the period 2011-2018 of which 184 000 CERs are up 2012.

CDM Risks and requirements

The project CDM additionality shouldn't be a problem since it could be readily justified on the basis of the low or non profitability of the program without CDM.

Concerning CDM requirements, the approved methodology AMS II-J specifies CDM development conditions and monitoring procedure.

The major program risk is in the management, activity large scale deployment and implementation modalities

4-4-3 Solar water heaters program

According to the LCEC, Many pilot collective and individual Solar Water Heaters (SWH) programs and initiatives have been implemented in Lebanon. More than 40 private companies are active in the solar energy sector and several NGOs have implemented various capacity building programs and solar demonstration projects. More importantly, many financial schemes are offered by private banks to their clients for the SWH installations.

From the information gathered during the mission, it looks like that Lebanon is at start of a self sustainable large scale SWH market deployment. **The timing is perfect for the development of a CDM program on SWH. This is a golden opportunity that should be urgently grasped. Indeed, to preserve its additionality, the CDM program should absolutely be developed at this critical market phase.**

***Recommendation*:** LCEC should urgently promote a CDM program on SWH**.** Since the program is marked based activity, LCEC role will be limited to the establishment of the framework for the CERs management.

4-5 Cimenterie Nationale Plant Energy efficiency project

The following table summarizes the 2007 cement production in Lebanon and presents the relative market share of the four cement companies operating in Lebanon.

Cement production in Lebanon in 2007
in 1000 tons

Cement company	Nominal Capacity		Production	
Holcim Lebanon	2 200	37%	1 644	37%
Cimenterie Nationale S.A.L.	2 000	34%	1 637	36%
Cimenterie du Moyen-Orient	500	8%	167	4%
Ciment de Sibline	1 200	20%	1 050	23%
Total	5 900	100%	4 498	100%

Source: Arab Union for Cement and Building Materials AUCBM- http://www.aucbm.org

Cimenterie Nationale is implementing an energy efficiency project and is exploring the opportunity to benefit from CDM. The proposed project is analyzed for its CDM feasibility in the following paragraphs.

Project consistence

The proposed project aims at the modernization of the kiln burner and waste heat recovery from the cooler of firing line 3. According to Cimenterie Nationale management, the project consists of the following measures:

1. Feeding kiln three with petcoke from coal mill four instead of coal mill three and reforming the energy inefficient coal mill three;
2. Replacing the main burner of kiln three with a new state of the art main burner, thus decreasing petcoke consumption significantly;
3. Waste recovery from cooler three to coal mill four.

Project baseline:

The project baseline is the current situation of the continuing use of the energy inefficient coal mill and kiln burner of firing line 3 as well as not recovering the wasted heat. The current operational conditions generate additional GHG emissions that will be reduced by the proposed project's EE activities.

CDM Project rational:

Using efficient cement processing installations, namely coal mill and kiln burner, and recovering wasted heat will lower the thermal energy and electricity consumptions of the cement plant and thus will help reduce the GHG emissions associated with the current cement processing practice. As such, the proposed project can benefit from the CDM.

Project emissions:

The project expected emissions are those associated with the thermal energy and electricity consumptions of the new energy efficient installations.

Methodology:

The small scale approved methodologies AMS II-D and AMS II-I are suited to be used respectively for the EE activity and for the waste heat recovery activity of the project:

- *Methodology AMS II.D. Energy efficiency and fuel switching measures for industrial facilities*

- *Methodology AMS II.I. Efficient utilization of waste energy in industrial facilities*

Additionality justification:

According the Cimenterie Nationale figures the project should be very profitable. Therefore the CDM additionality will be hard to establish, unless the project proponent could evoke some barriers (investment, technological, etc.) that the project implementation is facing.

Emissions Reduction evaluation:

The approved methodologies to be used for the CDM development of the project, AMS II- D and AMS II-I, provide the approach for the expected ER calculations. The following table presents the ER evaluation details.

Project's expected ERs

Parameter	Unit	Value
Clinker production line 3	t clk/year	585 000
Coal mill production line 3	t petcoke/year	49 960
NCV petcoke	kcal/kg	8 200
	GJ/t petcoke	34
Electricity savings	kWh/t petcoke	80
	MWh/year	3 997
Thermal energy savings	kcal/kg clk	18
	t petcoke/year	1 248
Emission factor grid	t CO2/MWh	0,742
Emission factor Petcoke	t CO2/TJ	98
	t CO2/t petcoke	3,35
ER evaluation **Electricity savings** **Thermal energy savings**	 **tCO2/year** **tCO2/year**	 **2 966** **4 177**
Total ER	**tCO2/year**	**7 143**

According to the approved used methodologies, the Cimenterie Nationale project as defined above will generate around 7 140 t CO2/year.

CDM Risks and requirements

Given the fact that the project is very profitable, its CDM additionality could be an issue and in any case, would be hard to justify.

Considering the limited expected ERs, there is a concern about the low CDM benefits and their capacity to compensate for the CDM development costs that should be engaged by the cement company.

5- CDM DEVELOPMENT ACTION PLAN

The definition of a detailed CDM development action plan in Lebanon is beyond the scope of the present mission. The different recommendations made for the DNA organization and approval process speedup are summarized below along with other pertinent proposed measures for CDM development in Lebanon. They can be considered as outlines for CDM action plan to be developed subsequently by the DNA.

OUTLINES OF A CDM DEVELOPMENT ACTION PLAN IN LEBANON

Institutional tasks
Establishment of a CDM development strategy and action plan for awareness raising and financial resources mobilization
Reorientation of DNA missions and simplification of the CDM project approval procedures
Reinforcement of the CDM team by affecting a full time junior staff member to the development of CDM activities under the supervision of an experienced senior staff
Design a specific web site dedicated to CDM activities in Lebanon
Implement the CDM awareness raising and financial resources mobilization action plans
Local, regional and international partnerships fostering.
At a further CDM development stage, establish a **consultative** steering committee for the CDM activities development (concerned public institutions, private sector stakeholders, CDM experts, NGOs etc)
Technical tasks
Engage a consultant or a consulting company for the build up of CDM portfolio for Lebanon
Establish the official emission factor of the electricity grid according to the CDM EB procedures[4].
Entrust the CDM development of the Naameh and Zahle landfills to a private developer[5]
Implement a SWH CDM program with LCEC as coordinating entity
Refine the concept of the nationwide CDM CFL program promoted by the LCEC - Make a survey for the households lighting patterns and baseline establishment and develop the PDD of the program

[4] Methodological tool to calculate the emission factor for an electricity system- EB meeting 35 report – annex 12. www.unfccc.int

[5] Given the projects additionality risk explained in paragraph 4.2, the CDM development risk should be borne by the private CDM developer

LIST OF CONSULTED DOCUMENTS

1. Clean Development Mechanism: Overview, Process and Possibilities at Ministry of Environment – Technical report submitted to the DGoE in November 2006 based on Ministerial decision 22/1 of June 15, 2006**.**

2. Decision 12/1 of the Ministry of Environment on the review procedure of the CDM projects, dated 7th of March 2009.

3. Lebanon Second National Communication (SNC)– GHG emissions inventory- Ministry of Environment – GEF- UNDP- 2009.

4. Approach to GHG Emission Reduction Analysis –IIEC-Asia-July 2008.

5. Assistance in Site Selection and Preparation of environmental Studies for Solid Waste Facilities in Lebanon- EIA study- service Area 1: Beirut & Mount Lebanon- July 2007.

6. Assistance in Site Selection and Preparation of environmental Studies for Solid Waste Facilities in Lebanon- EIA study- service Area 3: North Lebanon and Aakkar - July 2007.

7. Treatment and Disposal of Municipal Waste in Lebanon – Request for Proposals Document- CDR- 2004.

8. Summary note on the state of Municipal Solid Waste in Lebanon, prepared by the MoE for the World Bank. 2002.

9. Solid Waste Management in Lebanon – METAP- 2003.

10. Economic and Environmental Rehabilitation Assessment for Zouk Power Plant – e7-138-2003.

11. Electricity sector organization - Law N° 462 dated September 2, 2009.

12. Sites localisation for Municipal solid waste sanitary treatment and land filling in Lebanon- Technical committee N°3 report – CDR- 22/04/2004

13. State and Trends of the carbon Market 2008. WBI-CF Assist- May 2008.

14. CDM Rulebook, Baker&McKinsie, 2009; *http://cdmrulebook.org/PageId/95*

15. UNFCCC official web site: www.unfccc.int

16. Landfill gas and biomethanation: Issues, Options and Experiences, Ad Dankers & Jan van den Akker –UNDP-2005

17. Electricity Sector Public Expenditure Review. World Bank report No. 41421- Republic of Lebanon, January 31,2008.

18. PIN for the Replacement of GLS by CFL Nationwide program- LCEC-2009.

19. Cimenterie Nationale Plant Energy efficiency project - Documents communicated by the cement company management during the mission

Annexes

Annex A

Terms of reference

MNA Region - Carbon Finance Activities
Support to the development of CDM Project Idea Notes in Lebanon

Terms of Reference for an International CDM Consultant

I. INTRODUCTION

1. The Kyoto Protocol (KP) to the UN Framework Convention on Climate Change (UNFCCC) was agreed upon in December 1997. The Protocol commits industrialized ("Annex I") countries to reduce their carbon emissions by an average of 5.2 percent below 1990 levels in the first commitment period (2008-2012). To meet these commitments in the most cost-effective manner, the Protocol's Article 12 established the enabling industrialized countries to receive credits for financing emissions reduction (ER) projects in developing (host) countries. While host countries have no commitments or emission reduction targets under the Protocol, they can benefit from activities under the CDM, so that they could maximize their sustainable development gains along with global environmental benefits.

2. CF-Assist is a capacity building and technical assistance program established by the World Bank in fiscal year 2005 to enable the full engagement of developing countries and economies in transition in the carbon market so that they could maximize their sustainable development gains along with global environmental benefits.

3. In this context, the World Bank Institute (WBI) responsible of managing this program has allocated resources and a budget at the request of the MNA Regional Carbon Finance Coordinator that would be used for CF-Assist activities in Lebanon. In February 2007, a specific country capacity building program was prepared for Lebanon in order to build the national capacities on CDM ("track 1") as well as to initiate CDM project development ("track 2"). In June 2007, a two days CDM workshop was organized by the World Bank with participation of 40 representatives of the main CDM stakeholders in Lebanon, including DNA staff, project developers and local consultants. Three project ideas were identified in energy, biogas/waste, cement sectors and the related Projects Idea Notes (PIN) were drafted.

4. The World Bank is seeking the consulting services to complete the implementation of the capacity development activities ("track 1") and the project development activities ("track 2"). To this end, the present Terms of Reference detail the scope of work of the required consulting services for this task.

II. OBJECTIVES

5. The objective of this assignment is to provide high quality technical assistance and support to ensure effective implementation of the capacity building activities providing support to the Designated National Authority (DNA) as well as to potential public and private CDM project developers in Lebanon. This will include the accomplishment of the following specific tasks:

(i) to identify potential CDM projects in Lebanon;

(ii) build national capacities of potential project developers in different sectors in order to be able to develop a stream of CDM projects;

(iii) prepare Project Idea Notes (PINs), PIN financial analysis; and

(iv) Risk Assessment for two CDM projects.

III. MAIN TASKS

6. Consistent with the above objectives, the main tasks of the consultant work will include, but not limited to:

(i) Preparing and carrying out a 10 days country mission to Lebanon in order to conduct interviews and field visits and consult closely with concerned authorities and local stakeholders as appropriate,

(ii) Suggesting priorities for CDM in Lebanon, including sectors, key private and public sector stakeholders and prospective projects--with the emphasis on projects that enhance access to energy, economic development in rural areas and other socio-economic and environmental benefits.

(iii) Reviewing investment and development plans of selected sectors/actors in the context of carbon finance' criteria and eligibility requirements with the aim to identify projects that offer good prospects for carbon financing with parallel sustainable development benefits (considering the time-frame for development and implementation, costs of CERs, possible risks, availability of financing for the underlying project etc.).

(iv) Conducting a series of meetings with potential CDM project proponents in Lebanon to identify their interest, potential and capacity/barriers to work on CDM.

(v) Carrying out a half-day training workshop targeting 15 to 20 potential CDM projects developers. The Consultant will prepare the agenda, make presentations and facilitate the workshop. Workshop topics will cover, but not limited to, the CDM project cycle, introduction to methodologies and additionality, PIN and PDD. Participants will be identified by the World Bank in collaboration with the DNA. The workshop will be held in Beirut. The Ministry of Environment will bear all expenses related to the organization this meeting.

(vi) Preparing a list of potential projects (10-12 projects) that will include summary eligibility assessment for each project, data/information gaps, summary of key risks (carbon, technical, economic/financial, political, etc.).

(vii) Identifying data gaps and address those through follow-up consultations with project proponents.

(viii) In consultation with the DNA and the World Bank, select two most promising projects in terms of potential for CDM.

(ix) Developing two Project Idea Notes (PINs), PIN financial analysis and Risk Assessment for CDM projects, using the templates provided by Carbon Finance Unit of the World Bank[6]. Information in the PINs should comply with

[6] The templates provided by CFU/WB are commonly used by most private and public buyers in the carbon market, with minor differences.

the UNFCCC and CDM Executive Board criteria. Projects will be selected by the World Bank in collaboration with the DNA.

(x) Preparing and revising PIN drafts and annexes, seeking and incorporating comments – including from the World Bank as appropriate. The Consultant will complete the final version of the documents above at the satisfaction of the World Bank, and prepare a final completion report.

IV. WORK ORGANIZATION & REPORTING

7. The Consultant will report to Mr. Jaafar Friaa, the Middle East and North Africa Regional Carbon Finance Coordinator at the World Bank. He/she will work closely with the CDM-DNA in Lebanon, the identified project developers and others local/national concerned institutions as required.

8. Under the proposed assignment, the Consultant will prepare and submit the following documents:

List of deliverables and time-line for Component 1:

Deliverable	Deadline
Deliverable 1: Report on the workshop (including Agenda, List of Attendees, Satisfaction Survey, material presented)	20 January 2009

List of deliverables and time-line for Component 2:

Deliverable	Deadline
Deliverable 1: Long-list of potential CDM projects with summary on project eligibility, risks and overall rating	20 January 2009
Deliverable 2: Two draft PINs for short-listed projects	15 February 2009
Deliverable 3: Finalized PINs and TORs for follow-up actions	28 February 2009

9. The Consultant should also report bi-monthly on the progress made during the course of the assignment. These progress reports should be produced in English and submitted to the TTL of this activity at the Bank.

10. All documents should be produced in English and submitted both electronically (Excel and Word) and hard copy.

V. REQUIRED QUALIFICATION

11. The required main qualifications of the individual consultant are:

- Formal educational background in a directly related technical field at the Engineer or Masters level.
- Good knowledge and understanding of national and international institutional and legal requirements for Kyoto protocol flexible mechanisms, particularly CDM.

- Hands-on experience with institutional capacity development for Kyoto Protocol and CDM project development.
- Fluency in English and Arabic required with excellent written and oral communica-tion skills.

VI LEVEL OF EFFORT

12. The proposed assignment is expected to require 25 days of full-time work, including two 5 to 7 day missions in Lebanon.

13. The proposed assignment is expected to be carried between November 1, 2008 and February 28 , 2009.

Annex B

List of the persons met/interviewed

PERSONS MET/ INTERVIEWED

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Annex C

Mission Preliminary Findings

CDM DEVELOPMENT IN

Mission from May 7 to May 14, 2009

PRELIMINARY FINDINGS

Abdelmourhit Lahbabi

OVERVIEW OPINION

☺ *The Good news;*

and

MYTH

CDM is complicated, requires a lot of resources we don't have and given the particular situation

REALITY

CDM for the DNA is simple – The mandate is clear – DNA has a role of facilitator that can be achieved with a minimum resources

Better

REALITY

CDM can be used to mobilize important additional human and financial resources to the MoE.

DNA MANDATE

- Raise awareness of the stakeholders (projects holders, public institutions, service companies, banks,)
- Facilitate the projects development by providing information and advice, contacts etc.
- Validation of the CDM projects with respect to the SD national criteria
- Provide the official LOA for the validated projects
- Provide technical support and advice if required for public projects holders.

DNA ONE MINISTRY SET UP

- Advantage: Facilitate the decision making and speed up the national validation process and the LOA issuance
- Risk: possible mix up of the role of the MoA and the DNA (the one hat, multi missions dilemma), example: the EIA requirement.

Investment Project and CDM Project

A CDM Project is first an investment project. It needs to satisfy all the requirements of an investment project: project holder, technical feasibility, financing, economical viability etc.

A project needs first to be assessed for its requirements and benefits. The CDM allows for additional revenues that can improve the financial fundamentals of the project.

It is important to note also that there no CERS if the project is not implemented.

DNA Organization

One full time junior staff

One part time senior staff (20%)

Technical CDM expertise support can easily be ensured through international collaboration **(bilateral programs, international institutions etc.)**

CDM Potential projects waste sector

- Programmatic approach for the new planned sanitary landfills
- PIN could be developed
- Data/info needed: summary of the waste master plan for waste management in Lebanon
- The Naameh case, at commercial stage; No TA will be provide
- PIN for Zahleh could be developed – Should get the data/info.

CDM potential projects: Electricity sector EDL

- Potential projects:
  - Natural gas switch . Needs to have a visibility on the gas supply
  - Zouk power plant rehabilitation
  - Richmaya Hydro power plant rehabilitation (3MW to 12 MW).
- Forget CDM; why the projects are not implemented ? Six months pay time period.
- The electricity sector has to go a global structural reform (medium - term
- Request for one PIN development should be made to EDL

CDM potential projects: EE and RE (LCEC)

- Potential projects:
  - CFL : good CDM project - need a financing and the set up of a financial cost recovery scheme
  - Solarthermal water heaters: Good CDM project idea, should be developed by LCEC as a CDM Program

CDM potential projects: Cement

- Potential project: EE project submitted by Cimenterie Nationale
- CDM additionality could be a problem, but it worth a try.
- The PIN could be developed based on the data info provided by the promoter.

Mission deliverables

- Recommendations for DNA organization – approval procedures – Action plan for the coming year;
- PINS to be developed:
  - Waste programmatic PIN
  - a PIN for Zahlé or an EDL project
- Recommendations for the other CDM projects (LCEC, EDL)

Further technical assistance (provided the WB approval)

- Strategic Policy Paper for CDM development in Lebanon (to be addressed to the council of Ministries)
- The development of the Solar Water heater project concept and the development of its PDD
- Technical assistance for the implementation of the CFL project
- Additional projects identification to help strengthen Lebanon CDM portfolio

Deliverables Schedule

- Data/info collection deadline: May 21.
- Mission report first draft: June10
- Comments and remarks by June 17
- Mission report final version: June24

Annex D

CDM Workshop Participants List

حلقة حوارية حول آلية التنمية النظيفة في لبنان

٢٠٠٩/٥/١١

لائحة الحضور

الرقم	الاسم	المؤسسة	المهنة	رقم التلفون	رقم الفاكس	البريد الالكتروني
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حلقة حوارية حول آلية التنمية النظيفة في لبنان

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لائحة الحضور

الرقم	الاسم	المؤسسة	المهنة	رقم التلفون	رقم الفاكس	البريد الالكتروني
	وليد الدغيلي	الإسكوا	رئيس قسم الطاقة	٠١ ٩٧٨٥٤٧ ٠٣ ٥٥٠٤٢٦		deghaili@un.org
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الرقم	الاسم	المؤسسة	المهنة	رقم التلفون	رقم الفاكس	البريد الالكتروني
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حلقة حوارية حول آلية التنمية النظيفة في لبنان

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لائحة الحضور

الرقم	الاسم	المؤسسة	المهنة	رقم التلفون	رقم الفاكس	البريد الالكتروني
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الجمهورية اللبنانية
وزارة البيئة

حلقة حوارية حول آلية التنمية النظيفة في لبنان

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الرقم	الاسم	المؤسسة	المهنة	رقم التلفون	رقم الفاكس	البريد الالكتروني
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حلقة حوارية حول آلية التنمية النظيفة في لبنان

٢٠٠٩/٥/١١

لائحة الحضور

الرقم	الاسم	المؤسسة	المهنة	رقم التلفون	رقم الفاكس	البريد الالكتروني
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Annex E

Workshop presentations

World Bank Carbon Finance Activities in Middle East and North Africa

Gaël Grégoire
Regional Carbon Finance Coordinator
The World Bank Group

May 11th, 2009
Beirut, Lebanon

Why is the World Bank in the Carbon Market?

- IPCC conclusions on global climate change
- Impact of climate change on development
- Efficiency of market-based instruments to reduce GHG emissions
- Pioneering Carbon Finance

World Bank Carbon Finance Approach (1)

- Ensure that carbon finance contributes to sustainable development, beyond its contribution to global environmental efforts
- Supporting developing countries in enabling them to receive the maximum capital transfers for sustainable development from carbon finance
- Ensuring all carbon projects promoted by the Bank have additional sustainable development benefits beyond the reduction of carbon emissions by applying the Bank's environmental and social safeguards and adding sustainable development value

World Bank Carbon Finance Approach (2)

- Assist in building, sustaining and expanding the market for GHG emission reductions
- Develop new markets and sectors for carbon finance
- Supporting the regulatory framework – developing new tools, collaboration with the regulator
- Expanding the capacity of other financial and development institutions through cooperation with other development banks
- Participating with the private sector in international associations and providing opportunities for purchases by the private sector
- Increasing market liquidity by creating projects with large volumes with a portion available to the private sector

16 governments, 66 firms participate in these funds /

- Out of **$2.1 billion** of investible capital from the Bank's 'Kyoto Funds '(to purchase emission reductions)
  –$1.85 billion committed (**118 signed ERPAs;)**
  – $ 265 million remaining to be committed
- Looking ahead, greater focus on implementation/delivery of emissions reductions to participants
  - Reductions of **36.2 million tCO_2e** have already been generated (as of Dec. 31, 2008)

World Bank Carbon Funds & Facilities -II Country Funds

Fund/Facility	Size	Participant(s)	Focus
Country Funds			
Netherlands Clean Mechanism Facility	€220M	Netherlands Environment	CDM
Netherlands European Carbon (Jointly managed ith	€44.9M	Netherlands Economic affairs	JI projects
Spanish Carbon Fund Tranche	€220M	Multi-shareholder	Multi-
Spanish Carbon Fund Tranche	€70M	GovernmentofSpai	
Italian Carbon Fund	$155.6 M	Multi-shareholder (Italy)	Multi-purpose
Danish Carbon Fund	€90M	Multi-shareholder (Denmark)	Multi-
Carbon Fund for Europe (Jointlymanaged ith	€50M	Multi-shareholder	Multi-

These are bilateral funds, some with special regional preferences.

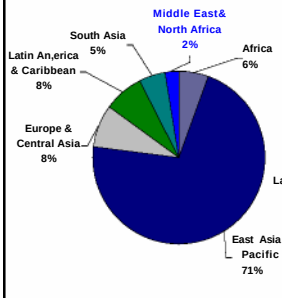
World Bank Carbon Funds & Facilities-I

Fund/Facility	Size	Participant(s)	Focus
The Pioneer			
Prototype Carbon Fund	$180M	Multi-shareholder	Multi-purpose
Specialized Funds			
Con,n,unity Developn,ent Carbon Fund	$128M	Multi-shareholder	Smai-scale projects plus social benefits
BioCarbon Fund Tranche 1	$53M	Multi-shareholder	Land Use, Land-Use Change, and Forestry (LULUCF)
BioCarbon Fund Tranche 2	$38M		
Un,brella Fund			
Un,brellaCarbon Facility	€799M	Multi-shareholder	Tranche 1: Two HFC-23 projects in China

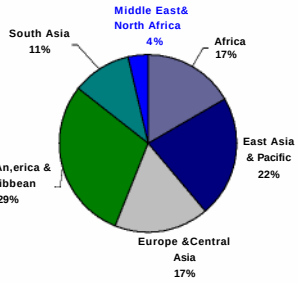
Following the pioneering PCF, each of these funds targets a specific sector/theme/instrument for aggregating carbon financing, including small energy, industrial gases, land use (and REDD pilots). Carbon Funds pay a market-determined price for emission reductions.

Regional distribution of

By value of ERPA
From a total of $1.9bn

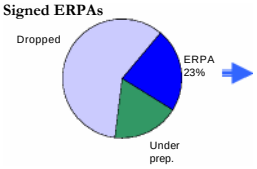


By number of Projects
From a total 139



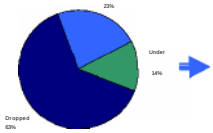
Project Portfolio

Signed ERPAs



Year	CountryandName ofProject
2009	**Jordan:** Amman Landfill GasProject
2008	**Egypt:** Cairo SouthernZone Composting
2006	**Tunisia:** DjebelChakirLandfill Gas Recovery and Flaring
2006	**Tunisia:** Gas RecoveryandFlaringfor Nine Landfills
2006	**Egypt:** Alexandria Onyx Landfill Gas (LFG)Capture andFlaring

Under prep.



Year	Country andName of Project
2007	**Yemen:** Loss Reduction inElectncity Distnbution Systems Project
2008	**Tunisia:** SidiDaoud Wind FarmProject
2008	**Yemen:** Al Mokha WindProject

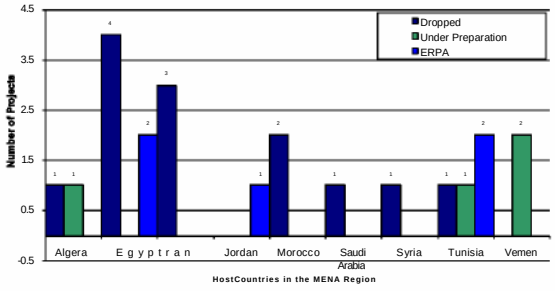
Details: Contracted Projects

Year	Country and Name of Project	Detail
2009	Jordan:AmmanLandfill Ga Project	$12.28m ATVALIDATION The purpo e of the project i to recoverlandfill ga from the Ghabawi landfill in Amman, Jordan andutilize the recovered ga for electricity generation for operational need and tran ferto the national grid.
2008	Egypt: Cairo Southern Zone Compo ting	$ 5.38m ATVALIDATION The project include a orting and compo ting facilityof olid wa te, collected and received from the outhern zone of Cairo.
2006	Tuni ia: Djebel Chakir Landfill Ga Recovery and	$13.51m REGISTERED To in tall ga recovery and flaring y tem in Cell 1-5 of the Djebel Chakir Landfill, which receive all of the wa te from the Tuni Capital.
2006	Tuni ia: Ga Recovery and Flaring for Nine Landfill	$7.84m REGISTERED To in tall ga recovery and flaring y tem in Cell 1 of 9 landfill di tributed over the Tuni ian Territory.
2006	Egypt:Alexandria Onyx Landfill Ga (LFG) Capture and Flaring	$ 7.5m REGISTERED In tall newlandfill ga collection y tem and collect ga emi ion from the Borg el Arab and ElHammam landfill ite in Alexandria. The project will collect re idual emi ion ga , which Onyx doe not currently have an obligation to

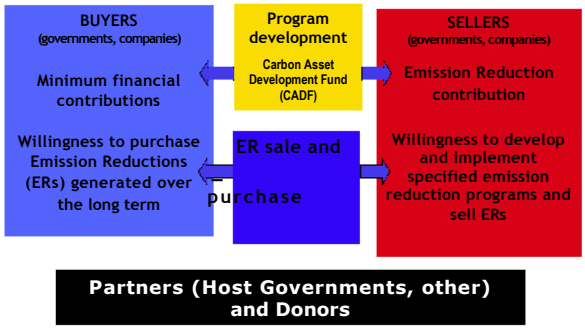
Details: Pipeline Projects

Year	Countryand Name of Project	Detail
2007	Yemen: Lo Reduction in Electricity Di tribution Sy tem	$9.13m The project aim at reducing technical lo in di tribution line by 1.3%-3.5% in 2007-2016 (See the below table). Thi will be done by in talling the different type of equipment at 97 place of 33/11kV di tribution ub tation connected to the National Grid throughout
2008	Tuni ia: Sidi Daoud Wind Farm Project	$ 2.6m The project involve con truction and operation of a 34.32 MW wind farm in Sidi Daoud (Governorate of Nabeil), Tuni ia
2008	Yemen: Al Mokha Wind Project	$3.4m The project con i t of con truction of a 60 MW Wind Farm at Al Mokha, Yemen
2008	Algeria: Oued Smar LGF project	To in tall ga recovery and flaring y tem in the Oued SmarLandfill, which received mo t of the wa te from Algier

Location (including dropped projects)



Carbon Partnership Facility (CPF) - Buyers and Sellers in a Partnership



CPF Current Status

- **Opened to participation and contributions on 11 October, 2008.**
  - **CADF now operational** (2 Donor Contributions; Spain, €5m; Norway, €2m)
  - Carbon Fund likelyto launch May2009 (needs €200 m buyer contributions plus 3 seller agreements)
- **First Buyer Participation Agreement to the CPF Carbon Fund done.**
  - **Spain, €65m**
  - High level discussions under wayto bring in commitments exceeding €200m
- **45 companies/entities and governments have signed Expressions of Interest:**
  - 33 potential Buyers, 3 potential Donors, 9 potential Sellers
- **Programs with several other potential Sellers under development as well.**

World Bank CDM Technical Assistance Activities in MENA

- Mediterranean Environmental Technical Assistance Program: Regional Solid Waste Assistance Project (2006/7): Focus on the solid waste sector, 7 countries, 320 participants
- Carbon Finance Assist Program: 3 years program (06-09), unified approach to developing countries and to coordinate all World Bank capacity building and training activities on carbon finance.
  - Enhanced CDM Governance: DNA support & capacity building
  - Involvement of priority sectors (e.g. financial / industry): Regional workshop, involvement of financiers
  - CDM Project Deal Flow: Project Portfolio development (PIN)
  - CDM Knowledge Management: National training workshop
  - Beneficiary Countries: Tunisia, Morocco, Egypt, Syria, Lebanon, Yemen

Key Results achieved so far: DNAs established

		Date of Kyoto Protocol ratification	DNA established	DNA/CDM dedicated Web Site	CDM-related carbon portofolio(Potential)
1	Algeria	2/16/2005	Yes	No	No
2	Bahrain	1/31/2006	Yes	No	No
3	Djibouti	3/12/2002	Yes	No	No
4	Egypt	1/12/2005	Yes	www.cdm-egypt.org	Yes
5	Iran	8/22/2005	Yes	No	No
6	Israel	3/15/2004	Yes	No	No
7	Jordan	1/17/2003	Yes	No	No
8	Kuwait	3/11/2005	Yes	No	No
9	Lebanon	11/13/2006	Yes	No	No
10	Libya	8/24/2006	No	No	No
11	Morocco	1/25/2002	Yes	www.cdmmorocco.ma	Yes
12	Qatar	1/11/2005	Yes	No	No
13	Saoud Arabia	1/31/2005	Yes	No	No
14	Sultanate of Oman	1/19/2005	No	No	No
15	Syria	1/27/2006	Yes	No	No
16	Tunisia	1/22/2003	Yes	www.mdptunisie.tn	Yes
17	UAE	1/26/2005	Yes	No	No
18	Yemen	9/15/2004	Yes	www.cdm-yemen.org	No

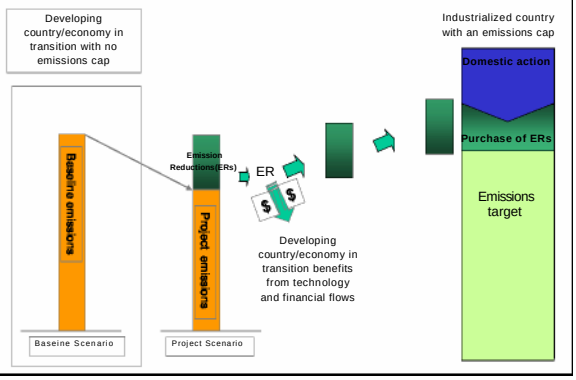
Key Results achieved so far

- Draft CDM pipelines are developed
- Tunisia: First two CF operations blended with Bank-funded SWM project (total potential ERs estimated to 6 million of TCO2eq)

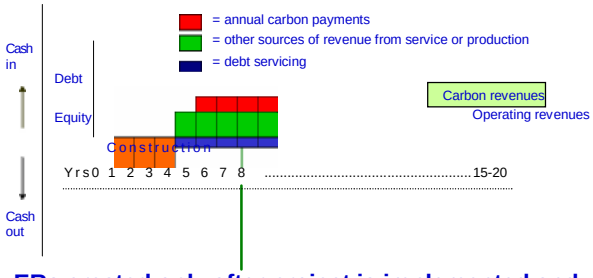
Thank you

ggregoire@worldbank.org

Carbon credits



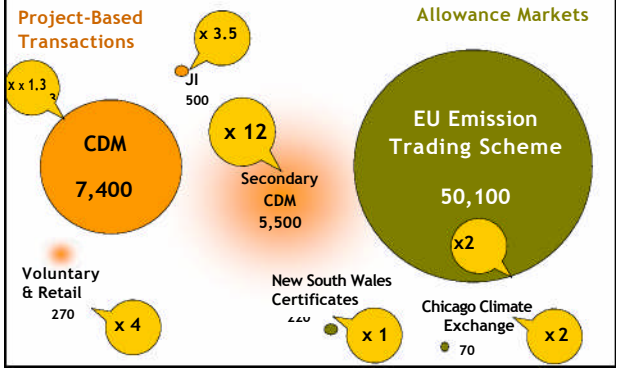
Carbon finance: payments for a stream of emission reductions



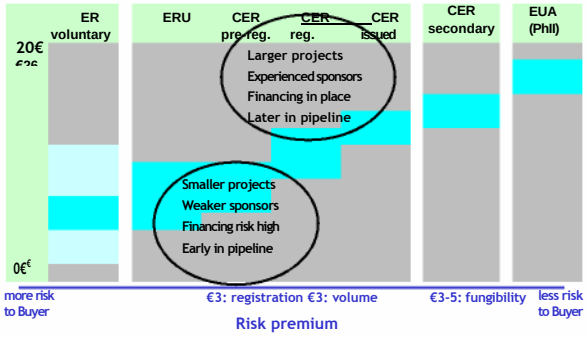
ERs created only after project is implemented and operational (Carbon finance is output-based).

Market Value Growth 2007

(in MUS$)

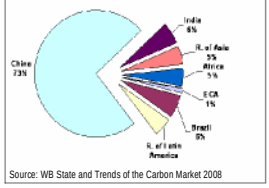


Market tiers widen



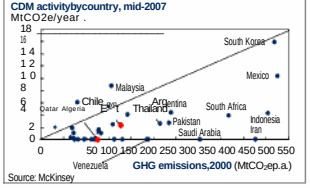
Tremendous untapped potential in developing countries

1. Location of CDM projects (percentage of volume, 2007)



Source: WB State and Trends of the Carbon Market 2008

2. Many countries are under-penetrated even relative to their emissions

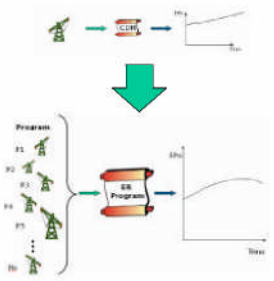


Source: McKinsey

- Uneven regional focus; China, India and Brazil = 85% of CDM market share;
- **Untapped potential particularly important in middle income MENA countries**
  - Emissions of GHGs = 2.7 % of World Total (2005),
  - Only 45 CDM projects in the pipeline, only 0,8 % of World Total (5300 in the pipeline, 1420 registered),

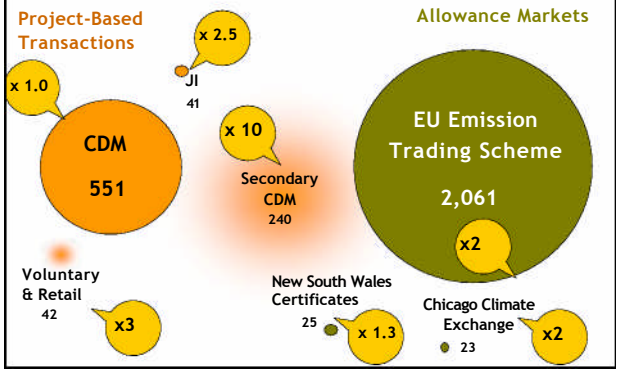
Future of Carbon Finance?

- Post 2012 scenarios
- The Carbon Partnership Facility: Designed to scale up carbon finance through programmatic and sector-based approaches



Market Volume Growth 2007

(in $MtCO_2e$)



Impact of Carbon Finance

INCREMENTAL IRR - CARBON FINANCE
Renewable Energy

ER Prices	Purchase period 5y('08-'12)	7y	10y	14y	21y	Impact per Unit
$5.00	0.5%	0.6%	0.8%	1.0%	1.2%	$3.16 / MWh
$10.00	1.0%	1.4%	1.7%	2.1%	2.3%	$6.33 / MWh
$15.00	1.6%	2.1%	2.7%	3.1%	3.3%	$9.49 / MWh
$20.00	2.2%	2.9%	3.6%	4.1%	4.5%	$12.65/MWh

INCREMENTAL IRR - CARBON FINANCE
Solid Waste

ERPrices	Purchase period 5y('08-'12)	7y	10y	14y	21y	Impact per Unit
	0.58 tCO2e/tSW	0.74 tCO2e/tSW	0.93 tCO2e/tSW	1.11 tCO2e/tSW	1.29 tCO2e/tSW	
$5.00	17.9%	24.1%	29.2%	31.7%	32.8%	$41 / MWh
$10.00	82.3%	99.1%	62.4%	63.5%	63.8%	$82 /MWh
$15.00	88.2%	93.3%	95.4%	95.9%	96.0%	$124 /MWh
$20.00	123.7%	127.3%	128.6%	128.8%	128.9%	$165 /MWh

*tSW = ton solid waste

INCREMENTAL IRR - CARBON FINANCE
HFC 23

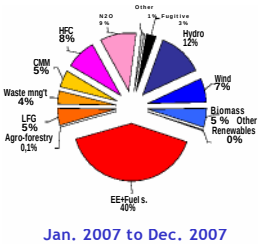
ERPrices	Purchase period 5y('08-'12)	7y	10y	14y	21y
$5.00	110.8%	112.3%	112.7%	112.7%	112.7%
$10.00	176.7%	177.3%	177.4%	177.4%	177.4%
$15.00	227.3%	227.6%	227.7%	227.7%	227.7%
$20.00	270.0%	270.2%	270.2%	270.2%	270.2%

*65%tax applied on carbon revenues

CDM Delivers on clean energy

(share of volumes)

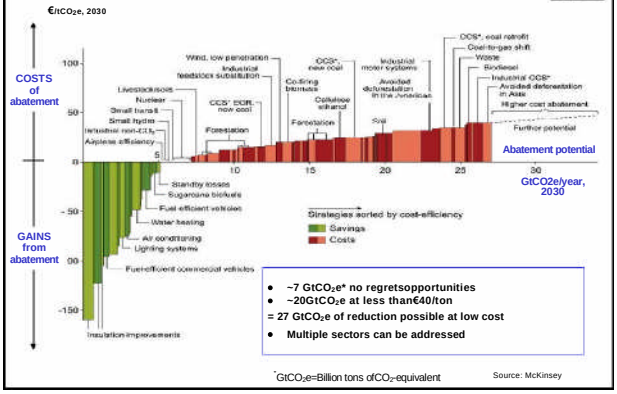
Clean energy: 64%



Jan. 2007 to Dec. 2007

- US$1 of carbon leverages US$9 financing of renewable energy
- US$33 billion (€24 billion) clean energy leveraged in 2007
- Cumulative (02-07) leverage US$52 billion (€39 billion) expected

Substantial economic potential for the mitigation of global GHG



- ~7 $GtCO_2e$* no regretsopportunities
- ~20$GtCO_2e$ at less than€40/ton

= 27 $GtCO_2e$ of reduction possible at low cost

- Multiple sectors can be addressed

*$GtCO_2e$=Billion tons ofCO_2-equivalent

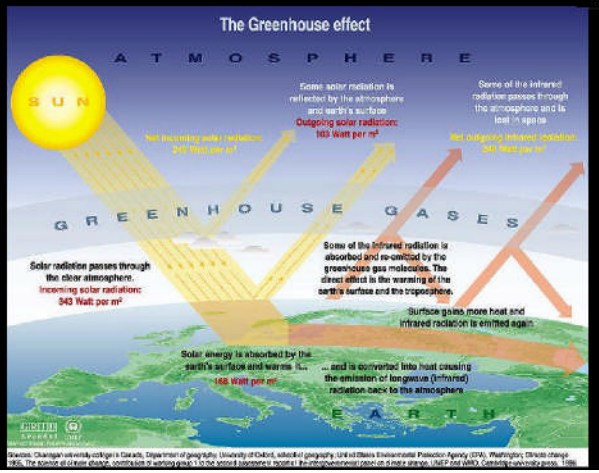
Source: McKinsey

Climate Change, The Kyoto Protocol and Clean Development Mechanism (CDM)

CDM Workshop
Beirut, Lebanon

May 11,2009

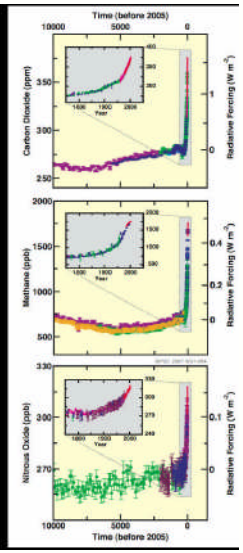
The Greenhouse effect



IPCC Fourth Assessment Report (2007)

Earth climate is warming and human activities are the primary cause (90%)

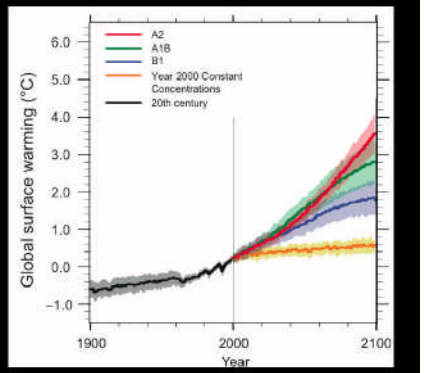
- CO_2 is the most important anthropogenic greenhouse gas, its global atmospheric concentration has increased from a value of 280 ppm to 379 ppm in 2005.
- 6 GHGs: CO_2, CH_4, N_2O, HFCs,



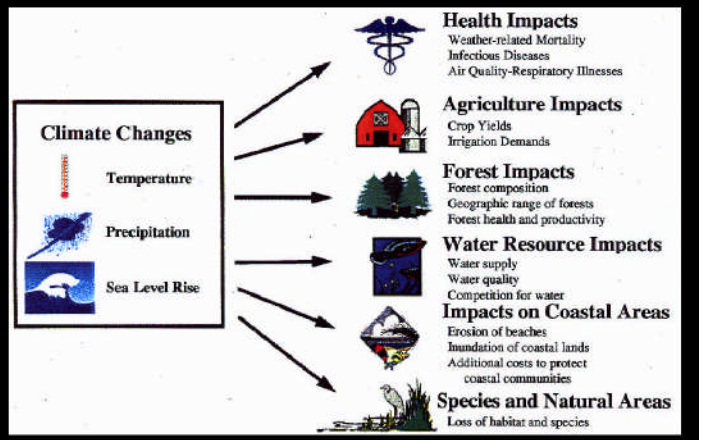
IPCC Fourth Assessment Report (2007)

Global projections (100 years):

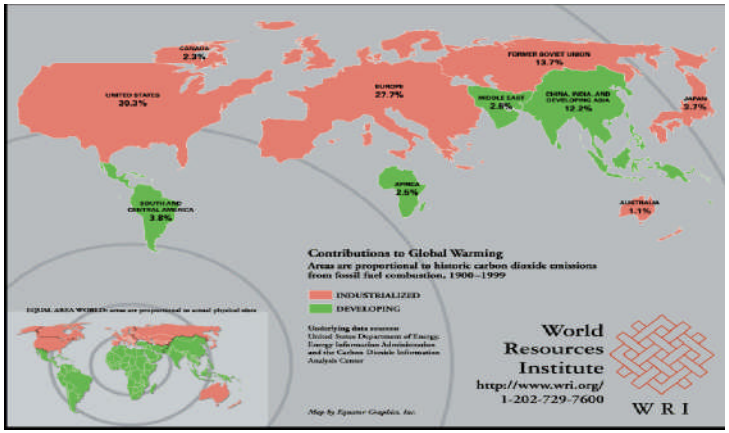
- For the next two decades a warming of about 0.2°C per decade is projected.
- Even if the concentrations of all GHG had been kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected.



Climate change impacts



Climate Change: Whose problem is it?



International response to Climate Change
The UNFCCC (RIO Summit 1992)

- Ultimate objective of stabilizing global greenhouse gas concentrations in the atmosphere
- Principal of "Common but differentiated responsibilities":
  - – Historical emissions of *industrialized countries* and
  - – Current global emissions (from industrialized and *developing countries)* cause global warming
- Support capacity building in, and facilitate technology transfer to developing countries to mitigate, and to adapt to climate change
- Meet as a "Conference of Parties" in the future, consider progress

International response to Climate Change
The Kyoto Protocol

- **36 Developed Countries and Economies in Transition agreed in 1997 to:**

  reduce GHG emissions by 5.2 % below 1990 levels in the commitment period 2008-

- **The PK** came into force in February 2005
- 184 states ratified

Main Greenhouse Gases

The Protocol's emissions targets cover the six main greenhouse gases [**Global Warming Potential**]:

'Carbon dioxide (CO_2)	[1]
'Methane (CH_4)	[21]
'Nitrous oxide (N_2O)	[310]
'Hydrofluorocarbons (HFCs)	[140-11,700]
'Perfluorocarbons (PFCs)	[6,500-9,200]

1 ton of CO2 reduction = 1 ERU or CER
For example: Reducing 1 ton of CH4 = Reducing 21 ton of CO2
1 ton of CH4 = 21 ERUs or CERs

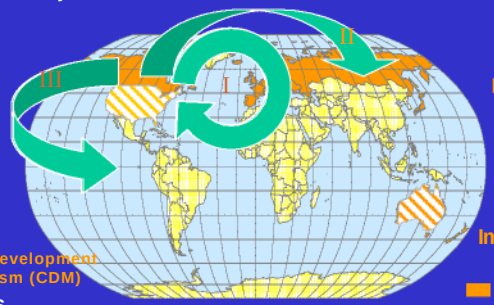
How can Developed Countries meet their obligations under Kyoto?

- Domestic Reductions
- International Credits (Kyoto Mechanisms):
  - International Emissions Trading
  - Project –Based: Joint Implementation
  - Project – Based: Clean Development Mechanism

Supplementarity: "..domestic action shall constitute a significant element of the effort by each Party.."

Flexibility Mechanisms of KP

- As it does not matter to the climate where emission reductions are achieved, sound economics argues for achieving them where they are least costly



I- Emissions Trading

II- Joint Implementation

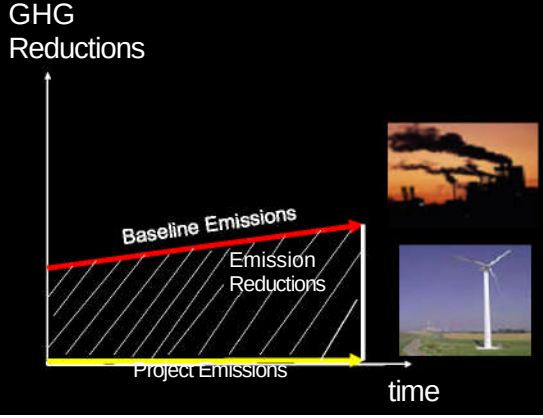
II- Clean Development Mechanism (CDM)

Annex I

Non-Annex I

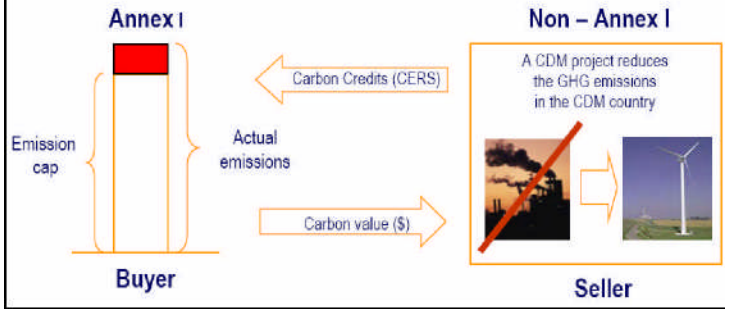
Assigns GHG emission targets to Annex I countries between 2008 and 2012

How the CDM works



How the CDM works

Reduced GHGs in a –NonAnnex I country can be sold to an Annex I country



CDM and its objectives

- More cost-effective emission abatement;
  - Environmental (e.g. air quality) and health benefits
  - Access to clean technologies
  - Infrastructure improvements
  - Increased employment
  - Revenues from credits
  - Mitigation of climate change

Implementing the CDM in host countries

Pre-conditions:

- Ratification of Kyoto Protocol
- Establishment of Designated National Authority (DNA)

A CDM project needs to:

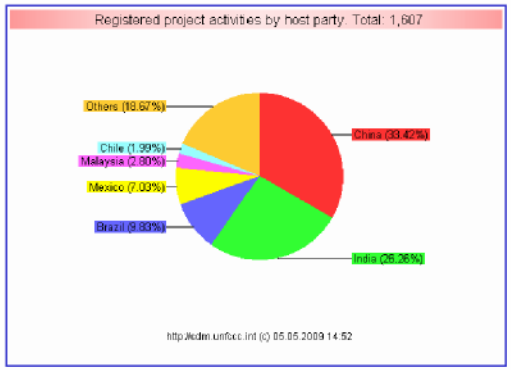
- Be voluntary and approved by involved parties
- Meet national criteria for Sustainable Development (for Letter of Approval)
- Have long-term measurable benefits and emission reductions
- Meet the criteria of the CDM Executive Board
  - Validation, Registration, Monitoring & Verification,...

CDM rules from Marrakech

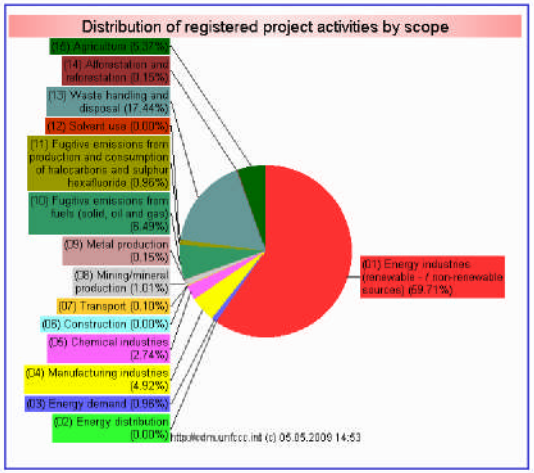
(Undertaken in developing countries
(CERs may be used by Annex I countries
(Voluntary participation approved by each Party
(Real, measurable and long-term mitigation benefits
(Reductions are additional to any that would occur in the absence of the project
(Promotes sustainable development, as confirmed by host country
(Does not divert ODA

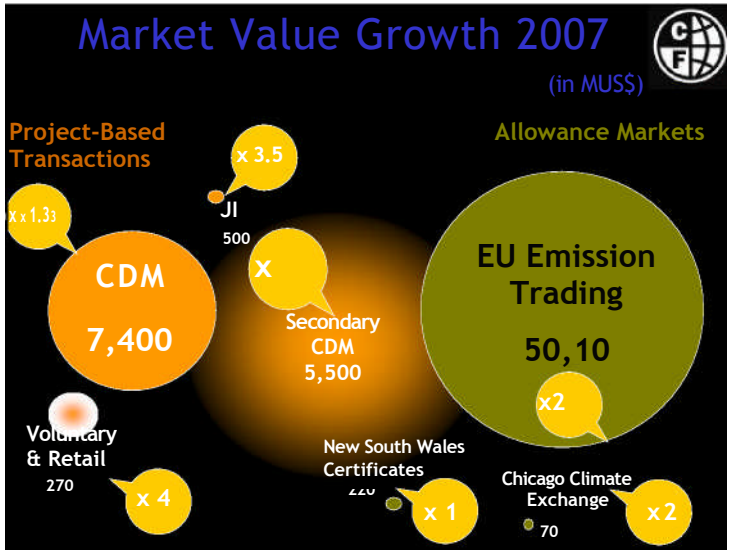
Overview of the carbon market & Status of the CDM Market

CDM Update:

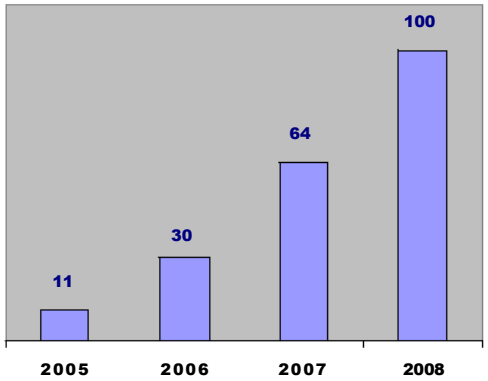


CDM Update : UNFCCC

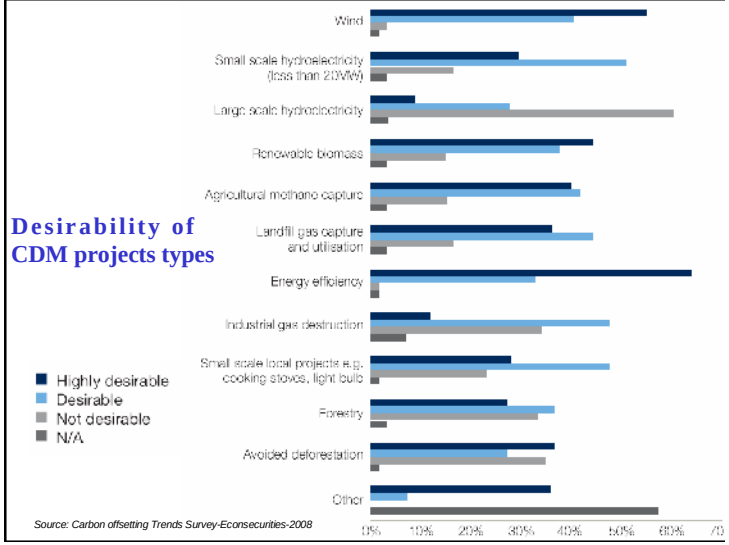




Evolution of the overall Carbon market

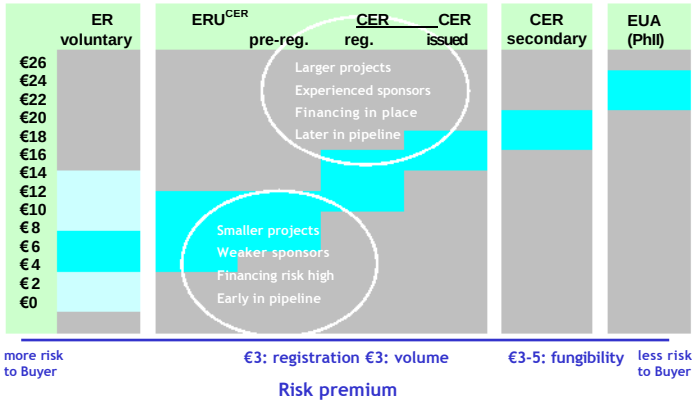


Desirability of CDM projects types



Market tiers widen

Avg CER price: €10, avg ERU price: €9



Thank you

alahbabi@menara.ma

REPUBLIC OF LEBANON

MINISTRY OF ENVIRONMENT

Role of Designated National

CDM Committee at the Ministry of Environment

May2009

TIMELINE OF EVENTS

- On 15 May 2006, the Lebanese Parliament passed Law 738 (Accession to Kyoto Protocol)
- On 15 June 2006, the CDM Committee was established under Decision 22/1
- In November 2006, a report was submitted to DGoE
- In February 2007, a technical report was submitted according to Decision 10/2 (January 11,2007)
- In May 2007, the Presidency of Council of Ministers granted approval to establish the DNA at MoE

Clean Development Mechanism in Lebanon

ELIGIBILITY CRITERIA

For Lebanon to host potential CDM projects, three basic requirements should be met:

- Ratification of Kyoto Protocol ✓
- Establishment of ✓
- Voluntary participation in CDM project activities

Clean Development Mechanism in Lebanon

ROLE OF DNA

The establishment of DNA is a prerequisite for participation

Main Responsibility

Issuance of written approval of CDM projects and serving as a single contact pointforproject participants

Clean Development Mechanism in Lebanon

CORE RESPONSIBILITIES

1. Establishment of national rules for project eligibility, submission and approval
2. Confirm compliance with national sustainable development criteria
3. Issuance of host country approval letter

Clean Development Mechanism in Lebanon

OTHER RESPONSIBILITIES

- Certify compliance with other country-specific regulations such as an EIA
- Outreach to project developers
- Technical assistance to project developers for the preparation of project proposals
- Outreach to potential partners to facilitate investment in CDM projects
- Attract donors for capacity building for CDM projects and financing

Clean Development Mechanism in Lebanon

Other Responsibilities

- Promotional activities
- Monitor CDM projects towards their compliance with national sustainable development goals
- Track issued CERs in a national database

Clean Development Mechanism in Lebanon

Design of DNA

In the design of the DNA, four steps should be taken into consideration:

1. Selection of institutional framework
2. Establishment of project review and evaluation process
3. Design of sustainable development criteria
4. Legalisation of the DNA

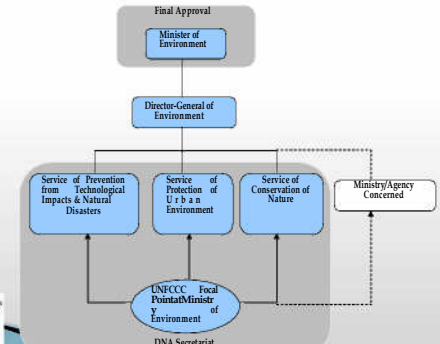
Clean Development Mechanism in Lebanon

Selection of Institutional Framework-Single Ministry Model

- Consists of two steps:
  1. Final approval in the form of "letter of approval" by Minister of Environment
  2. Formation of a technical review committee
- Advantages:
  - Draws on existing human resources and infrastructure
  - Low cost of implementation
  - Shortens the decision-making and approval processes

Clean Development Mechanism in Lebanon

Single Ministry Model



Clean Development Mechanism in Lebanon

Legalisation of DNA

- In May 2007, the Presidency of Council of Ministers granted approval to establish the DNA at MoE
- The Ministry of Foreign Affairs has notified the UNFCCC of contact details of DNA

Clean Development Mechanism in Lebanon

Thankyou For Your Attention...

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CDM PROJECT CYCLE

CDM Workshop
Beirut, Lebanon

May 11,2009

CDM project cycle steps

CDM project cycles involves activities split into:

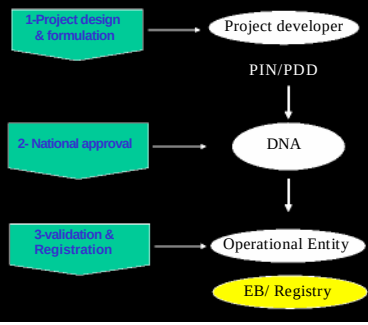
Pre-project implementation actions (one time):

1. Project Design (Project Developer).
2. Project Validation (DOE).
3. Project Registration (EB).

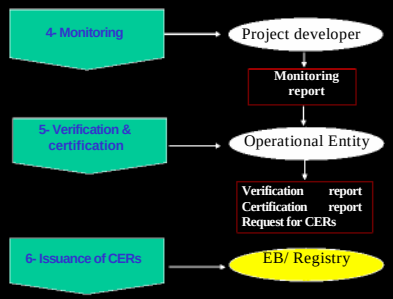
Post-project implementation actions (Repeated):

1. Project Monitoring (Project Developer or Third Party).
2. Verification and Certification (DOE).
3. Issuance (EB).

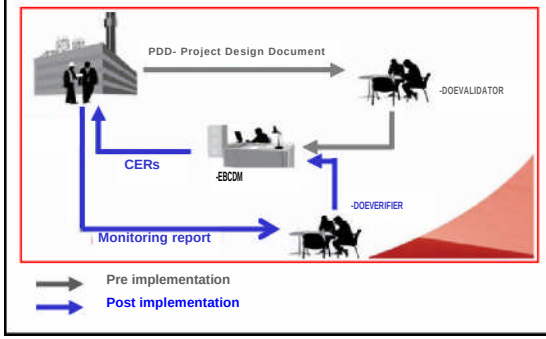
Pre-Implementation



Post-Implementation



How the process works



Project Design Document:

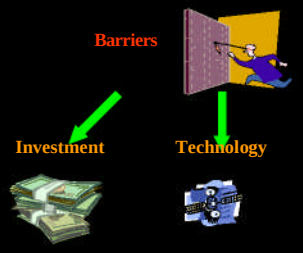
PDD to be prepared according to the EB latest directives and procedures (www.unfccc.int):

- **"Approved Baseline Methodology**
- **"Duration of the Project Activity**
- **"Monitoring Methodology and Plan**
- **"Calculation of GHG emissions**
- **"Environmental Impacts**
- **"Stakeholder Comments**

Critical elements in the preparation of a CDM project : the additionality concept

v' CDM requires that emission reduction must be additional to those which would have occurred in the absence of the project i.e. under a business-asusual scenario.

Barriers analysis for the demonstration additionality



- No enforceable regulation that mandates the implementation of the project (otherwise project is -nonAdditional as it would be then compliance with regulation).

National Approval

+ **Screening the projects (in a transparent manner) to assess their effectiveness in meeting SD criteria**

+ **DNA 4 rapid and transparent procedures to evaluate and approve projects**

v' This can be demonstrated in various ways:

- the project would not have been economically viable or;

- not be able to obtain sufficient financing without the sale of the carbon credits; or

- the used technology would not have otherwise been adopted

Validation/Registration

+ Review of the project (PDD, feedback from NGOS and local Communities, etc.) by an accredited DOE chosen by the project participants

+ DOE to receive written approval form the DNA of the voluntary participation in the project + Contribution to SD

+ DOE 4 forward to the Executive Board for formal registration

+DOE to make the validation report publicly available

Monitoring

v'**A Monitoring methodology/plan is included in the PDD (transparent, reliable, relevant)**

v'**Monitoring : systematic surveillance of the project performance**

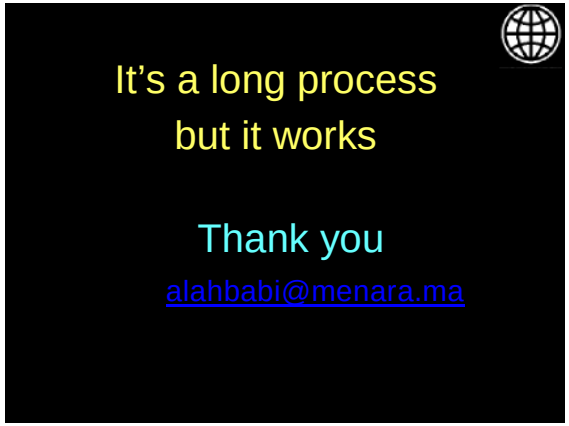
v'**Monitoring reports (applying the method. above) to be prepared by the project participants : project performance (GHG emission reduction, Leakage)**

Verification/Certification

Verification 4 Independent process monitoring reports to be submitted to a DOE:

- o**Periodic auditing of the monitoring results**
- o **Assessment of the emission reductions**
- o **Conformance with monitoring plan**
  - o **Conformance of the CERs occurrence with the conditions specified by the validated project**
- o **DOE to forward certification decision to Project participants, Parties involved, EB; and to make the Certification Decision publicly available**


Issuance of CERs
$$$


It’s a long process
but it works
Thank you
alahbabi@menara.ma

REPUBLIC OF LEBANON
MINISTRY OF ENVIRONMENT

Project Evaluation

CDM Committee at the Ministry of Environment

May 2009

DESIGN OF PROJECT REVIEW & EVALUATION

Designing an efficient project review process is essential for creating a transparent & effective DNA

Hence

- A project evaluation cycle that includes evaluation steps, a time line and a list of agencies, departments and/or experts involved
- Application and evaluation documents
- Host country approval templates for preliminary endorsement and final approval

Clean Development Mechanism in Lebanon

PROJECT EVALUATION CYCLE

A two-step approval procedure

1. Submission of PIN for initial feedback via a "Letter of Endorsement"
2. Submission of PDD for final approval

Raison d'être

To reduce the risk to project participant(s) since they will receive earlyfeedback on the eligibilityof the project forebe expending resources on preparing afull PDD

Clean Development Mechanism in Lebanon

PROJECT IDEA NOTE (PIN)

As a first step, PP(s) would need to develop the PIN

The PIN will include:

1. Basic information
2. EIA or IEE depending on type of project
3. Other relevant documentation/permits

Clean Development Mechanism in Lebanon

PIN - BASIC INFORMATION

The basic information includes:

- Contact information
- Overall description of the project
- Expected emission reductions and anticipated CERs
- Financial structure of the project

SUBMISSION OF PIN

Submission to UNFCCC focal point for initial screening of documents after registration at Registrar

Set-up of technical review committee

If approved, issuance of "Letter of Endorsement"

If not approved, the possibility to make corrections is granted through the issuance "Letter of Objection" and resubmission of PIN

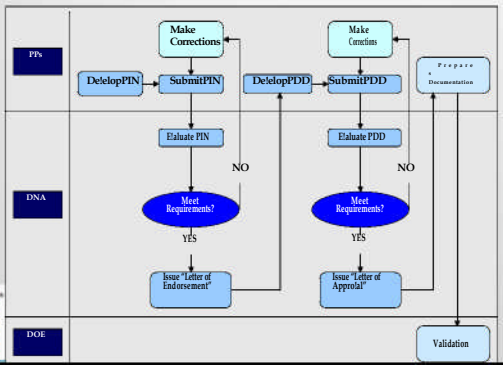
Clean Development Mechanism in Lebanon

SUBMISSION OF PDD

- Submission of PDD
- Review of PDD by technical review committee
- The technical review committee will submit a "Technical Review Report"
- If approved, a "Letter of Approval" will be issued - If not approved, the possibility to make corrections is granted and the PDD is resubmitted

Clean Development Mechanism in Lebanon

PROJECT EVALUATION CYCLE



Clean Development Mechanism in Lebanon

PROJECT APPLICATION &

- It is of essence to set-up the project application and evaluation documents to effectively streamline the process
- The documents include:
  - PIN template
  - Overview of the evaluation cycle
  - PDD
  - Sustainable development criteria
  - Technical review report, Letter of Endorsement, Letter of Objection, Letter of Evaluation, Letter of Approval

Clean Development Mechanism in Lebanon

LETTER OF APPROVAL

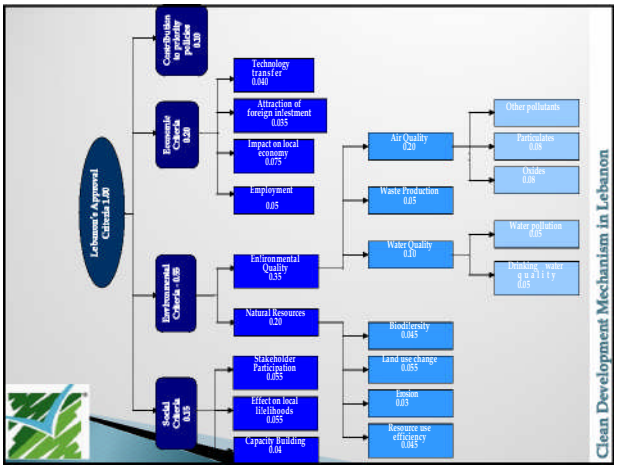
- The "Letter of Approval" should include:
  - Confirmation that the host country has ratified the Kyoto Protocol;
  - Approval of voluntary participation in the proposed CDM project; and
  - A statement that the proposed CDM project contributes toward sustainable development of the host Party and meets all other national regulatory requirements

Clean Development Mechanism in Lebanon

DEVELOP SD CRITERIA

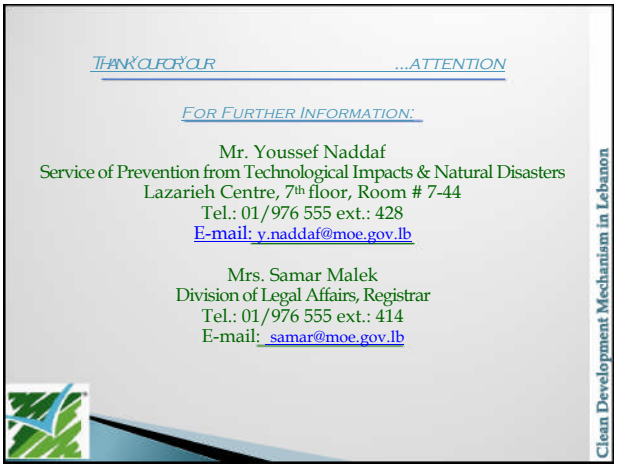
- Kyoto Protocol stipulates that CDM projects must assist non-Annex I countries in achieving sustainable development
- The host country's DNA must develop clear sustainable development criteria that includes:
  - Environmental: Assess whether the proposed project has any negative impacts and abides by Law 444/2002
  - Social: Assess whether the proposed project has positive impacts on social development in Lebanon
  - Economic: Assess whether the proposed project has positive impacts on economic development in Lebanon

Clean Development Mechanism in Lebanon



Clean Development Mechanism in Lebanon


The Procedure has been published in the Official Gazette under Decision 12/1 dated th 7of March 2009
Clean Development Mechanism in Lebanon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Clean Development Mechanism in Lebanon

CDM in Practice

CDM Workshop
Beirut. Lebanon

May 11. 2009

Benefits of CDM

a) CDM: a mechanism to monetize environmental benefits of clean technologies and processes.

b) CDM thus provides additional revenues to clean projects.

c) In addition, CDM registration often helps with financing. A project is more attractive to equity and debt investors with CDM status.

1

Requirements for CDM

- GHG emission reductions in real and measurable manner
- Contribution to the sustainable development of the host country
- Additionality: the project proponent should demonstrate that the project cannot be implemented without the CDM status and revenues. Otherwise the project will be part of the Business-As-Usual: BAU scenario
- The project should be developed according to the methodologies and procedures approved by the CDM EB.

2

Types of CDM Projects

- Renewable Energy Projects
- Energy Efficiency Improvement Projects
- Other Project Activities
  - *Agriculture*
  - *Switching fossil fuels*
  - *Emission reductions by low-greenhouse gas emitting vehicles*
  - *Methane recovery*
  - *Methane avoidance*
  - *Land Use and Land Use Change, Forestry (LULUCF), etc.*

3

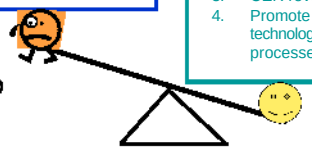
Costs and

Costs

1. Additional costs for the implementation
2. Fees for, professional and registration etc
3. Timely process
4. Risks

Benefits

1. Fight against the global warming
2. Preserving natural resources
3. CER revenue
4. Promote clean technologies and processes



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Renewable Energy Sources

What is renewable

- **Renewable energy:** Energy derived from sources that are regenerative or for all practical purposes can not be depleted.
- **Project type:** Construction of new or rehabilitation of existing RE based power generation units.
- **Examples:**

Solar Energy Wind Energy
Hydro Energy Geothermal
Biomass

6

RE Approved methodologies

Small scale:

AMS-I.A. Non-grid connected electricity generation
AMS-I.B. Mechanical energy generation
AMS-I.C. Thermal energy generation
AMS-I.D. Grid connected electricity generation
AMS-I-E. Switch from Non-Renewable Biomass for Thermal Applications by the User

Large scale:

ACM0002 Renewable energy sources exceptfor biomass (most common, 1200 projects)
AM0019 Replacement of part of electricity production of one single fossil-fuel-fired plant that stands alone or supplies electricity to a grid
AM0026 Renewable generation in countries with merit order based dispatch grid
AM0045 Grid connection of isolated electricity systems

7

Renewable energy projects

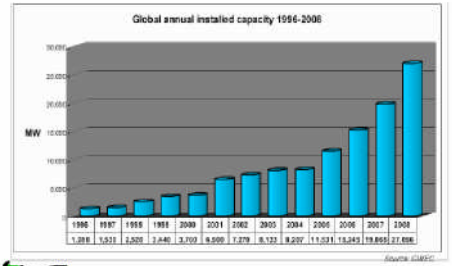
- **WHY?**

By generating thermal or electric energy with renewable sources we reduce the GHG emissions associated with fossil fuels combustion for energy generation.

- Example: Replacing a 15 MW coal fired TPP that emitted 98.000 tCO_2/year and by a new Wind Farm. will reduce the GHG emissions by 98.000

8

Wind Power



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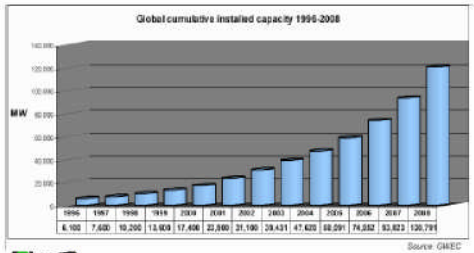
Wind Power



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Example

Project: Zafarana Wind Farm (Egypt)

Description: Construction of 120 MW wind farm

Annual generation: 452 016 MWh/yr

Methodology: ACM-0002.

Expected CER: 248 016 tCO_2/ Year

Registered June 22, 2007 under N 0740

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Fuel switch and Cogeneration

Fuel Switch and Cogeneration

- ***Fuel switch:*** Switching from intensive fossil fuels (coal or heavy fuel oil) to less intensive fossil fuels (Natural gas, LPG).

  Emission reductions achieved as a result of the decreased carbon intensity of electricity and/or heat generation.

- ***Cogeneration :*** Switch from electricity generation only to electricity and heat generation. High energy efficiency with less GHG emissions per unit energy generated

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EXAMPLE

Fuel Switching Project of the Aqaba Thermal Power Station ATPS: from fuel oil to natural gas (Jordan);

Methodology ACM 0011 – "Consolidated baseline methodology for fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation"

Expected CER: 397 163 tCO_2 / Year

Registered on September30, 2008 under N 1758

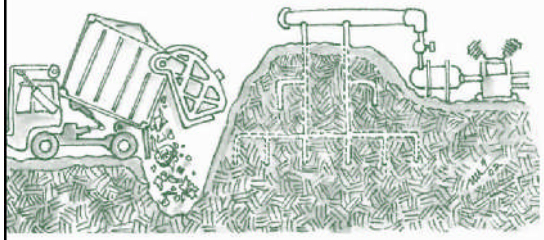
14

LANDFILL GAS CAPTURE, FLARING OR USE

Land Fill Gas (LFG)

- Landfill gas (LFG) is generated as a result of microbial processes.
- LFG production depends on the volume and type of waste (particularly its organic content) and landfill conditions (especially moisture).
- It is mixture of methane and carbon dioxide and volatile organic compounds.

PUMP THE DUMP



CDM Category

- This project category comprises measures to capture and combust methane from landfills used for disposal of residues from human activities including municipal, industrial, and other solid wastes containing biodegradable organic matter.
- the recovered LFG could be flared or used for heat or electricity generation.

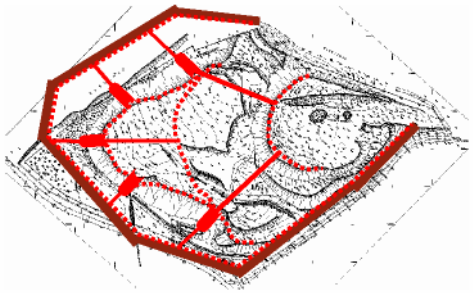
REDUCTION OF THE GHG

Based on the fact methane is a potent greenhouse gas, 21 times stronger than carbon dioxide.

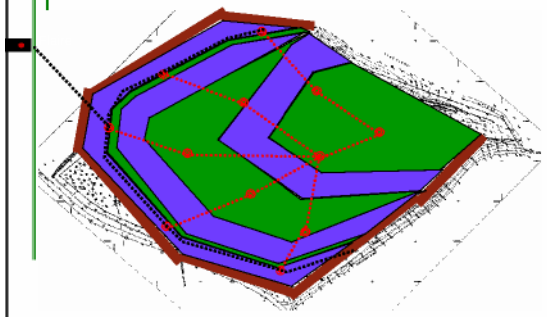
ADDITIONALITY

Voluntary project implementation for the CDM, no local legal obligation to

Leachate water collecting system



Gas collecting System



Gas Flaring

Approved Methodologies for waste projects

1. **AM : Approved Methodology" (large scale]**
   AM0002. AM0003. AM0010. AM0011, AM0013, AM0022, AM0025, AM0039, AM0057
2. **AMS: Approved Methodology for Small-scale CDM projects**
   AMSIII.E, III.F, III.G, III.H, III.I III.L
3. **ACM: Approved Consolidated Methodology (large scale]**
   ACM0001, ACM0010

EXAMPL

Description: Biogas capture, flaring or use in 14 main landfills in Morocco

Methodology: Programmatic approach based on ACM 0001 – "Consolidated baseline and monitoring methodology for landfill gas project activities"

Expected CER: 26 M tCO_2 over 25 years

Nominal installed capacity: 50 MW

CDM Program under development

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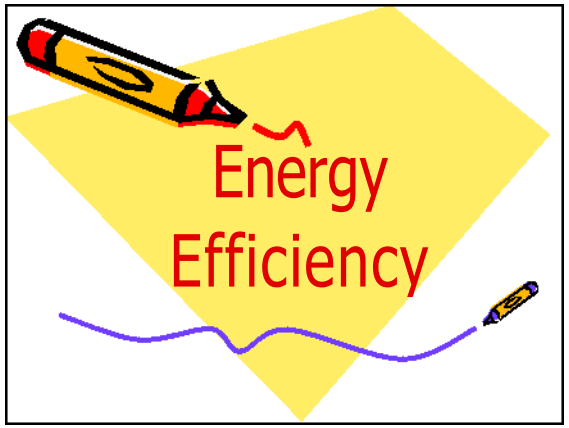

Energy Efficiency

- **Energy Efficiency comprises all the technologies, processes and measures that reduce the energy consumption required to produce one unit of goods or to deliver a specified service.**
- **Thus, for the same production or service offered, less energy is used and the associated GHG emissions are then reduced.**

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EE: possible projects types

Improvement of energy utilization efficiency by:

- Equipment with:
  - Higher efficiency
  - Less energy loss
  - Low energy utilization by changing the process
- Optimization of operation management

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Efficient Lighting

Project: Visakhapatnam (India) OSRAM CFL distribution CDM Project

Description: Replacement of 500 000 incandescent lamps (90% 60W and 10% 100W) per 15W and 20W Compact Florescent Lamps)

Methodology: AMS-II.C. "Demand-side energy efficiency programs for specific technologies"

Expected CERs: 275 276 tCO_2 over 10 years

Registered February 12, 2009 underN 1754

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Transport Systems

Transport Systems under the

- Transport projects that use less carbon intensive fuel, improve the fuel combustion efficiency or save energy through traffic optimization or modal change.
- Three approved methodologies
  - AM 0031 Baseline Methodology for Bus Rapid Transit Projects
  - AMS III.C Emission reductions by low-greenhouse gas emitting vehicles
  - AMS-III.U Cable Cars for Mass Rapid Transit System (MRTS)
- Two new proposed methodologies are under validation: NM0258 (variation of AM0031 and NM0266 for Railway Rapid Transit Projects)

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CDM Transport Projects

Methodology	Registered projects	Projects under validation	Total
AM0031	1	4	5
ASMIIIC	1	2	3
ASMIIIU	1		1
Total	3	6	9

32

EXAMPL

Bus Rapid Transit in Bogotá, Colombia TransMilenio Phase II-IV

Additional 1,3 M passengers/day using BRT

Methodology AM 0031: Baseline Methodology for Bus Rapid Transit Projects

Expected CER: 1,7 M tCO_2 over 7 years

Registered on December 7, 2006 under N' 0672

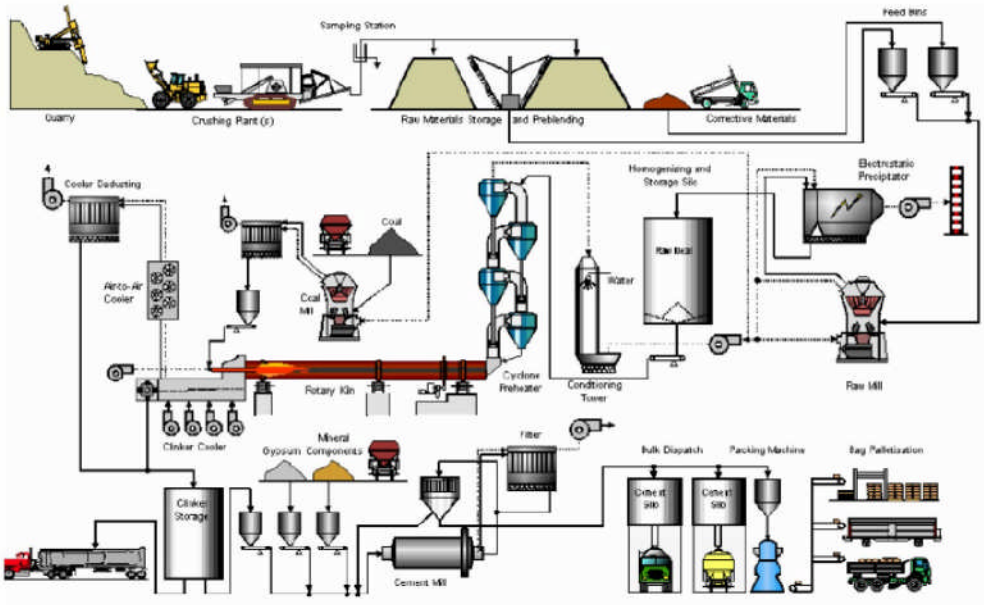
33

Thank you

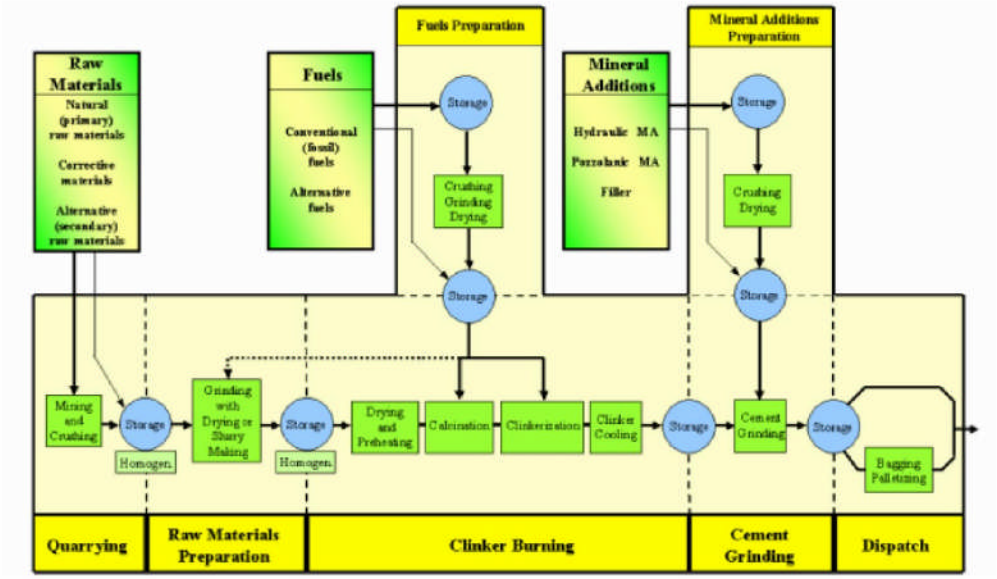
alahbabi@menara.ma

34

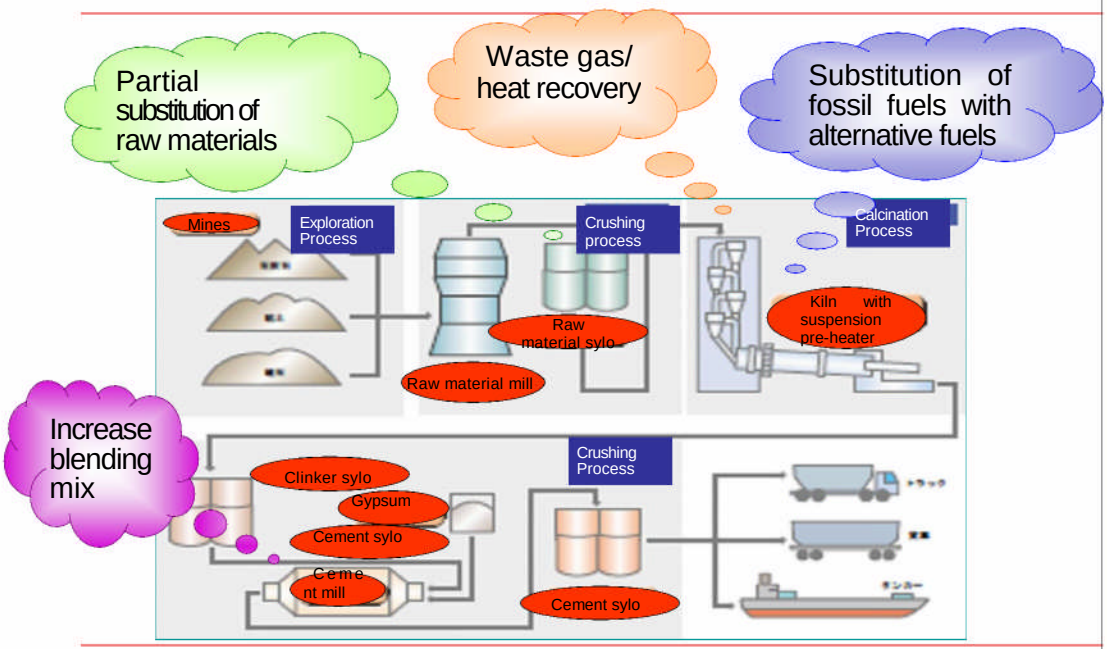
Dry Process Cement Production



Cement Production Process/Su bProcess identification



Cement Sector – Possible Type of Projects



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CDM Cement Sector Approved Methodologies

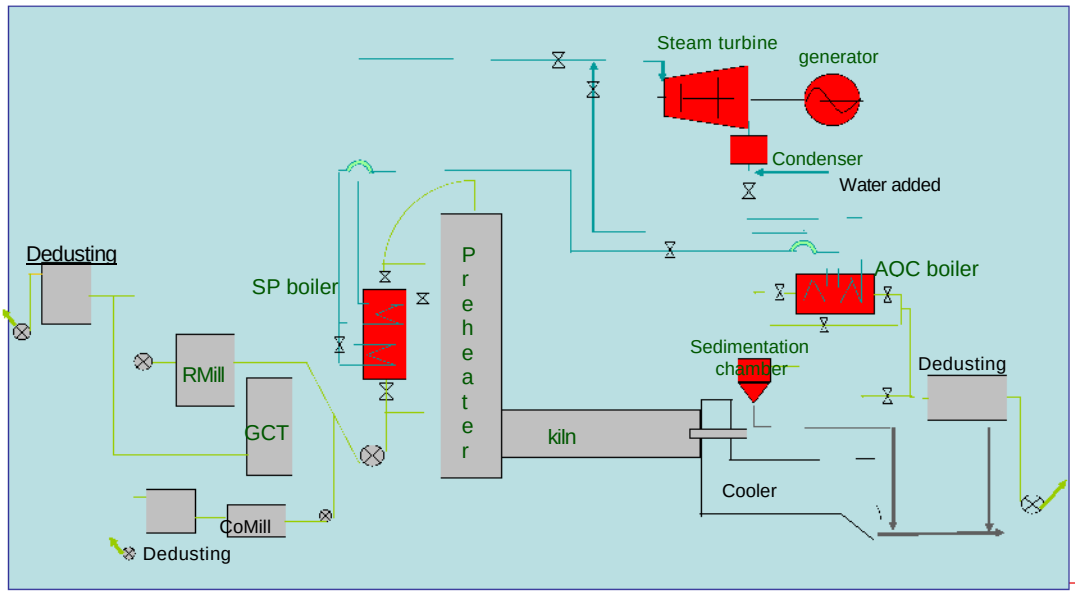
Type	Approved Methodology	Number of CDM Projects
1- Susbstitution Raw Material	ACM015	9
2-Waste heat recovery	AM024	23
3- Susbsitution fossil fuels	ACM003	21
4-Increasing blending	ACM005	39
Total		92

5

Small Scale Approved methodologies that can be applied to the cement sector

Approved Methodology	Number of CDM Projects
AMS-I I I-Q-Waste recovery energy projects	57
AMS-III-B-Switching fossil fuels	59
AMS-II-D-Energy efficiency and fuel switching measures for industrial facilities	136

Waste Heat Recovery - Basic Design



Case Study

Project:	25.3MW WHR Project of Zhejiang Leomax Group China; Project N° 1874 registered on March 16, 2009
Description:	Installation of waste heat recovery (WHR) systems to generate electricity for the 4 clinker production lines: 2x2,500 t/d and 2x5,000 t/d clinker production lines. WHR system uses the exit gases from the pre-heater (Suspension Preheater) and the cooler (Air Quenching Chamber).
Power displaced:	179,35 GWh/year, representing 50% of the plants electricity requirement
Methodology:	ACM0024
Expected CER:	162 203 CER/ year

Smile for Wind Energy

Tetouan Cement Iplant iWind Farm Project

Case Study

Project:	Tétouan Wind Farm Project for Lafarge Cement Plant Morocco - Registered on September 23, 2005 CDM Project N° 0042
Description:	Installation of a 10 MW wind farm to generate electricity and feed directly to the cement plant
Power displaced:	42,3 GWh/year, representing 45% of the plant electricity requirement
Methodology:	AMS-I-D : Grid connected renewable electricity generation

11

GHG EMISSIONS REDUCTION

Net Electricity Generated :
38.1 GWh/an

Emission Factor of the Grid :
0.752 tCO2 per MWh

Emission reductions of GHG:
28 650 tCO2/Year

For more information visit the UNFCCC web site: www.unfccc.int, CDM project N°

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