

Harnessing CDM Financing to Promote Renewable Energy in Bangladesh

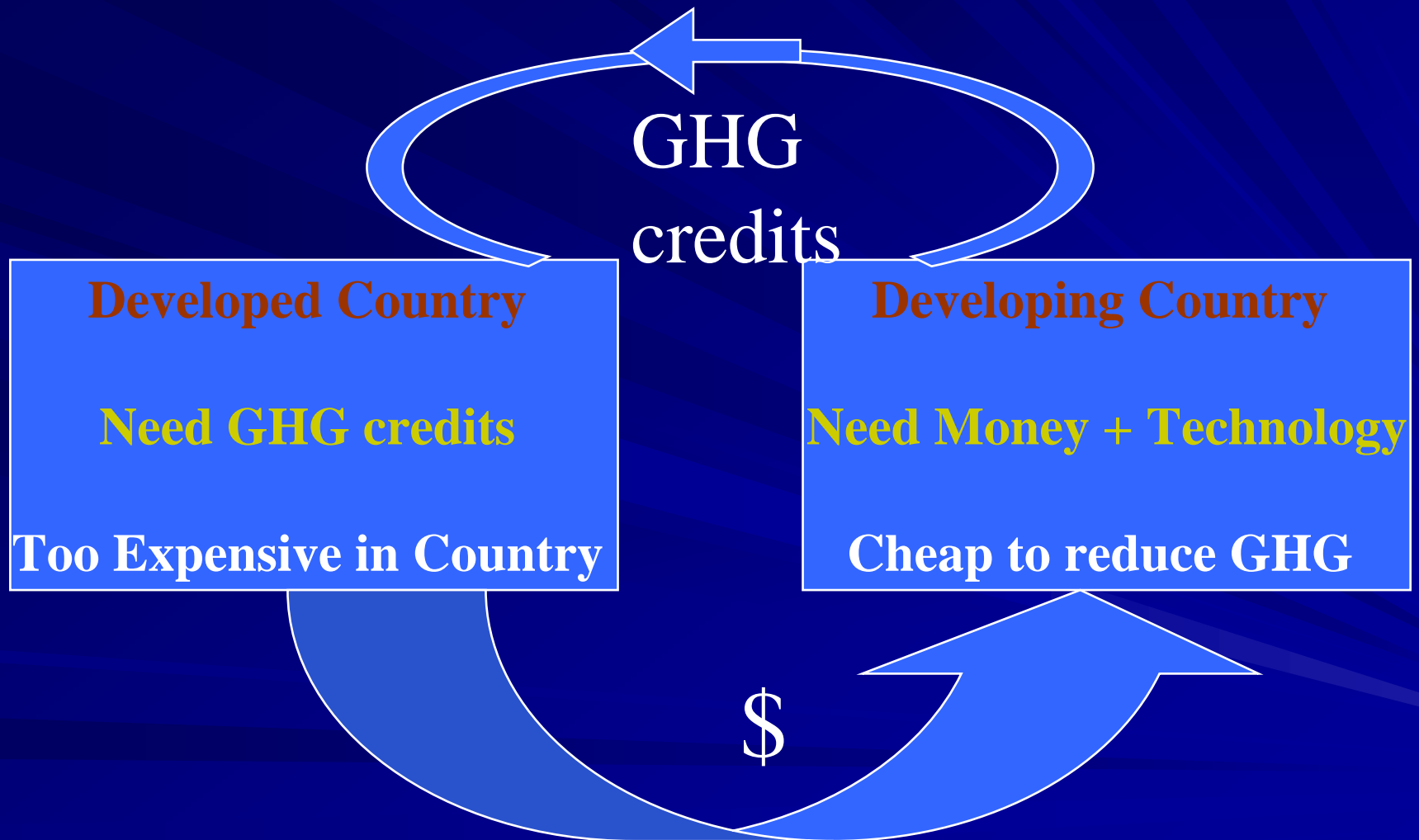
Ijaz Hossain
Professor, BUET

ijaz@bangla.net

Global Warming and Kyoto Protocol

- Scientists have conclusively determined that gases in the atmosphere such as CO₂, CH₄, N₂O cause Global Warming and are called Green-House Gases (GHG)
- The United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992 an international framework to address global climate change
- In December 1997, 160 countries signed the Kyoto Protocol (KP) at the Conference of Parties (COP3) at Kyoto, Japan to reduce GHG emissions
- KP includes reduction targets and timetable for reducing emissions of 6 GHGs by 38 developed countries
- CDM is one of the instruments of the KP to mitigate GHG

HOW DOES CDM WORK?



CDM

- CDM carbon credits are called certified emission reduction (CER) – **1 CER = 1 ton of CO₂**
- The price of a **CER** varies between **US\$ 5 – 10**
- For high quality CERs, the price can exceed **US\$ 20**
- India and China between them have more than **500** CDM projects
- Bangladesh has only **2** registered CDM projects

What is Renewable Energy?

- It is energy whose ultimate source is the sun
- **Solar Energy is continuously reaching the earth in the form of radiation, hence it is renewable**
- Direct Solar Energy – Photovoltaic Panels; Black Body Collectors; Mirrored Concentrators
- **Indirect Solar Energy – Wind; Hydro; Waves; Biomass**
- Most significant thing about RE is that it does not emit any Green House Gas (GHG)

Renewables are at the CORE of GHG Mitigation



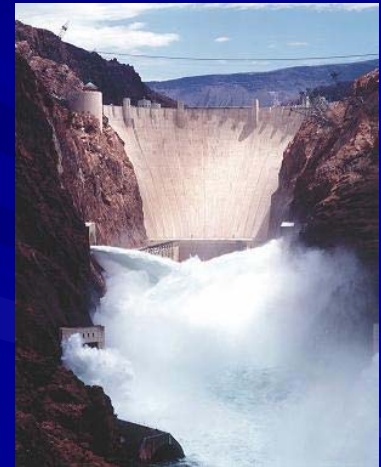
Solar

Biomass



Wind

Hydro



CERs from Renewables are considered High Quality

Renewable Energy and CDM

- Other than WIND renewable energy is not competitive with fossil fuel
- In most situations without subsidy Renewable Energy cannot be promoted
- CDM or Carbon Credits provide an excellent opportunity to finance a portion of the total investment

Solar Photovoltaic System



Grameen Shakti alone
has more than
200,000 SHS

Total capacity in
country is more than
10 MW

Potential more than
100 MW



Solar Photovoltaic Electricity is too **expensive** compared to grid electricity, therefore SHSs are excellent CDM projects



Solar Irrigation

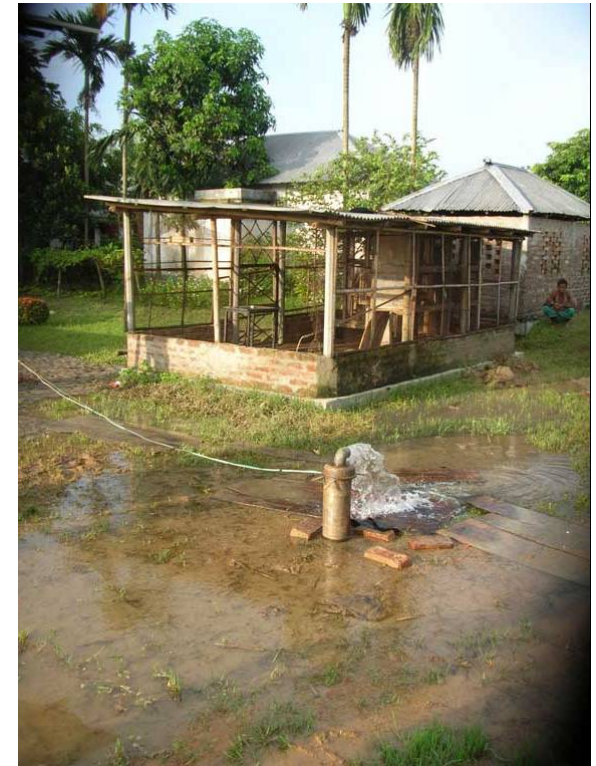
CDM Can Give Tk 3 lac
from sale of CERs in 7 years

	<u>Diesel-Pump</u>	<u>Solar-Pump</u>
--	--------------------	-------------------

Price:	Tk 70,000	Tk 6 lac
--------	-----------	----------

Diesel:	Tk 80000/yr	Tk 8000/yr
---------	-------------	------------

Life:	10 years	20 years
-------	----------	----------



Improved Biomass Cookstove



Efficiency of traditional stoves is 8-10%

Improved Cook Stoves (ICS) can easily achieve a thermal efficiency of 20%

If the saved biomass is Non Renewable Biomass, CDM can be used to promote ICS



← ICS →

Village Restaurant



Biogas can Replace LPG

Biogas Digester

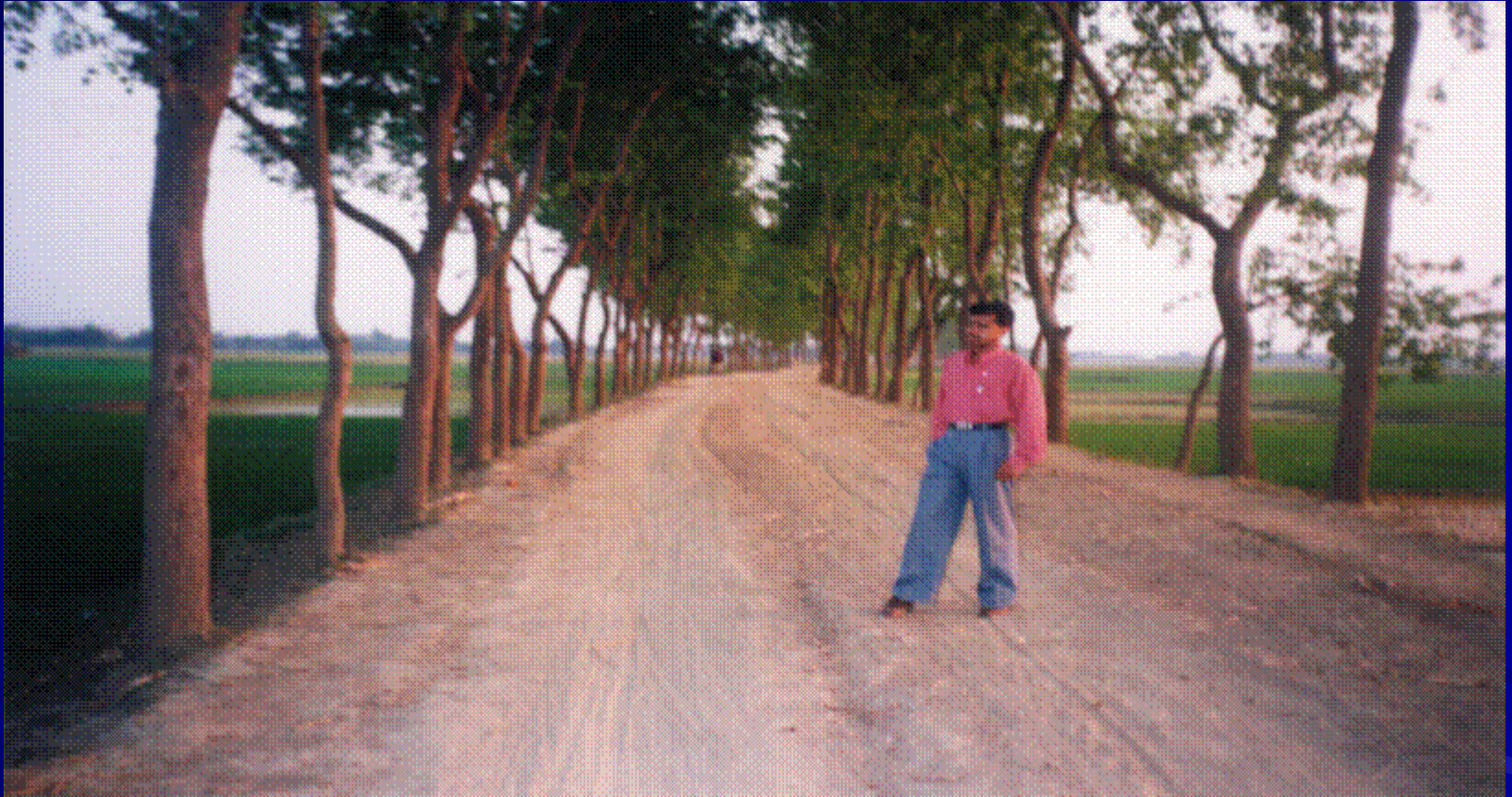


Biogas can Replace
NRB (Non Renewable
Biomass) →



Deforestation

Reforestation of Degraded Forests and Afforestation can be CDM Projects



Social Forestry - Lining Roadside

Efficiency Improvement in Parboiling

- GTZ has an ongoing project to increase the efficiency of parboiling boilers
- Efficiency improvements between 25 and 50% possible
- Will save 2-4 million tons of rice husk, which can be used to generate electricity (> 100 MW)



Biomass Gasification

9 kW gasifier system installed for Odanthurai Panchayat water supply system in Tamil Nadu State



Table 2. Operation cost per unit electricity comparison for water supply system of Odanthurai Panchayat, Tami Nadu State.

	with Grid Power	with Gasifier System
Electricity	Rs. 4.5 / kWh	Rs. 0.45 / kWh
Labour cost	Rs. 0.45	Rs. 0.66
Maintenance cost	Rs. 0.07	Rs. 0.28
Total	Rs. 5.02	Rs. 1.39

Abe, H. (2005), *Summary of Biomass Power Generation in India*, Ecosystem Research Group, Faculty of Natural and Agricultural Science, University of Western Australia JICA study team for 'The Master Plan Study on Rural Electrification by Renewable Energy in The Kingdom of Cambodia', Material taken from the following webpage: www.repp.org/discussiongroups/resources/gasification/abe/IndiaBioSummary050721Web.pdf.

Feedstock for Bio-Oils



Bangladeshi Oils:

Varenda

Rherir Tel

Jamalgota

Bio-diesel can be made from most bio-oils

- Rherir Tel can replace a substantial amount of kerosene now used in rural areas for lighting
- Since Rherir Tel is derived from Renewable Biomass, there is very little GHG emission leading to lower emission of CO₂
- CDM projects can offset some of the production costs

BIODIESEL

Vegetable oil (soybean, palm, jatropha, etc.) can be converted (transesterification) into a diesel like substance (complete substitute of diesel)

At \$70-80 barrel of OIL – Biodiesel can compete with oil

Indonesia doing biodiesel in a big way – clearing up an area the size of Denmark

Good CDM project in terms of CER, but concerns about **FOOD SECURITY and Deforestation**

Carbon Credits Are Financing Renewable Energy Projects in India

Sep 4, 2008 - Anupam Tyagi - RenewableEnergyWorld.com

- Ghaziabad, India - When a firm in India invests in a renewable energy source to meet growing energy needs, it may be able to acquire carbon credits.

- Firms in the European Union and the OECD member countries are buying carbon credits — called CER (Certified Emission Reductions) — from firms in India.

- CER are registered and issued by the Executive Board of the Clean Development Mechanism (CDM) of the UNFCCC

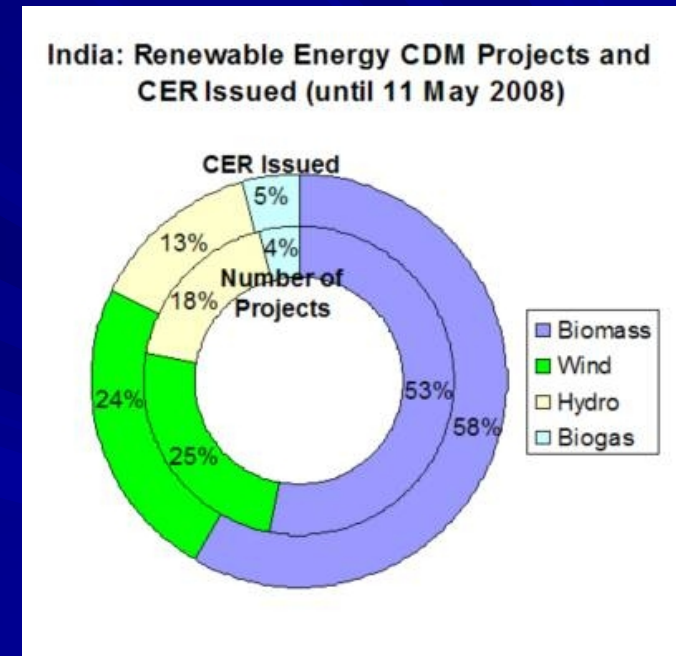
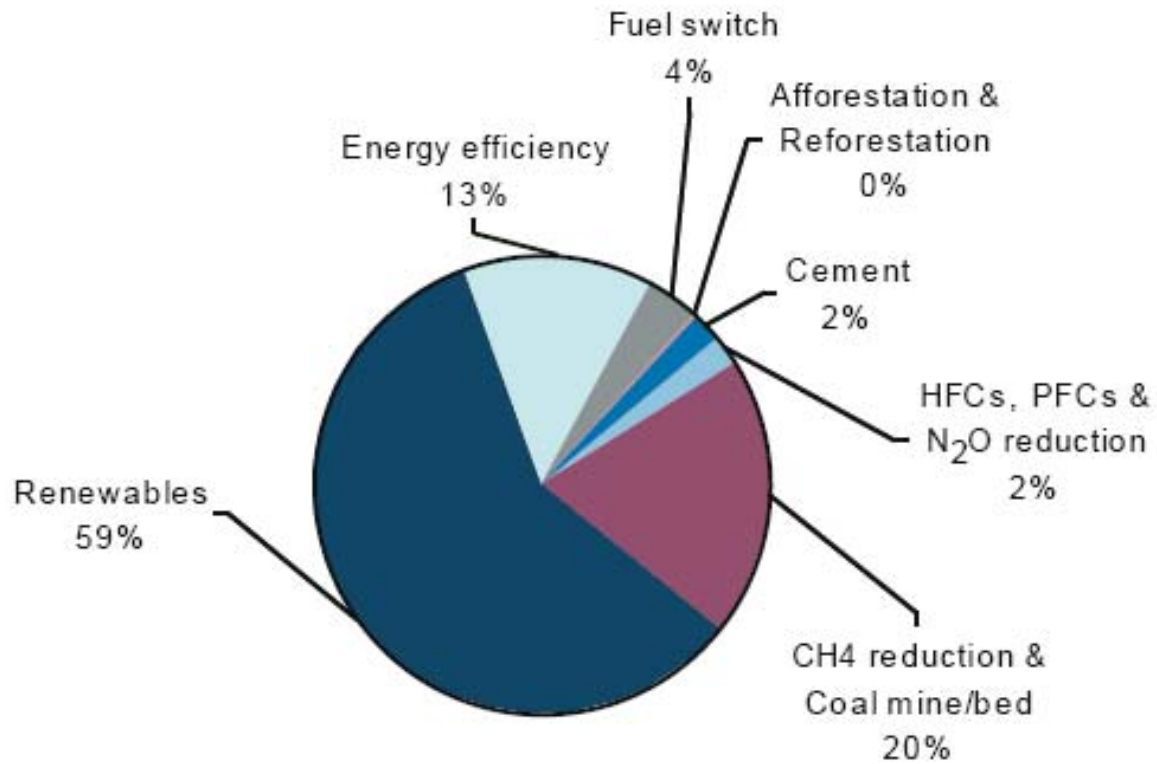


Figure 7: CDM projects by sector



Guidebook to Financing CDM Projects



Types of Finance for a CDM Project

The situation is more complex with regard to the costs incurred during the construction phase. As noted elsewhere, these costs are generally much larger than the planning phase costs, yet CDM projects are still relatively 'small' (typically under US\$20 million). Nevertheless, the potential sources of finance include:

- **Lenders:** who may provide limited recourse debt to relatively large projects with secure revenue streams and relatively low risks, or to other projects with recourse to a financially strong sponsor;
- **Private sector CDM project developers:** who may be able to finance (usually smaller) projects with their own equity;
- **Project hosts:** who may be able to finance (usually smaller) projects from their own internal funds;
- **Equipment suppliers:** who may provide assets on lease or credit; and
- **CER buyers:** who may provide up-front payments against future CER deliveries.

Multilateral and private financiers

Name of Financier	More information
Asian Development Bank	http://www.adb.org
African Development Bank	http://www.afdb.org/
European Bank for Reconstruction and Development	http://www.ebrd.org
European Investment Bank	http://www.eib.org
Export Import Bank (USA)	http://www.exim.gov
Export Import Bank (Japan)	http://www.jbic.go.jp
Global Environmental Facility	http://www.gefweb.org
Inter American Development Bank	http://www.iadb.org
International Fund for Agricultural Development	http://www.ifad.org
International Monetary Fund	http://www.imf.org
Kreditanstalt für Wiederaufbau (German Bank for Reconstruction and Development)	http://www.kfw.de
North American Development Bank	http://www.nadb.org/
Overseas Economic Cooperation Fund (Japan)	http://www.jbic.go.jp
Swedish International Development Agency	http://www.sida.se/
United States Agency for International Development	http://www.usaid.gov/
World Bank Group (including IBRD, IDA, IFC, and MIGA)	http://www.worldbank.org

For a list of private financiers please refer to the following link which provides an overview of the worlds' commercial banks. <http://tfs.xproject.ru/bankwatch/eng/bnksrtd/banks.html>