

Opportunities with Carbon Credits in the building sector

A practical Guideline

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This paper provides an introduction and guideline to developing carbon credits for project in the building sector that reduces emission reductions. The paper includes a brief step by step guideline to developing a Clean Development Mechanism project and an overview of CDM project in the MEDA region.

What are Carbon Credits?

Projects in the building sector that involve the implementation of renewable energy or energy efficiency technologies may result in a reduction of CO₂ emissions, which may be converted to carbon credits when certain requirements are met. Examples of project that reduce CO₂ emissions in the building sector are:

- Renewable energy technologies in buildings such as PV, solar water heaters, heat/cold storage
- Energy efficiency projects such as insulation and energy efficient appliances and lighting.

Carbon credits can be sold at the international carbon market, thus allowing project developers to attracting a hard currency revenue stream for their projects. Project developer that want to develop carbon credits have to meet the rules of the Clean Development Mechanism (CDM) as laid down by the UNFCCC in the Kyoto Protocol. Carbon credits from CDM project are referred to as Certified Emission Reductions (CERs) that are purchased by governments in industrialized countries that have signed the Kyoto Protocol and companies in those countries that need to meet emission reduction targets. Apart from CDM, another option is to develop carbon credits for the voluntary market where the requirements to carbon credits are less stringent. Those credits are called Voluntary Emission Reductions (VERs).

Additionality

The “additionality” is the most important requirement to a CDM project. A project is additional if it can be shown that the project would not be implemented without CDM, i.e. that the carbon revenues are required to overcome one or more barriers to implementation. In addition, the project should not be mandatory by law or regulation, in other words it needs to be shown that the current situation, i.e. the baseline situation, is consistent with applicable laws and regulation. The baseline emissions forecast represents the baseline, against which the performance of a CDM project is measured. The emission reductions (or carbon credits) are determined by subtracting the emissions after implementation of the project from baseline emissions (see figure 1).

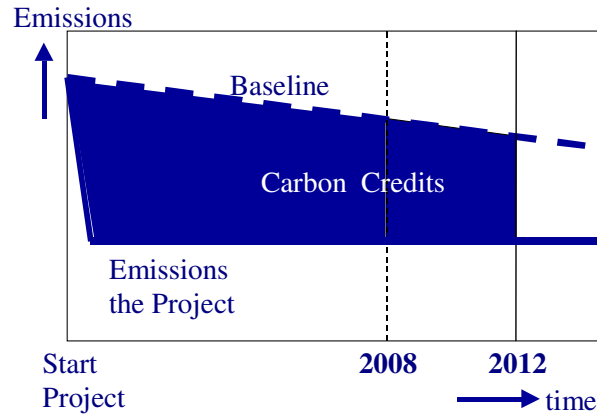
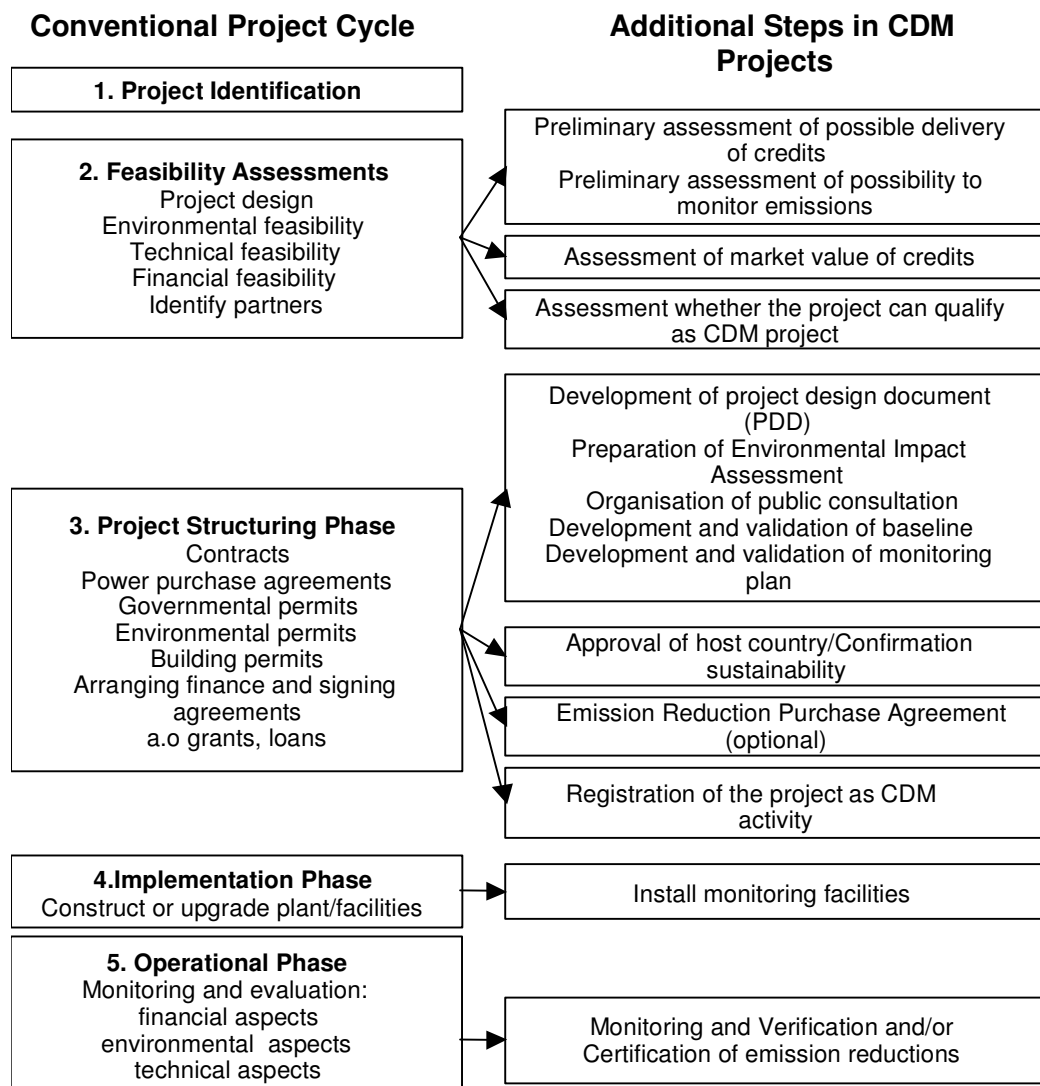


Figure 1. Baseline emissions, actual project emissions and the respective carbon credits.

Steps to developing a CDM project

The following figure provides an outline of the steps that have to be completed in a typical project cycle of an investment project (left part of the figure) and provides the additional steps required for the CDM (right section of the figure).



Feasibility assessment

As a first step it needs to be assessed whether a project can potentially meet all CDM requirements. The most important criteria are:

- The host country should be a developing country that has ratified the Kyoto Protocol
In the Meda-region the following countries have ratified the Kyoto Protocol: Lebanon, Syria, Jordan, Israel, Egypt, Tunisia, Algeria, Morocco. Turkey and Palestine have not yet ratified. While those countries are thus not eligible for CDM projects, VER projects will be possible.
- The project should reduce greenhouse gas emissions
- The project is additional to a business as usual situation (the baseline)
- The revenues from sale of carbon credits should exceed transaction costs.
Transaction costs for meeting all CDM requirements amount from circa 20.000 to 30.000 Euro per year. The income from carbon credits thus needs to exceed those costs in order to be financially viable. Assuming a price of 8 Euro per tonne of CO₂, the project should at least result in 2500 to 3750 tonne CO₂ per year to cover transaction costs.
- An approved methodology should be available
A CDM project should be developed in accordance with an approved CDM methodology.

Example: Qudsaya Youth Building Project in Syria Damascus.

Pilot project: 16 apartments with insulated walls and windows
80sq.m/apartment- start June 2007
Total project: 50.000 apartments

Table 1: Heat transfer coefficient for walls and windows in baseline and project situation

	Baseline (Traditional system)	Project
Walls	Hollow block walls (2.7 W/m ² °C)	Insulated walls (0.53 W/m ² °C)
Windows	Aluminum windows with single glass (8.35 W/m ² °C)	U-PVC windows with double glass (2.4 W/m ² °C)

Result: decrease in heating and air-conditioning energy use.

CDM feasibility check:

- Syria has ratified the Kyoto Protocol and thus the project can be developed as CDM
- The project reduces CO₂ emissions, as shown in the table below
- The project will most likely be additional to business as usual as:
 - The investment of the insulation measures is much higher than without the measures
 - Syrian law and regulation has not set any building standards,
- The annual carbon revenue is estimated to be Euro 1.470.000 per year, compared to which transaction cost is only a fraction.
- The total energy saving exceeds 60 GWh and thus and new methodology needs to be developed.

Table 2: energy and emission reductions per apartment

Energy consumption	Baseline	Project	Saving	Emission reduction Per apartment (tCO ₂ eq./yr)
Diesel (litre/yr)	1800	540	1260	3.2
Electricity (kWh/yr)	3240	1380	1860	1
Total				4.2

Energy saving for 50.000 apartments: 63 million litre diesel and 93 GWh electricity

Emission reduction for 50.000 apartments: 210.000 tonne CO₂.

Annual Carbon income based on price of 7 Euro/tonne CO₂: Euro 1.470.000 per year.

Project structuring phase

Project financing and organization are arranged during this phase. Additionally for a CDM project, the following steps are required.

- Written approval from the host country
- Development of a Project Design /Document (PDD) including a baseline and monitoring plan:
 - A baseline describes the most likely development of greenhouse gas emissions if the project would not be implemented;
 - A monitoring plan describes the collection of all data required to assess the project's emissions;
- Validation of the PDD by a Designated Operational Entity (DOE).
- CDM projects have to be approved by and registered with the CDM Executive Board, which is an institution set-up by the United Nations Framework Convention on Climate Change (UNFCCC);

Implementation phase

The additional step for a CDM project in the implementation phase of a project is the obligatory implementation of monitoring facilities.

Operational phase

Greenhouse gas emissions and/or the amount of electricity generation, resulting from the project have to be monitored and reported in a monitoring report, which has to be submitted to DOE for verification and certification.

CDM in the building sector

At the moment just a handful CDM projects on energy efficiency in buildings have been developed, mainly due to the following reasons:

- The scale of project is too small to overcome transaction costs.
- Lack of suitable methodologies
- The threshold of the small scale methodologies is too low

The UNFCCC acknowledges the barriers for implementing end use energy efficiency projects. Therefore recently rules for developing several small project activities as one CDM project under a Programme of Activities (PoA) have been developed. This allows project developers to develop several similar activities at different locations that can be implemented at different moments in a certain timeframe.

An overview of CDM methodologies that are currently approved can be found at:

<http://cdm.unfccc.int/methodologies/index.html>

Methodologies currently available for the building sector:

- Distribution of efficient light bulbs to households for project larger than 60 GWh of energy saving (AM0046)
- Energy efficient waterpumping for water supply to end-users in municipal water utilities (AM0020).
- Demand-side energy efficiency programmes for energy-efficient equipment, lamps, ballasts, refrigerators, motors, fans, air conditioners, appliances, etc. at many sites up to a maximum energy saving of 60 GWh per year. (AMS II C)
- Energy efficiency and fuel switching measures for buildings up to a maximum energy saving of 60 GWh per year. Examples include technical energy efficiency measures

(such as efficient appliances, better insulation and optimal arrangement of equipment) and fuel switching measures (such as switching from oil to gas). (AMS II E)

If no approved methodology exists, a new methodology needs to be developed and submitted for approval at the UNFCCC. As this can be a lengthy procedure, an alternative option in this case could be to develop the project for the voluntary market.

CDM in Meda region

The below table shows the type and number of CDM project that have reached the validation stage in the Meda region. CDM projects have only been developed in Egypt, Israel, Morocco and Tunisia. In Turkey also several emission reduction project have been developed, but since Turkey has not ratified the Kyoto Protocol yet, those project are currently developed for the voluntary market.

Table 2: Number of CDM project at validation, at request fro registration and registered in the Meda region

Country	Types of projects	At validation	Request registration	Registered	Total
Egypt	Fossil fuel switch, Wind, N ₂ O, Landfill gas, Hydro, waste gas cogeneration.	3	2	2	7
Israel	Biomass, Wind, Energy efficiency in the industry, Landfill gas, N ₂ O, Biogas, Fossil fuel, switch, Agriculture, Landfill gas	11	0	5	16
Morocco	Solar, Wind, Landfill gas, Energy efficiency industry	2	0	3	5
Tunisia	Landfill gas	0	0	2	2

The carbon market

The carbon credit market can be roughly divided in the following market segments:

- Market for emission allowances such as the EU Emission Trading Scheme (EU ETS)
- Kyoto Compliant market for project-based emission reductions: CDM and JI¹
- The voluntary market for project-based emission reductions.

The carbon market grew in value to an estimated in €23 billion in 2006 three times greater than the previous year. The market was dominated by the sale and re-sale of European Union Allowances (EUAs) at a value of nearly €19 billion under the EU ETS.

Project-based activities primarily through the CDM and JI grew sharply to a value of about €3.8 billion in 2006. The voluntary market for reductions by corporations and individuals also grew strongly to an estimated €80 million in 2006.²

Companies under the ETS can buy EAUs and credits from CDM and JI projects to reach their target. The development of the EAU market price will be the most important factor to determine the demand for credits from CDM projects. It is expected that EU market prices will increase thereby enhancing demand for project credits.

¹ JI stand for Joint Implementation which is the equivalent for CDM for Countries in Eastern Europe.

² Source: State and Trends of the Carbon Market 2007, The World Bank, 2007.

Voluntary market

Some companies, institutions or individuals purchase emission reductions as a voluntary action. These buyers do not use the emission reductions to comply under the EU ETS, but for example to meet voluntary targets and/or to compensate for the impact of its activities on the climate. Since the emission reductions are voluntary they do not have to meet EU or UNFCCC requirements. However, as most buyers prefer to purchase credits that have a certain credibility, various standards are currently developed for voluntary projects, for example: The Gold Standard for Voluntary Offsets (<http://www.cdmgoldstandard.org>)

Further information:

Useful links can be found at:

An overview of UNFCCC decision and approved CDM methodologies:

<http://cdm.unfccc.int>

UNEP provides for an overview of all CDM project in the UNFCCC pipeline:

www.cdmpipeline.org

An elaborate CDM guideline:

<http://www.cd4cdm.org/Publications/cdm%20guideline%202nd%20edition.pdf>

An CDM project finance guidebook:

<http://www.cd4cdm.org/Publications/FinanceCDMprojectsGuidebook.pdf>

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