

# **CLIMATE CHANGE MITIGATION AND THE CLEAN DEVELOPMENT MECHANISM**



**mgm** INTERNATIONAL

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## **INTRODUCTION**

Climate change is a natural phenomenon, which allows the Earth to maintain conditions which enable living beings to survive and develop. Throughout history, the earth's climate has undergone many variations that serve as references and enable us to estimate the consequences of marked environmental variations one of the kind our planet is undergoing as a result of the industrial revolution. Anthropogenically induced climate change directly affects economic activity as it can destroy the natural resources of the world, change vegetation growth patterns and affect animal and human life. Climate change can also lead to various calamities like droughts, floods, other extreme phenomena, and rise in sea level, etc. resulting in major economic losses. The subject has hence been engaging the attention of scientists, financial institutions, business, insurance companies, and government for several years. It has been determined that the pace of climate change has accelerated as a direct result of industrialisation, deforestation, population growth, and various other human activities. Unless corrective measures are taken, climate change is likely to become more rapid and have an adverse and extreme impact on life on earth.

## **GREENHOUSE GASES AND CLIMATE CHANGE**

The warming near the earth's surface that results when the earth's atmosphere traps the heat received from the sun is called the greenhouse effect. In the absence of this effect, the average temperature of the earth would be about 33 degrees Celsius lower. The greenhouse effect received its name because the earth atmosphere acts much like the glass roof and walls of a greenhouse.

The earth's atmosphere allows most of the sunlight that reaches it to pass through and heat the earth's surface. The earth sends the heat energy back into the atmosphere as infrared radiation. A lot of this radiation does not pass freely into space, because certain gases in the atmosphere absorb it. These gases are known as greenhouse gases.

Chief amongst these greenhouse gases are carbon dioxide (CO<sub>2</sub>), water vapour (H<sub>2</sub>O), ozone (O<sub>3</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>).

The concentration of these gases in the atmosphere has been increasing because of a variety of reasons. The amount of carbon dioxide in the atmosphere is increasing as a result of the burning of fossil fuels such as coal, oil and, to a lesser extent, natural gas, as also the rapid destruction of forests and trees, which absorb carbon dioxide. The levels of other greenhouse gases are increasing in the atmosphere mainly as a result of emissions in different industries and through different industrial processes.

The result of increase in the concentration of these gases in the atmosphere is that the heat energy that passes freely into space in the form of infrared radiation is decreasing and the temperatures on earth are rising, resulting in global warming.

Besides increasing the earth's temperatures, global warming also causes shifting rainfall patterns, rise in the sea level (due to thermal expansion and melting of ice) and alteration of the natural ecological balance. The effects of global warming on agriculture as also human beings can be serious. Due to heat retention into the atmosphere, there are more heat waves and droughts and the number of weather disasters tend to increase, as a consequence of the excess heat energy.

The *Intergovernmental Panel on Climate Change* (IPCC), a scientific body set up in 1988, had estimated that the global mean surface temperature on earth could rise by as much as 5.8 degrees Celsius by 2100. Changes, which earlier took millions of years, are now taking place

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in decades without allowing ecosystems sufficient time to adapt. As a result, many species of flora and fauna could become extinct.

According to a group of U.N. sponsored scientists, developing countries are twice as vulnerable to climate change as industrialised countries.

## **WORLD RESPONSE TO CLIMATE CHANGE**

International concern on environmental issues has been increasing over the last three decades. Awareness about environmental and climate issues, as also knowledge about mechanisms for addressing such issues, has also been increasing.

The *Montreal Protocol* of 1987 concerned the protection of the Ozone layer around the earth. In 1988, The U.N. General Assembly adopted a resolution urging 'Protection of global climate for present and future generations of mankind.' The same year, the Intergovernmental Panel on Climate Change (IPCC) was created by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP) to compile and assess scientific information on the subject.

The First Assessment Report of the IPCC, issued in 1990, confirmed the threat of climate change. The Second World Climate Conference was held in Geneva later that year and it called for a global agreement on climate change.

## **UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE**

Accordingly, the *United Nations Framework Convention on Climate Change* (UNFCCC) was adopted by various government representatives in May 1992, was opened for signature at the Earth Summit at Rio de Janeiro in June 1992 and came into force in 1994. Today the UNFCCC is one of the most widely supported international environmental agreements ratified by 188 states and the European Community. The full text of the UNFCCC can be seen at: <http://unfccc.int/resource/docs/convkp/conveng.pdf>

The ultimate objective of the UNFCCC is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

Countries that are parties to the UNFCCC are classified into two categories, giving rise to a third category including those countries that do not belong to the first two categories. They have different commitments imposed on them. These three categories are:

1. The Annex I countries,
2. The Annex II countries, and
3. The non-Annex I countries.

The Annex I countries consist of the industrialized countries that were members of the OECD in 1992 and the countries with Economies in Transition (the EIT parties). These countries were required to take steps to reduce their GHG emissions to 1990 levels by the year 2000. The EIT parties had some flexibility in choosing a base year other than 1990. Details of the 1990 emissions of Annex 1 parties are given in the following table:

| Country            | 1990 equivalent CO <sub>2</sub> emissions (Gg) | % Share of Total |
|--------------------|--|------------------|
| Australia          | 288,965  | 2.1              |
| Austria            | 59,200   | 0.4              |
| Belgium            | 113,405  | 0.8              |
| Bulgaria           | 82,990   | 0.6              |
| Canada             | 457,441  | 3.3              |
| Czech Republic     | 169,514  | 1.2              |
| Denmark            | 52,100   | 0.4              |
| Estonia            | 52,100   | 0.4              |
| Finland            | 53,900   | 0.4              |
| France             | 366,536  | 2.7              |
| Germany            | 1,012,443                                      | 7.4              |
| Greece             | 82,100   | 0.6              |
| Hungary            | 71,673   | 0.5              |
| Iceland            | 2,172  | 0.0              |
| Ireland            | 30,719   | 0.2              |
| Italy              | 428,941  | 3.1              |
| Japan              | 1,173,360                                      | 8.5              |
| Latvia             | 22,976   | 0.2              |
| Liechtenstein      | 208  | 0.0              |
| Luxemburg          | 11,343   | 0.1              |
| Monaco             | 71   | 0.0              |
| Netherlands        | 167,600  | 1.2              |
| New Zealand        | 25,530   | 0.2              |
| Norway             | 35,533   | 0.3              |
| Poland             | 414,930  | 3.0              |
| Portugal           | 42,148   | 0.3              |
| Romania            | 171,103  | 1.2              |
| Russian Federation | 2,388,720                                      | 17.4             |
| Slovakia           | 58,278   | 0.4              |
| Spain              | 260,654  | 1.9              |
| Sweden             | 61,256   | 0.4              |
| Switzerland        | 43,600   | 0.3              |
| United Kingdom     | 584,078  | 4.3              |
| USA                | 4,957,022                                      | 36.1             |

**The Annex II countries** consist of the OECD members of Annex I excluding the EIT parties. They are required to provide financial resources to developing countries to undertake emission reduction activities as also develop and transfer environment friendly technologies to the developing countries as well as EIT parties.

**The non-Annex I countries** are mostly developing countries. Some of the countries that are least developed and especially vulnerable to the effects of climate change are given special consideration under the UNFCCC.

The decision-making authority of the UNFCCC is the *Conference of the Parties* (COP), which is established as the supreme body of the Convention. The COP meets annually unless decided otherwise by the parties.

The first COP took place at Berlin in 1995. The 9<sup>th</sup> COP took place at Milan in December 2003. The 10<sup>th</sup> COP will take place in Buenos Aires in December 2004.

The UNFCCC has also set up two subsidiary bodies to advise the COP. These are:

- The Subsidiary Body for Scientific and Technological Advice (SBSTA), and
- The Subsidiary Body for Implementation (SBI).

### KYOTO PROTOCOL

The 3<sup>rd</sup> Conference of the Parties that was held at Kyoto in Japan in 1997 was of special significance. At this COP, a protocol, now known as the *Kyoto Protocol* was agreed upon.

The Kyoto Protocol contains:

- the individual emission limitations and reductions commitments for the Annex I countries covering 6 greenhouse gases, not controlled by the Montreal Protocol, namely:
  - Carbon Dioxide (CO<sub>2</sub>)
  - Methane (CH<sub>4</sub>)
  - Nitrous Oxide (N<sub>2</sub>O)
  - Hydrofluorocarbons (HFCs)
  - Perfluorocarbons (PFCs)
  - Sulphur Hexafluoride (SF<sub>6</sub>)

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- the baseline years to be adopted, viz.:
  - 1990 for the first three gases listed above, and
  - 1995 for the subsequent three, if preferred.
- three “flexibility” mechanisms to assist industrialized countries to achieve their emission reduction targets in a cost-effective manner, viz.:
  - Joint Implementation (JI),
  - Clean Development Mechanism (CDM), and
  - Emissions Trading (ET).
- modalities for emission reductions through land-use, land-use change and forestry (LULUCF) sector.

The full text of the Kyoto Protocol can be seen at:

<http://unfccc.int/resource/docs/convkp/kpeng.html>

### **Emission Reduction Targets**

Under the Kyoto Protocol, industrialized countries agreed to decrease their emissions by at least 5.2% compared to the 1990 emission levels, by the period 2008-12 (the first commitment period). Specific targets listed under Annex B of the protocol can be seen at:

<http://unfccc.int/resource/docs/convkp/kpeng.pdf>

### **Kyoto Protocol Ratification**

The Kyoto Protocol will come into force when both the following conditions are satisfied:

- Ratification by 55 parties to the UNFCCC.
- Such parties must include Annex I countries which accounted for at least 55% of the 1990 level of CO<sub>2</sub> emissions of the Annex I countries.

As of March 2004, 122 parties to the UNFCCC had deposited their instruments of ratification, acceptance, approval, or accession to the Kyoto Protocol, thus meeting the first of the two criteria above. However, these parties only add up to 44.2% of total 1990 emissions of Annex 1 countries, thus falling short of the 55% required. The Annex 1 countries that have not yet ratified the Kyoto Protocol are Australia, Liechtenstein, Monaco, Russian Federation, and the United States of America. However, the 55% goal can only be achieved if either Russia or the

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USA (or both) ratify the protocol. The USA and Australia have already announced their decisions not to ratify the protocol. Russia has postponed ratification on several occasions. The Kyoto Protocol is seen as “conditional” on Russian ratification. The latest status on the ratification of the Kyoto Protocol can be seen at <http://unfccc.int/resource/kpstats.pdf>, visually represented by the Kyoto “thermometer” in <http://unfccc.int/resource/kpthermo.html>.

## **FLEXIBILITY MECHANISMS UNDER THE KYOTO PROTOCOL**

Recognizing the fact that industrialised countries may find it expensive to achieve emission reductions domestically in view of their already high energy efficiencies and high capacity industries, the Kyoto Protocol specified three innovative *flexibility mechanisms* to allow these countries to undertake steps for climate change mitigation at lower cost by participating in emission reduction projects abroad. However, only those Annex I parties that have ratified the protocol and are in compliance with their methodological and reporting commitments under the protocol can take advantage of these mechanisms.

The three flexibility mechanisms under the Kyoto Protocol are:

- **Joint Implementation (JI)** – This allows industrialised or Annex I countries to earn credits in the form of Emission Reduction Units (ERUs) by financing projects that reduce emissions in other Annex I countries.
- **Clean Development Mechanism (CDM)** – This is a form of joint implementation between industrialized and developing countries. Under this option, the Annex I countries can participate in the implementation of projects that reduce GHG emissions in non-Annex I countries. The emission reductions achieved by implementation of such projects as compared with the emissions under a baseline scenario, duly certified, are treated as Certified Emission Reductions (CERs), which can be bought and used by the Annex I countries to comply with their emission reduction commitments / targets.
- **Emissions Trading (ET)** – This flexibility mechanism allows an Annex 1 country, which holds excess emission units (assigned amount units, AAUs) to sell its units to another Annex 1 country to enable it to meet its obligations. Annex I Parties may also acquire, from other Annex I Parties, CERs from CDM projects, ERUs from joint implementation projects, or RMUs from sink activities.

Emission trading is considered to be a contentious aspect of the flexibility mechanisms. Any trading has to be supplemental to domestic actions as per the Article 17 of the Kyoto Protocol but no “cap” has been placed on the amount countries are allowed to trade beyond the domestic actions. There is hence a concern that some countries may hence avoid domestic action altogether and meet their commitments merely by emissions trading. Countries such as Ukraine and Russia which have a huge surplus of credits as a result of their economic decline since 1990 (also known as “hot air”) may flood the market with such credits at cheap prices leading to absence of domestic action by several developed countries.

## CDM PROJECT AUTHORITIES AND PARTICIPANTS

At the COP-7, the *CDM Executive Board* (EB) was elected to supervise the CDM process and to issue CERs after certification of the emission reductions. The EB is the main authority responsible for approving CDM projects. It is also responsible for accrediting agencies responsible for validating the Project Design Documents, including the Verification and Certification of emission reductions originated by the projects under implementation. Such agencies are called *Designated Operational Entities* (DOEs). An entity that has applied for accreditation as a DOE is called an *Applicant Entity* (AE).

The *Project Participant, Sponsor or Developer* is the public or private organization that proposes to initiate the CDM project.

The *Host country* is the non-Annex I country in which the CDM project is being implemented.

The *Investor* is the Annex I country from which the buyer of the CERs originates.

The *Designated National Authority* (DNA) is the governmental authority of a Party of the Kyoto Protocol responsible for issuing the written approval of voluntary participation of the project participants in the CDM project activity. The host country DNA is responsible for assessing the contribution of the project to achieve sustainable development of the host country.

## CDM PROJECT CYCLE

Any project requires the execution of a series of well-defined steps over a specific timeframe and CDM projects are no exception. The process followed in the case of a CDM Project is known as the CDM Project Cycle.

The CDM Project Cycle consists of the following steps:

1. Design
2. Validation/Registration
3. Monitoring
4. Verification/Certification
5. Issuance of CERs

Each of these processes is discussed below.

## **Design**

This step starts with an analysis to determine whether a given project concept would qualify as a CDM project. After going into a procedure of screening, estimating the magnitude of emissions reduction and establishing project viability, project developers draft the *Project Design Document* (PDD). While the PDD is being prepared it is common to identify potential CER purchasers' interest in the project. Each PDD must have a baseline and monitoring plan clearly defined. These must use baseline and monitoring methodologies already approved by the CDM Executive Board or must clearly indicate the new methodology to be adopted. The new methodology shall be submitted by the designated operational entity to the Executive Board for review with the draft project design document, including a description of the project and identification of the project participants.

## **Validation**

*Validation* is the process of independent evaluation of the project activity by a designated operational entity (DOE) against the requirements of the CDM, on the basis of the PDD.

The designated operational entity selected by project participants to validate a project activity, being under a contractual arrangement with them, shall review the project design document and any supporting documentation to confirm that the following requirements have been met:

1. The participation requirements are satisfied:
  - Participation in a CDM project activity is voluntary.
  - Parties participating in the CDM have designated a national authority for the CDM.
  - The Party not included in Annex I is a Party to the Kyoto Protocol.
2. Comments by local stakeholders have been invited, a summary of the comments received has been provided, and a report to the designated operational entity on how due account was taken of any comments has been received.
3. Project participants have submitted to the designated operational entity documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts and, if those impacts are considered significant by the project participants or the host Party, have undertaken an environmental impact assessment in accordance with procedures as required by the host Party.

4. The project activity is expected to result in a reduction in anthropogenic emissions by sources of greenhouse gases that are additional to any that would occur in the absence of the proposed project activity.
5. The baseline and monitoring methodologies comply with requirements pertaining to methodologies previously approved by the CDM Executive Board or modalities and procedures for establishing new methodologies.

On review, the DOE issues a validation report and opinion. The project sponsor and PDD consultant must respond to the validation report queries and comments to the satisfaction of the DOE for the final *Validation Report* to be issued. Prior to the submission of the validation report to the CDM Executive Board, the DOE must receive from the project participants written approval of voluntary participation from the Designated National Authority of each Party involved, including confirmation by the host Party that the project activity assists it in achieving sustainable development.

### **Registration**

On satisfying itself that the proposed project activity is a valid CDM activity, the Designated Operational Entity shall submit to the CDM Executive Board a request for registration in the form of a validation report, including the project design document, the written approval of the DNAs, and an explanation of how it has taken due account of comments received.

*Registration* is the formal acceptance by the CDM Executive Board of a validated project as a CDM project activity. It is the official recognition of the project feasibility to generate CERs. The CDM Executive Board reviews the proposals and may invite public comments or ask for additional information/details before rejecting or accepting the proposal.

Details of the projects submitted to the EB and their status are shown on their website <http://cdm.unfccc.int>.

The process of negotiations for certified emission reduction purchase/sale agreement can usually start as the Project Design Document is being finalized. A Term Sheet spelling out the terms of the agreement is initially prepared and later used as the basis for drafting the *Certified Emission Reduction Purchase/Sale Agreement (CERP/SA)*. Once the project has been validated by one of the Designated Operational Entities, the CERP/SA is signed. The CERP/SA spells out the period for which the emission reductions will be credited/purchased and this can extend up to 21 years. CDM projects can obtain CERs for up to three periods of

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7 years each, with project validation between each period. Alternatively, the crediting period may be a single interval of up to 10 years, with no further validation requirements. In no case, the CER crediting period can exceed the life of the project activity, and the resulting emission reductions.

### **Monitoring**

Once the project has been validated, the detailed engineering activities for the project are taken up. Once the construction is completed, and the activity has been initiated, the project sponsors initiate the monitoring of emission reductions as specified in the PDD and the project monitoring plan.

Measurements as per the *Monitoring Plan* should be carried out to quantify the GHG emission reductions generated by the project, through the monitoring of activity levels and key parameters allowing GHG emission calculation. In order to calculate emission reductions, the emission of the project activity has to be subtracted from the reference scenario (called Baseline), which has to be determined by a methodology previously approved by the CDM Executive Board.

### **Verification/Certification**

*Verification* is the periodic independent review and *ex post* determination by the DOE of the monitored reductions in anthropogenic emissions by sources of GHG that have occurred as a result of a registered CDM project activity during the verification period.

*Certification* is the written assurance by the DOE that, during a specified time period, the project activity achieved the reductions in anthropogenic emissions by sources of GHG as verified.

A different Designated Operational Entity (i.e a DOE other than the one which carried out the validation and registration process for the project) will be in charge of verifying the emissions reductions actually took place and their magnitude.

The designated operational entity contracted by the project participants to perform the verification shall make the monitoring report publicly available, and shall:

1. Determine whether the project documentation provided is in accordance with the requirements of the registered project design document.

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2. Conduct on-site inspections, as appropriate, that may comprise, *inter alia*, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observation of established practices and testing of the accuracy of monitoring equipment.
3. Review monitoring results and verify that the monitoring methodologies for the estimation of reductions in anthropogenic emissions by sources have been applied correctly and their documentation is complete and transparent.
4. Recommend to the project participants appropriate changes to the monitoring methodology for any future crediting period, if necessary.
5. Determine the reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CDM project activity, using calculation procedures consistent with those contained in the registered project design document and in the monitoring plan.
6. Provide a *verification report* to the project participants, the Parties involved and the CDM Executive Board. The report shall be made publicly available.
7. The Designated Operational Entity shall inform the project participants, Parties involved and the CDM Executive Board of its certification decision in writing immediately upon completion of the certification process and make the certification report publicly available.

Once the project activity goes on stream, periodic verifications and certifications are undertaken as per a predefined schedule, typically annually.

#### **Issuance of CERs**

The certification report shall constitute a request to the CDM Executive Board for *issuance* of CERs equal to the verified amount of reductions of anthropogenic emissions by sources of greenhouse gases.

The issuance shall be considered final 15 days after the date of receipt of the request for issuance, unless a Party involved in the project activity or at least three members of the CDM Executive Board request a review of the proposed issuance of CERs. Such a review shall be limited to issues of fraud, malfeasance or incompetence of the designated operational entities.

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Upon being instructed by the CDM Executive Board to issue CERs for a CDM project activity, the CDM registry administrator, working under the authority of the CDM Executive Board, shall, promptly, issue the specified quantity of CERs into the pending account of the CDM Executive Board in the CDM registry. Upon such issuance, the CDM registry administrator shall promptly:

- (a) Forward the quantity of CERs corresponding to the share of proceeds to cover administrative expenses and to assist in meeting costs of adaptation, respectively, in accordance with Article 12, paragraph 8, to the appropriate accounts in the CDM registry for the management of the share of proceeds;
- (b) Forward the remaining CERs to the registry accounts of Parties and project participants involved, in accordance with their request ".

### **Various Options for Utilizing Certified Emission Reductions**

Experience has shown that the CERs generated through CDM projects can be utilized mainly in three different ways, *viz*:

- **CER purchase/sale options:** In this case a buyer from an Annex 1 country signs a purchase/sale agreement with the organization implementing the CDM project to buy/sell the CERs. The buyer makes no investment in the project and is hence not subject to any risk. If CERs are not generated, the buyer loses nothing.
- **Direct Investment to acquire CERs:** In this case a buyer from an Annex 1 country invests in the CDM project activity and keeps the CERs generated by the project. The risk passes on to the buyer of CERs in this case. However, this process may result in a lower cost for CER acquisition for certain kinds of projects where the project sponsor has difficulties in securing project financing.
- **CERs for own use:** This applies to multinational companies in Annex 1 countries. Such companies may implement CDM projects in their subsidiaries in non-Annex 1 countries and retain the CERs for their own use, to be credited to their (Annex 1) country.

Combinations of these cases are also possible.

### **Baseline Methodologies, Additionality & Monitoring Procedures**

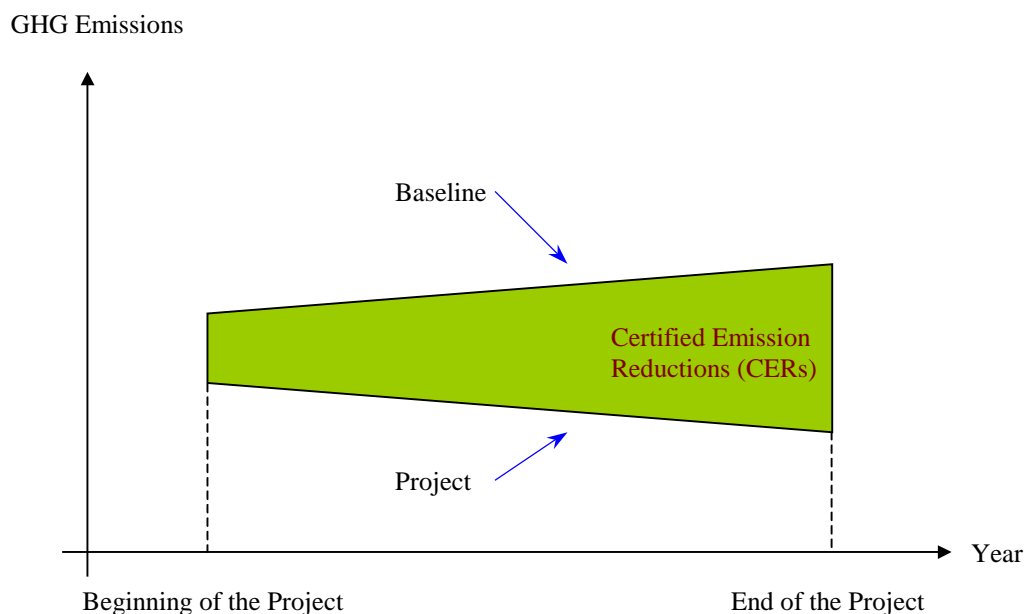
One of the most important prerequisites under the CDM is establishing the *additionality* of the project. It needs to be shown that the emission reductions would not have occurred in the absence of the certified project activity. All CDM projects must be additional. A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.

The *baseline* for a CDM project activity is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity.

Baselines can be project-specific or standardized. In choosing a baseline methodology for a project activity, project participants shall select from among the following approaches the one deemed most appropriate for the project activity:

- Existing actual or historical emissions;
- Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment;
- The average emissions of similar project activities undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category.

The baseline analysis also permits “carbon credits” or *Certified Emission Reductions* (CERs) in the CDM to be computed. These are reductions of greenhouse gas emissions caused by a project. One CER is 1 tonne CO<sub>2</sub> equivalent of the GHG in question. To determine the CO<sub>2</sub> equivalent of each GHG, other than CO<sub>2</sub>, the mass of each gas emission needs to be multiplied by the *Global Warming Potential* of each gas with respect to CO<sub>2</sub>. Diagrammatically, the concepts of baseline and CERs resulting from additionality arising from CDM are shown in the figure below.



Project Design Documents must use baseline and monitoring methodologies approved by the CDM Executive Board, or propose new methodologies for such approval. Details of the methodologies approved by the CDM Executive Board, proposed new methodologies under consideration and the procedures for proposing new methodologies are given on the UNFCCC website <http://cdm.unfccc.int/methodologies>.

Determination of the baseline, the project boundary and additionality, as well as the monitoring procedures are important elements of the project design document of any CDM project. These aspects are critically examined by the CDM Executive Board while registering a project.

### **Difficulties in Showing the Additionality in CDM Projects**

Demonstration of additionality is crucial in CDM projects as any project which fails to demonstrate additionality does not qualify as a CDM project.

Additionality is a very complex issue. Basically, one needs to demonstrate that a proposed CDM project activity would not have happened anyway, if the CDM did not exist. Demonstration of additionality is often very controversial. Many proposed CDM projects are questioned and may be rejected on this issue.

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As recommended by the CDM Executive Board, examples of tools that may be used to demonstrate that a project activity is additional and therefore not the baseline scenario include, among others:

1. A flow-chart or series of questions that lead to a narrowing of potential baseline options; and/or
2. A qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely; and/or
3. A qualitative or quantitative assessment of one or more barriers facing the proposed project activity (such as those laid out for small-scale CDM projects); and/or
4. An indication that the project type is not common practice (e.g. occurs in less than [ $<x\%$ ] of similar cases) in the proposed area of implementation, and not required by a Party's legislation/regulations.

For the Small Scale category (option 3 above), the CDM Executive Board has proposed the following set of barriers to demonstrate additionality:

- **Investment barrier:** a financially more viable alternative to the project activity would have led to higher emissions;
- **Technological barrier:** a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
- **Barrier due to prevailing practice:** prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
- **Other barriers:** without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.