



CDM

and its OPPORTUNITIES in Bangladesh

_____ Clean
_____ Development
_____ Mechanism



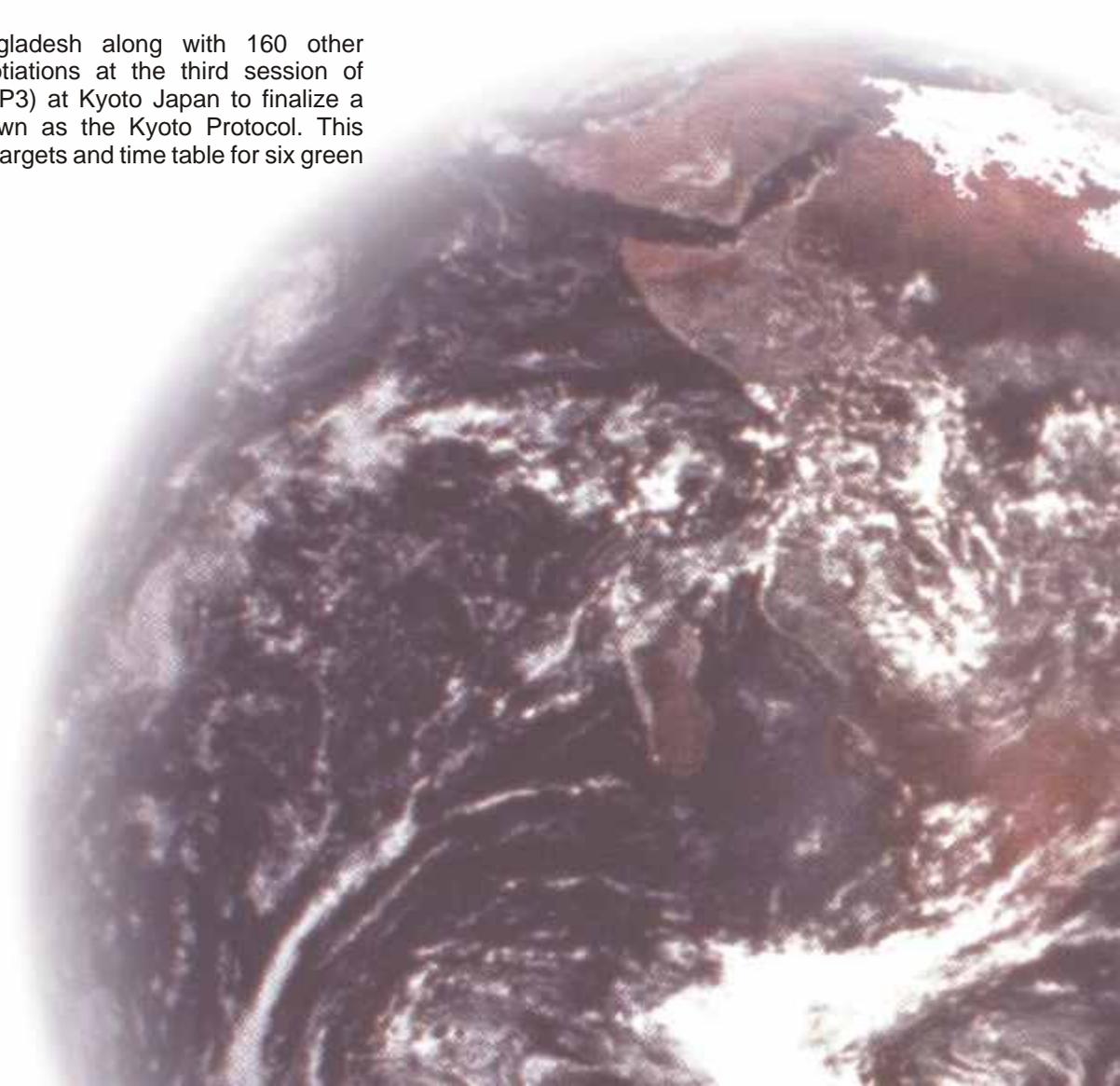
Global Warming and Kyoto Protocol

Increasing scientific evidence reveals that the earth is getting warmer due to various human activities resulting in sea level rise and occurrence of extreme events such as cyclones, floods and droughts.

In order to tackle Global Warming, United Nations General Assembly took up this issue of Climate Change and adopted the resolution "Protection of Global Climate for Present and Future Generations of Mankind".

The United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992 which came into force in 1994 established an international framework to address global climate change. Parties to the Convention agreed to stabilize green house gas (GHG) concentrations in the earth's atmosphere.

In December 1997, Bangladesh along with 160 other countries, completed negotiations at the third session of Conference of Parties (COP3) at Kyoto Japan to finalize a protocol subsequently known as the Kyoto Protocol. This protocol includes reduction targets and time table for six green house gases.



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What is Green House Gas (GHG)?



Many gases present in the atmosphere are known as green house gases (GHG) because these prevent heat from escaping from the earth. The gases are: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. If the amount of these gases increase in the atmosphere, earth's temperature will increase. Scientists have named this phenomenon "Global Warming" and the associated changes to the atmosphere is known as "Climate Change".

If the rate of increase of GHGs in the atmosphere can be lessened then the process of global warming can also be lessened. A variety of measures like switching from coal to natural gas, using more efficient devices in industries and commercial units, using renewable energy, preventing release of methane gas from landfill, etc. are some examples of what constitute GHG reduction.

The most important aspect of the Kyoto Protocol is its legally binding commitments for 39 developed countries to reduce their GHG emissions by an average of 5.2% relative to 1990 level. These emission reductions must be achieved by 2008-2012: the so called first commitment period.

Impact of Global Warming in Bangladesh

Bangladesh is a low carbon dioxide emitting country. For instance, the per capita carbon dioxide emission is estimated at 0.2 ton/year, while the average for developing countries is 1.6 ton/year. In USA the per capita emission is 20 ton/year.

The low GHG emission status however provides no relief from the effects of Global Warming because 1.5 meter rise in sea level would inundate an area of 22,000 sq.km of Bangladesh, affecting 17 million people. Obviously Bangladesh is likely to be one of the worst suffers of Global Warming. The other impacts of global warming would be on:

- Agriculture
- Bio diversity and Forestry
- Human Health
- Fisheries
- Drainage
- Fresh water

What is Clean Development Mechanism (CDM)?

The Kyoto Protocol allows Annex-B countries to reach their emission reduction targets in different ways through Flexibility Mechanisms. These include Emission Trading (trading of emission between developed countries); Joint Implementation (transferring emission allowances between developed nations linked to a specific emission reduction project); and Clean Development Mechanism (CDM).

CDM is the only flexibility mechanism that involves developing countries (Non-Annex B). It allows developed countries (Annex-B) to achieve part of their reduction obligations through investment in projects in developing countries that reduce GHG emissions or fix or sequester carbon dioxide from the atmosphere.



Annex-B and Non-Annex-B Countries

According to the Kyoto Protocol, 39 countries mentioned in Annex-B of the Protocol required to reduce their green house gas emissions are called Annex-B countries. Countries not listed in the Annex-B of the Kyoto Protocol are called Non-Annex B countries.

Annex-B countries (from the Kyoto Protocol) are essentially the same as Annex-I countries (from the United Nations Frame Work Convention on Climate Change). Turkey and Belarus have been dropped from the list.



How Does CDM Work?

CDM enables developing country entrepreneurs and others to get investment fund for doing projects, which reduce GHG. Two things are important in CDM, namely,

- The project proponent must prove that the activity (hence the GHG reduction) would not have occurred in the absence of the project
- The project must promote sustainable development

Figure 1 illustrates how CDM works. From developed countries there is a flow of finance either up front or from annual sale of CERs. In return developing countries will reduce a certain quantity of GHG, which will flow to developed countries as CERs after approval by the Executive Board of the UNFCCC. Whether or not a project is actually reducing GHG is to be verified by an auditor like firm known in the Kyoto Protocol as Operational Entity (OE). The OE also has the responsibility to validate the baseline, i.e., establish the GHG emissions that would have occurred without the CDM project.

What are CERs?

Green house gas reduction of any CDM project is measured according to internationally agreed methods and are quantified in standard units called Certified Emission Reductions (CERs). These are expressed in tons of carbon dioxide (CO₂) equivalents.

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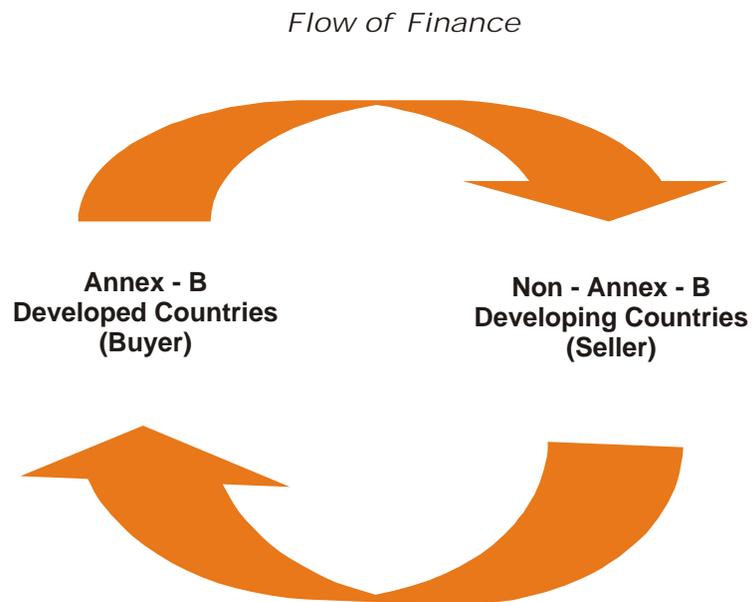


Fig 1

Flow of Emission Credit

Salient Features of CDM

- Industrialized (Annex-B) countries' state or private companies can invest in projects in developing (Non-Annex B) countries that contribute to reduction of GHG emission.
- Developing (Non-Annex B) countries' state or private companies are allowed to implement such projects.
- Through CDM projects industries in developing countries can be technologically upgraded and made environment friendly thus contributing to global climate protection as well as promoting sustainable development in the host country.
- The industrialized countries' investing entities can earn credit for emission reductions achieved through its investment in developing country towards its own emission commitment.

Basic Concept of Carbon Trading

Carbon trading also referred to as emission reduction trading is a relatively simple concept. Carbon trading is an economic tool which, in essence, allows for several parties to meet total emission reduction requirements at lower costs by working together. Carbon trading allows surplus emission reduction to required limits to be traded to other parties needing to meet emission limits.

In theory, if one party can reduce emissions at a lower cost than a second party, then first party could maximize emission reductions and sell any surplus reductions to the second party to help meet its reduction requirements. The aim is to improve the overall flexibility and economic efficiency of obtaining emission reduction.

Who is a Seller of CERs?

The seller of an emission reduction is one who has exceeded his regulated or voluntary emission reduction requirement, or is in possession of unused, banked or traded emission reductions, and is looking to sell these quantified emission reductions. The emission reduction must be real, surplus, quantifiable and verifiable.

All Non-Annex-B countries (including Bangladesh) under the Kyoto Protocol can be a seller of CERs.

Who is a Buyer of CERs?

The buyer of emission reductions is a party who has to meet a regulated or voluntary reduction in emission. A buyer can also be an investor who believes that the value of emission reductions will increase with time. An emission reduction can, subject to trading system, be bought, held (banked) and traded (sold) by anybody and at almost anytime. Annex-B countries under the Kyoto Protocol are Buyer of CERs.

What is the Present Market Price of CDM?

The current market price of emission reduction credits in existing carbon markets is between US \$ 3 and US \$ 5 per ton of carbon dioxide. In the absence of the participation of the United States of America in the international carbon trading, it is anticipated that the price per ton of carbon dioxide will not rise above US \$ 10 in the next few years, and anticipates an increase in their market value.

What is the Crediting Period of CERs?

Project activities, which meet all the CDM requirements and initiated after January 1, 2000 and registered with the CDM Executive Board by December 31, 2005 are eligible for crediting after validation by a recognized operational entity.

Emission reductions can be claimed for maximum ten years without revision of the project baseline, or for a period of seven years with two extensions of seven years each, provided the project baseline is revised at the time of each extension.

Trading of CERs

CERs earned from CDM projects are marketable commodity that may be exchanged with other companies or governments. A company that has earned CERs may also choose to bank them in order to be traded in future commitment periods after 2012, This is useful if the company does not require the credits in the current period and anticipates an increase in their market value.



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How CDM Can Help Private Sector in Bangladesh

Developing countries including Bangladesh in the process of achieving fast economic growth often have to settle for inferior technologies. These technologies more often than not consume more energy than state-of-the-art or advanced technologies. CDM allows a more energy efficient (or less GHG emitting) technology to be installed. Through CDM therefore an entrepreneur can

- Opt for a better technology resulting in cost savings;
- Be able to comply easily with the Department of Environment's regulations;
- Have a safer and cleaner plant; and
- Contribute to national sustainable development and to global environmental protection.

Companies of Annex-B countries participating in the CDM project will obtain the CERs to meet their domestic emission reduction targets in an economically efficient manner. However, companies from Annex-B countries that have no requirement to reduce GHG emissions may also choose to gain ownership of CERs through the CDM at a low price to sell in the international market at a future date.

A Company or Annex-B country participating in the CDM project can finance a project in a developing country (Non-Annex-B) like Bangladesh using any one of the following options:

- Full or Partial Equity:** A company finances all or co-finances part of a CDM project in return for full or shared financial returns and CERs.
- Financial Contribution:** A company financially contributes towards the cost of a CDM project equal to some portion of the incremental cost of the project over and above the baseline technology, or finances the removal of market barriers, in return for the CERs.
- Loan:** A company provides loan or lease at financing at concessional rates in return for CERs
- CER Purchase Agreement:** A company agrees to buy CERs as they are produced by the project.

For landfill gas recovery CDM projects, Bangladeshi companies can get the entire financing for the project by selling CERs . In most cases, however, CDM would help to finance the incremental cost of the project or might provide financing to remove market barriers to make the project a financially viable one.

step 01

ESTABLISH BASELINE

step 02

IDENTIFY TECHNOLOGY TO
REDUCE EMISSION

step 03

CALCULATE EMISSION
REDUCTION

step 04

CALCULATE SALE
PROCEEDS OF CERs

step 05

DEVELOP PROJECT
CONCEPT REPORT

step 06

SUBMIT PROJECT CONCEPT
REPORT FOR NATIONAL APPROVAL

step 07

PROJECT REGISTRATION
WITH CDM BOARD

How to Prepare a CDM Project

Step-1

Establish Baseline

Examine your operations and see what your present and past emissions have been. This is important in establishing a "baseline" emission level against which any reductions will be measured. A baseline is the level of emission that was taking place for a pre-selected year before any measures were undertaken.

Step-2

Identify Technology to Reduce Emission

Find out how emissions can be reduced in your enterprise (see the section potential sectors for CDM Projects in Bangladesh for generic types). You should already have a fairly good idea how this can be achieved. There are usually two reasons why an entrepreneur does not go for upgrading existing technology. These are:

- I) Lack of fund; and
- II) Low return on investment.

CDM is the perfect opportunity to achieve your goals and generate CERs. For instance, if a landfill site has no system for gas recovery, identify a technology or system that can capture and destroy gases either by flaring or by utilization.

Step-3

Calculate Emission Reduction

After establishing a baseline and project boundary, the net emission reduction can be estimated using the following steps:

- Estimate Total Baseline Emission for Each Green House Gas (GHG)
- Estimate Total Project Emissions for Each GHG
- Calculate Emission Reductions for Each GHG which is = Total Baseline Emission - Total Project Emission
- Estimate Carbon Dioxide Equivalent Reduction of Each GHG which is = Emission X Global Warming Potential (GWP)
- Calculate Total Emission Reductions which is = Sum of Carbon Dioxide Equivalent

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Example of Green House Gas Reduction at a Landfill

Methane generated in landfills is considered to come from decomposition of organic biomass. The collection and combustion of landfill gas can be considered to reduce green house gas emissions by 100%. To calculate the amount of GHG reductions in a landfill:

- Meter the Gas Collected and Combusted
- Determine the Quantity of Methane in the Gas (landfill gas is typically 60% methane)
- Convert the Volume of Gas in Tons of Methane
- Multiply the Tons of Methane By Global Warming Potential to Get the Amount of GHG Reduction in Tons Equivalent of Carbon Dioxide (eCO₂)

A hypothetical example of green house gas reductions in landfill is given below:

- Landfill gas flow: 81562 cubic meter/day of landfill gas
- Methane Concentration @60% = 48937 cubic meter/day of methane
- 48937 cubic meter/day of methane X 0.717 kg/ cubic meter = 35088 kg of methane/day = 35.08 metric tons of methane per day
- 35.08 tons of methane/day X 21 (Global Warming Potential of Methane) = 737 tons of eCO₂ per day or 269005 tons of eCO₂ per year.

Global Warming Potential (GWP) of Key GHG

Green House Gas	Global Warming Potential
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous Oxide (N ₂ O)	310
Hydrofluorocarbons (HFC's)	140-11,700
Perfluorocarbons (PFC's)	7,000-9,200
Sulphur Hexafluoride (SF ₆)	23,900

Step-4

Calculate Sale Proceeds of CERs

Calculate your sale proceeds of CERs by multiplying emission reductions with the current market price of CERs. After calculating your annual sale proceeds of CERs multiply it with the crediting period of CERs, usually ten years without base line review. This will give you an idea about how much you can earn by selling CERs.

Calculation of Sale Proceeds of CERs

A hypothetical example of sale proceeds of CERs is given below:

- Annual CERs: 269005 tons of eCO₂ per year
- Annual Sale Proceeds : 269005 tons X US \$ 5/ton = US \$ 1345025 or US \$ 1.34 Million
- Total Sale Proceeds = US \$ 1.34 Million X 10 Years = US \$ 13.4 Million.

Step-5

Develop a Project Concept Report

Once you have calculated the emission reduction, the next step is to prepare a Project Concept Report. The Project Concept Report serves as an initial project summary for the project host and partners. It outlines the basic features such as role of investing company (buyer) in the proposed project, key stakeholders, etc. It also presents a basic analysis of the project baseline, the emission reductions to be generated from the project and a monitoring system. An emission reduction and financial analysis of the project should also be included.

The Project Concept Report can be prepared by the project proponent (seller) by a local consulting company, NGO in the host developing country or the company providing the CDM financing (buyer) party.

Step-6

Submit the Project Concept Report for National Approval

The project proponent (seller) must obtain written approval of the voluntary participation of each party involved i.e., the buyer (an Annex-B country entity) and the host country project owner. Written approval is also required from the host country that the project would achieve sustainable development. Once host country approval is received, Project Document should be prepared using the CDM guidelines.

Step-7

Project Registration

The project proponents must choose an independent third party organization of the UNFCCC an Operational Entity (OE) to validate the project and bring it forward to the CDM Executive Board for registration. An Operational Entity is an independent legal entity that has been accredited and is accountable to the CDM Executive Board.

The Operational Entity reviews the Project Design Document to confirm that the legal requirements of a CDM project activity have been met. If the project has met all the legal requirements the operational entity validates the project.

Once the project is validated, the Project Design Document is forwarded to the Executive Board for approval. Approval of the Executive board results in registration of the project. After registration the project can be implemented.

Potential Sectors for CDM Projects in Bangladesh

Through the CDM mechanism GHG emissions can be reduced in three major sectors, namely,

- Energy, both supply side and demand side;
- Waste; and
- Forestry

The waste sector options prevent the release of methane from bio-methanation processes. The methane collected can be flared or used to generate electricity. The waste sector options for Bangladesh can be landfill (see box), poultry waste, human excreta and waste water treatment.

The options in the forestry sector can be both afforestation and reforestation.

The energy sector options for CDM are numerous. It is best to look at these projects within the type they belong to. The different types of CDM projects along with some suitable examples for Bangladesh are listed below.

- Switching from carbon intensive fuels to less carbon intensive fuels or renewables** - *Replacing coal by natural gas in brickfields; Replacing diesel buses by CNG buses; Solar home systems*
- Replacing an inefficient device by an efficient one** *Incandescent bulbs to Compact Fluorescent lamps; Efficient air-conditioners; Efficient grinders in cement industries; Improved cookstoves*
- Increasing the efficiency of an existing device** - *Retrofitting boilers and motors; Vehicle maintenance*
- Modifications of a process so that it consumes less fossil fuel** - *Pulping using Continuous digesters in place of Batch digesters; Retrofitting old ammonia-urea plants to bring those to the level of the state-of-the-art plants; Replacing the wet process of cement manufacture by the dry process in the Chattak Cement Factory*
- Waste heat utilization either from electricity generating turbines or high temperature processes** - *The first option is also known as Cogeneration which can be employed in Sugar Mills; Textile Mills; Jute Mills and Tea Manufacturing. The second option can be employed in Ceramic Industries.*
- Greenfield projects** (i.e. using an entirely different process in a new project to accomplish the same outputs as the baseline) - *Vertical Shaft Brick Kiln (VSBK) for brick making, Hoffman Kiln, which uses natural gas, is a greenfield project with fuel switching.*
- Lowering energy consumption through building design and materials** *Solar reflective glass windows to reduce air-conditioning load, Design buildings to have windows facing south*
- Conservation** *Car pooling, Using mass transit systems instead of personalized transport modes*

From the long list of projects it would be apparent that there can be many CDM projects in the eight categories listed above. The essential idea is to reduce GHG emission with respect to a predetermined (agreed and approved) baseline emission. Since CDM is a project based mechanism the fact that Bangladesh's overall energy consumption is very low should be no barrier. It is also important to note that CDM is concerned with emission that will occur in future, and in that respect, the prospect of CDM is bright because Bangladesh's commercial energy consumption is increasing at 6% per year.

Clean Development Mechanism

Global Experience

CDM is evolving into a powerful mechanism that can bring both financial and sustainable development benefits for developing countries. Many countries especially those in Latin America are aggressively pursuing CDM, whereas most Asian countries are severely lagging behind. One reason for this is of course the fact that Latin America was instrumental in getting CDM passed at the third session of Conference of Parties (COP3). On the buyer's side the Dutch Government has been most active. The Dutch Government through several tenders has invited bids for CDM projects from developing countries. Over two dozen projects have already been accepted. These projects are concentrated in two areas, namely, waste (landfill) and renewables (hydro and biomass). According to the Kyoto Protocol 39 countries have obligation to reduce GHG emission below that of the 1990 level. This means that there exists a good opportunity to sell CERs.

The Japanese government is beginning to enter the market. It is expected that very soon others will follow suit. Many countries are moving ahead in developing their own projects or are doing so in collaboration with Annex I (Annex B of Kyoto Protocol) brokers. The following is a non-exhaustive list of organizations/entities engaged in CDM project formulation.

- World Bank through the Prototype Carbon Fund (PCF) and Community Carbon Fund (CCF)
- Asian Development Bank (ADB) through various multilateral and bilateral projects
- Environmental NGOs such as South-South-North (SSN) Network
- Broker type organizations of the developed countries such as Eco-Securities
- Companies, environmental NGOs and even individuals in both developed and developing countries

The PCF of the World Bank is most active in CDM project formulation. The PCF on behalf of several developed countries' companies is investing in CDM projects in developing countries. To participate in the PCF, developing countries governments have to first sign MOU. After that, the PCF can be approached with CDM concept notes. If the PCF finds the concept notes worthy of further consideration, it will not only finance the project development cost but also take the project to the Executive Board for validation.



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This publication, prepared by Waste Concern, intends to raise awareness amongst the stakeholders, about the opportunities available under the CDM.

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