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## **Appendix A**

### **Bangladesh country paper**

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## Appendix A Bangladesh country paper

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## **A1. Poverty alleviation and the CDM**

### **A1.1. The development profile in Bangladesh**

#### **A1.1.1. Poverty in Bangladesh**

Bangladesh is one of the poorest countries in the world, ranking 70 out of 85 in the UNDP human development index. The income per capita in 1995 was US\$348, with an average annual rate of change between 1975 to 98 of 2.4 percent. Over a fifth of the population is not expected to live to the age of 40 years. The poorest 20 percent of the population accounted for 8.7 percent of the total income, while the richest 20 percent of the population accounted for almost 43 percent. The share of people below income poverty line (defined as \$1 per day in 1993 US\$ Purchasing Power Parity) for the period 1989-98 was 29.1 percent. Most of the urban population - about 85 percent - live in temporary or makeshift housing of thatch and bamboo, often with a tin roof. There are over 3,000 slum areas in Dhaka city, occupying 20 percent of the residential space but housing 70 percent of the city population.

Poverty is defined as “Forms of economic, social and psychological deprivation occurring among people lacking sufficient ownership, control or access to resources for minimum required level of living.” (Fifth Five Year Plan, Section 8.2.1; Fifth Plan, Government of Bangladesh). The major causes of poverty in Bangladesh are low economic growth, inequitable distribution of income, unequal distribution of productive assets, unemployment and underemployment, high rate of population growth, low level of human resource development, natural disasters, and limited access to public services.<sup>1</sup> The average growth rate during several decades has averaged four to five percent. A four percent growth rate together with the existing pattern of income distribution means that it would take at least 23 years to raise a person over the poverty line.<sup>2</sup>

#### **A1.1.2. The investment climate in Bangladesh**

The barriers to foreign direct investment and domestically sourced investment are significant. The legacy of state domination, starting from conventional monopolies like railways and power, and extending into banks, insurance, and large sections of manufacturing enterprises like textiles and the sugar sector, is a major reason for the existing economic sluggishness. Almost all the state-owned enterprises, with hardly any exception, have been run inefficiently and have drained national resources substantially. In 1994-95, the losses from state-owned enterprises were equivalent to over half of social sector spending in the Annual Development Programme (World Bank, 1996 Bangladesh: Public Expenditure Review, P.12).

The public investment planned for the country through the Annual Development Program (ADP) needs to improve - in terms of physical infrastructure as well as human development priorities like health and education. In 1996 to 1997, 28 percent of the ADP target was for infrastructure, 14 percent

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<sup>1</sup> Fifth Five Year Plan, Chapter 8, Section on Causes of Poverty

<sup>2</sup> IBRD, 1996, Growth or Stagnation: A Review of Bangladesh's Development, University Press, P. 117

for energy, and 14 percent for education. However, ADP implementation is not strong. In some occasions, projects are selected more for political reasons and in general they suffer endless delays, in the procurement of goods and services as well as in project approval and processing and land acquisition. Most of the delays are due to over-centralisation and bureaucracy.

The government took steps to shift more responsibility to the private sector - power generation is one such area. The privatization programme which began in 1991 has not been very successful and very few units were sold, while others were abandoned as there were doubts about their valuation and militant resistance from the workers and their unions. The presence of large state-owned sectors also has disrupted the competitive environment, thereby reducing economic efficiency and growth. At the same time, the private sector lacks dynamism from decades of protection from external competition. The economy has failed to attract significant levels of foreign capital, particularly in the manufacturing sector for reasons that include long gestation periods, lack of technological and managerial expertise, or absence of appropriate institutional structure and approval processes. Total investment is still around 17 percent of GDP, which is about half of that of other nations in East Asia.

The private sector also has suffered by lack of ready source of finance. The Dhaka Stock Exchange is small in comparison to other south Asian exchanges. Therefore most of the private sector has to rely on a banking industry, which is still not geared to address the shift of responsibility of economic progress from the public to the private sector. Inadequate regulation and supervision of the financial sector has been a principal factor in restraining productive investment and slowing future economic growth.

There are some prospects of improvements. From the early 1990's, successive governments, with the encouragement of the World Bank and the International Monetary Fund, have attempted to ensure macro-economic stability. Budget deficits have dropped from 7.9 to 6 percent from 1990 to 1994, and this has been possible due to introduction of VAT, which alone contributed 31 percent of total revenue by 1995 to 1996.

The inward investment scenario has improved in the service, transport and construction sectors.

### **A1.1.3. Institutional framework for poverty reduction**

The Planning Commission is currently responsible for the implementation of poverty reduction strategies, although this responsibility is soon to be mainstreamed into every Ministry's portfolio of work. There are no mechanisms or instruments to implement poverty reduction objectives.

The Development and Poverty Alleviation Strategy for Bangladesh is summarised in the Fifth Five Year Plan (1997-2002). The development objectives of the nation are:

- ?? Poverty alleviation through accelerated economic growth;
- ?? Generating sustainable employment opportunities, increasing productivity through optimal choices of traditional labour and new capital intensive technologies;
- ?? Food self sufficiency;
- ?? Promoting higher production of diversified high value export goods;
- ?? Human resource development including compulsory primary education;

- ?? Development of necessary infrastructure, utilities and other services needed to promote growth, particularly in the private sector;
- ?? Achieving lower population growth rates;
- ?? Strengthening of the country's scientific and technological base with emphasis on research and development of new generation technologies;
- ?? Protection of the environment, by putting in place adequate regulatory regimes and effective institutions, keeping in view optimum exploitation of natural resources for sustainable development;
- ?? Closing the gender gap;
- ?? Establishing better social justice and a more equitable distribution of income, resources and opportunities, and creation of effective safety nets for the socially and economically disadvantaged section of the population.

In addition, the Dhaka Declaration for Poverty Eradication under the 7<sup>th</sup> SAARC Summit, April 1993 stipulated that each SAARC country would prepare a pro-poor plan and action programme. The plan identifies three broad areas for intervention

1. Human Resource Development;
2. Economic Development of the Poor;
3. Institutional Development at Local Level for implementing pro-poor projects.

## A1.2. The overlap between CDM projects and poverty reduction

### A1.2.1. Research results

Table A1 sets out the development-focused CDM projects scoped through stakeholder consultation.

**Table A1** Development-focused CDM projects selected

Sector		Project
Energy	Grid Connected Generation Systems	<ol style="list-style-type: none"> <li>1. Introducing Aero derivative turbines in place of conventional turbines for peak load generation</li> <li>2. Cogeneration in Sugar Mills</li> <li>3. Setting up a 20 MW Power Plant using Municipal Waste</li> </ol>
	Off-grid Systems	<ol style="list-style-type: none"> <li>4. Package of Solar Home Systems in Remote Rural Areas; 50,000 systems in 10 locations</li> <li>5. Stand Alone Solar Power System for 5,000 Health Care Centres</li> <li>6. Solar Panel Street Lighting for one Typical Village in Bangladesh</li> <li>7. Installation of 500,000 Efficient Cooking Stoves</li> </ol>
Industry		8. Cement Manufacture (wet to dry process)
Transport		<ol style="list-style-type: none"> <li>9. Conversion of four stroke vehicles to CNG</li> <li>10. Introduction of Electric Vehicles in Urban Area</li> </ol>

Appendix A1.3 provides more detailed descriptions, the baseline and the replicability value of the projects.

Table A2 highlights the overlap between greenhouse reduction projects and development objectives. The projects are all impacted on high priority development features. Four out of the twelve development features are ranked high priorities. Many of the projects also display health benefits that are ranked a medium priority. Social exclusion is also a feature of many projects, though this is ranked as a low priority in Bangladesh.

**Table A2** Overlay between greenhouse gas reduction objectives and development priorities in Bangladesh

	Development Priority for Bangladesh	Projects									
		1	2	3	4	5	6	7	8	9	10
Income	High	XX	XX	X	X	XX	XX	XX	XX	XX	XX
Employment	High		X	X	X	X	X	XX	XX	XX	XX
Energy provision	High		XX	XX	XX	XX	XX	XX			
Education	High		X		X						
Food Security	Medium-High										
Water	Medium										
Transport	Medium										
Health	Medium	XX	X	XX	X	XX		XX	XX	XX	XX
Sanitation	Medium										
Crime & Security/Peace	Low-Medium						XX				
Housing	Low-Medium										
Social Exclusion	Low		XX		XX	XX	XX	XX			
<b>REPLICABILITY</b>		<b>L</b>	<b>L</b>	<b>L</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>L</b>	<b>H</b>	<b>H</b>
Assured benefits Scores		8	11	8	6	19	13.5	19	15	13	13
Other potential Benefits		0	8	10	18	5	5	0	0	0	0
Total benefits		8	24	18	24	24	18.5	19	15	13	13

Assured benefits, those benefits that would occur through the implementation of the project itself, receive two XX. Potential benefits rely on collateral assets being supplied, for example, solar home systems in rural areas may lead to rural enterprise development if credit services are also provided, however, credit services lie outside the project boundary. 1 X represents these benefits. Each benefit receives one point, which is multiplied by its developing ranking. Impacts are weighted according to development priority: those in a high priority are weighed by 5, medium priority by 3 and low priority by 1. Where the project partners have established medium high and medium low priorities the factors are 3.5 and 2.5 respectively. Two numerical rankings are given at the bottom of each column. The first shows the value of the assured benefits, and the second ranking shows the value of potential benefits.

Energy provision is the main focus of the projects scoped by stakeholder consultation in Bangladesh, and the baseline situation shows why. Bangladesh has one of the lowest per capita commercial energy production rates in the world. Existing grid electricity supply hardly covers 25 percent of the population. Power supply is not reliable and power cuts are frequent. In order to meet the electricity demand in urban areas, electricity to the rural areas is not provided during peak hours, which has profound economic and social impact on the rural population as well as small-scale businesses in the peri-urban areas. Industrial production and expansion, and commercial activities are disrupted through chronic shortages of electricity. Existing projections of supply generation leaves the bulk of the rural population excluded from conventional grid electricity connection.

Domestic cooking consumes the largest proportion of biomass fuels (65 per cent), in rural as well as urban areas. There are around 20 million rural households in Bangladesh, most of which use traditional stoves for cooking. The total consumption of biomass only for cooking purpose is estimated to be 40 million tonnes. Traditional cooking stoves, mostly used in the rural areas, have efficiencies between 5 to 15 percent. With the introduction of improved stoves, as much as 20 million tonnes of biomass can be saved in the country.

The highest-ranking project based on assured benefits is B5, the stand-alone solar power systems for a group of health care centres and B7, the provision of fuel-efficient stoves.

B5 (the stand-alone solar power systems for a group of health care centres) has high direct benefits because the project enables improved health services and the cheaper cost of energy reduces the cost of the service to users. This could have high impacts on social exclusion by enabling health services to be within the financial reach of many more households. The project will not only provide electricity where none was previously available but to health centres where grid power is currently supplied, but where supply is extremely unreliable.

**Box A1 The forestry sector in Bangladesh**

The total forest cover in Bangladesh has fallen by an annual average rate of 0.85 per cent from 1990 to 1995. This is significantly higher than the global annual average of 0.32 per cent per year and the Asian average of 0.55 per cent per year during the same period. At present, certain parts of the country has fuelwood surplus with respect to present local demands. However, transportation and other costs are too high to even out the supply of fuelwood.

Biomass use has been sustainable for a long time, but recent trends indicate the reduction and shortfall of biomass due to expansion of high yield variety (HYV) paddy production.

Due to the shortage of fuelwood, most of the agricultural residues previously used as fodder and recycled fertilizer are increasingly being used as fuel. The country uses 98 percent inorganic fertilizer and the remaining two percent comes from organic sources. There is disproportionate use of urea (N) to sustain increased HYV rice yields, leading to soil degradation. The projected growth rate for urea consumption is 10 percent annually.

Source: Bangladesh Centre for Advanced Studies

A cluster of projects then follows: B8 (improved energy efficiency in the cement sector), B6, solar panel street lighting, B9 and B10, both transport projects which have high income, employment and health impacts, and B2, a cogeneration plant in the sugar sector.

The main benefit of B8 (improved energy efficiency in the cement sector) is that it will improve the competitiveness of the product with regards to imported cement. This is because the energy cost of cement production is currently 20 to 30 percent of the total production cost, and the dry process can conserve up to 50 percent less energy than the wet process.

B6 (Solar street lighting) has high impacts on reducing social exclusion, particularly for women. The general law and order situation in Bangladesh is rapidly declining and public security is at one of the lowest levels historically. This is due to lack of enforcement of law, malpractice and corruption, nepotism, political interference.

B9 and B10 (transport projects) will both have direct impacts on urban pollution levels. Urban air quality of Dhaka city ranks amongst the worst in the world. It is estimated that about 15,000 people die of respiratory problems in Dhaka City every year. The government of Bangladesh is keen to promote measures that will alleviate the problem. The replacement of liquid fuels by compressed natural gas (CNG) is a particularly attractive proposition because of the abundance of sulphur-free natural gas in Bangladesh. Savings on imported fuel are estimated to be in the region of US\$ 13 million per year.

B2 (a cogeneration plant in the sugar sector): Cash crops are particularly important in Bangladesh and, a large farming community is dependent on sugar cane cultivation. Most of the sugar mills are situated the northern part of the country where sugarcane is grown. The region is economically depressed compared to the other regions. In the last decade, locally produced sugar has been unable to compete with imported sugar because of high production costs. The reason for this is the highly inefficient sugar mills. The present practice in sugar mills is the burning of bagasse in low-pressure boilers to raise steam. Bagasse cogeneration can improve efficiency and hence, increase profitability of the sugar mills. The excess electricity generated can be sold to the national grid will displace natural gas-based electricity, and it can also supply electricity to households, thereby empowering them with the capacity to engage in livelihood activities that they are unable to do at present. The Northern region currently faces acute shortage of power.

The relative ranking of projects shifts somewhat when potential benefits are considered, boosting the cogeneration plant (B2), and the solar home systems project (B4) to first place, to join B5 (solar power for health centres). It is interesting to note that for the solar home systems project (B4), the potential benefits rank higher than assured benefits, highlighting the importance that project design has on the overall impact of CDM projects on development objectives. For example, an uninterrupted and reliable source of energy can result in an increase of employment and added income, if collateral services are also provided. It has been observed in a cluster of 750 solar home systems in Narsingdi in Bangladesh the earning specially of women has increased considerably by undertaking contracts to manual sewing job.

The main conclusions are that:

- ?? there is potential for the majority of CDM projects to lead to high development impacts in Bangladesh;
- ?? all of the projects are related to energy - two in the transport area and the rest in non-transport energy provision;

- ?? most projects will lead to direct impacts on income;
- ?? some projects have positive impacts on social exclusion, by strengthening the participation of rural communities, and in some cases, women within these communities, in decision-making;
- ?? some projects impact on education and skills, however this is indirect and is dependent on the provision of other assets;
- ?? off-grid electricity greenhouse gas reduction projects have the highest replicability of all the projects.

## **A2. Capacity building needs for CDM project implementation**

### **A2.1. Existing capacity**

#### **A2.1.1. Institutional framework**

The Ministry of Environment and Forests (MoEF) is responsible for climate change policy. The Secretary of this Ministry is the FCCC focal point. The Department of Environment, its implementation wing, set up a climate change desk and a Director has been given its charge. A National Climate Committee was established in 1994 to give policy guidance and oversee the implementation of the obligations under the UNFCCC. It comprises members from a range of government ministries and non-government organisations.

A National Sustainable Development Commission (NSDC) was created in the follow up to the UN Conference on Environment & Development (UNCED), 1992. The NSDC have never been truly active.

### **A2.2. Capacity building actions to date**

It is worth noting the activities that have to date been implemented in Bangladesh to inform the assessment of capacity needs of Bangladesh with regards to implementation of a greenhouse gas mitigation strategy. Table A3 sets out the capacity building activities carried out in Bangladesh to date.

**Table A3** Capacity building activities carried in Bangladesh to date

Sponsor	Activity	Participants (where relevant)
<b>Awareness raising - technical training</b>		
Dutch Foreign Affairs, 2000	Demonstration projects (a solar home system project and an electric vehicle project.): South South North capacity building project	
Asian Development Bank, 2000	2 seminars that brought together relevant government departments, as well as scientists, research organizations, and to a limited extent, the private business sector.	Ministry of Environment, Bangladesh University of Engineering and Technology, Bangladesh Centre for Advanced Studies, Bangladesh Unnayan Parishad, Bangladesh Institute of Development Studies, Other university participants.
International Education's Energy Group, 1999	1 day training for government, academic & research institutes and some private sector	Ministry of Environment, Bangladesh University of Engineering and Technology, Bangladesh Centre for Advanced Studies, Bangladesh Unnayan Parishad, Bangladesh Institute of Development Studies, Other university participants.
<b>Scoping/strategy building</b>		
UNEP, Not yet initiated	Adaptation needs assessment	
GEF, 2000-ongoing	Preparation of National Communications	
DFID, 2000 - 2002	An assessment of the links between the CDM and poverty alleviation. Recommendations on capacity building actions	
Pembina Institute of Appropriate Development, 2001	Scoping of CDM opportunities in Bangladesh - based on greenhouse gas reduction potential, sustainable development objectives, and ease of implementation.	
UNDP/GEF, 1999	Asia Least Cost Greenhouse Gas Abatement Strategy: Identification of least-cost greenhouse gas mitigation options	
US government, 1995-1996	A country study that focused on greenhouse gas emission inventories, vulnerability and adaptation, mitigation options and information dissemination.	

The majority of activities have focused on strategy building, although none, other than this current study, set out to evaluate the poverty reduction benefits of the CDM to Bangladesh. The South-South-North project, funded by the Dutch Ministry of Foreign Affairs, is an example of 'learning by doing', which can have valuable capacity building results.

### **A2.3. Capacity building needs for CDM project implementation**

#### **A2.3.1. Research results**

The gap analysis shows that there is little capacity in Bangladesh for any of the indicators chosen.

**Table A4** Gap analysis

Indicators of capacity	Level of capacity	Details
<b>Skills/expertise/awareness</b>		
Awareness levels	☞	Poor, and generally targeted a few sectors and a few government and private sector players, for example, awareness needs to take place at the local government level as well as national government level.  There is some in-country capacity to deal with the financing of development-focused greenhouse gas mitigation projects. However, there is no awareness among the financial community of how carbon could help to improve, for example, the repayment terms for solar home system programmes.
Technical expertise	☞	
<b>Institutional</b>		
CDM Office	X	There is general problem of inefficiency and inactivity in existing government institutions with regards to policy implementation.
Small scale projects bundling mechanism	X	
Technology transfer strategy	X	
<b>Policy &amp; Legal Context</b>		
Country climate change strategy	☞	Mitigation options have been scoped, but not with regard to poverty reduction objectives.
Legal framework	X	
Integration into other policy areas	X	None. There are few fiscal incentives to encourage private investment, and none specifically for clean technology transfer.
Development of standardised approaches to the project design document	X	
Streamlined CDM approval procedures	X	The approval process for projects is long and not transparent. It can take 12 - 24 months. There is no fast-track procedure for poverty-focused projects.

(X=not available, ☞=some/partly, ??=good.)

The following sections provide further country-specific information on four key areas of capacity needs:

- ☞ Awareness raising;
- ☞ Dissemination of technology-related information;
- ☞ Experience in the implementation with the scoped technologies;
- ☞ Supporting fiscal regime.

For information on other capacity indicators, please refer to the main capacity building paper.

### A2.3.1.1. Level of awareness among relevant stakeholders

The level of awareness of the opportunities offered by the CDM is low. Capacity building actions to date have focused on the climate community in Bangladesh, with occasional outreach to other government ministries.

**Table A5** Level of awareness among stakeholder groups in Bangladesh

Actors/ Institutions	Level of awareness	Comments
Government	Low	Awareness is limited to the MOEF
Local government	Low	Under the Local Government Amendment Act, 1993 the Union Parishads have become the 'focal points' for local level development and administration.
Business sector	Low	Awareness raising has targeted some of the actors involved in the energy sector. A number of the research institutes like Bangladesh Unnoyon Parishod (BUP), have continued to follow on their learning, while some of the private sector businesses have expressed their keenness to acquire more learning in order to participate meaningfully in the process.
Financing institutions	Low	The group has been the least targeted by capacity building activity to date.
NGOs	Some	Awareness is limited to internationally linked NGOs, such as CARE. Activity tends to be supply-pushed rather than demand-led.
Research/technical institutes	Low	One of the institutional drawback in building an enabling environment for private participation and investment in the economy is the lack of any effective service provided on technology related information to the private sector.

Although climate change objectives have been accommodated within current institutional structures, the issue here is of promotion of the CDM among different government stakeholders. Other MEND countries have representation from different Ministries in 'climate change secretariats' and the like. It is recommended that, if Bangladesh is to engage in the CDM, that current institutional structures be strengthened to promote this inter-Ministry dialogue.

It will be important for future actions to concentrate on awareness raising of stakeholders not conventionally included in climate change issues, such as the development community, financing institutions, Chambers of Commerce, and areas of government other than the Ministry of Environment & Forests.

Information dissemination channels exist that could be developed for CDM capacity building. Each Ministry is to have a cell to have direct interaction with the private sector. The government also has expressed in its Fifth Plan that it will strengthen its information dissemination services about the Bangladesh market to foreign investors through its diplomatic missions abroad.

The Chambers of Commerce and Trade Associations have been identified as the vehicles through which effective information dissemination mechanisms could be developed and strengthened to facilitate dialogue between the government and the private sector.

The media, including radio, television and newspapers are the most effective medium for information dissemination among local communities, in rural, peri-urban as well as metropolitan areas. General messages and awareness building through these mediums have been carried out for a large number of issues including disaster preparedness and environmental concerns. However, a more focused and consistent medium for disseminating information is through the large NGO network in the country, represented by Association for Developing Agencies in Bangladesh (ADAB), or more specifically by groups like the Coalition for Environmental NGO's (CEN) whose business is advocacy and campaigning on national environmental concerns including climate change impacts.

#### **A2.3.1.2. Dissemination of technology-related information**

There is no central point for technology-related information, and no needs assessment has been performed in Bangladesh setting out technology transfer priorities. In the government sector, the Ministry of Science and Technology is entrusted with this responsibility and occasionally provides information updates. The Department of Industries has an information cell but it hardly caters to technology information dissemination or collection. The Bangladesh Council for Industrial and Scientific Research (BCSIR) collects technology-related information based on its own research and development initiatives and disseminate these among interested parties, both public and private.

In the private sector, there is a Research & Development Cell under the Dhaka Chamber of Commerce and Industry (DCCI) which operates a Technology Information Service for its members. Also, Micro Industries Development Assistance Society (MIDAS), a non-government financial organization also operates a technology information cell catering to the private sector. The Business Advisory Services Centre (BASC), a venture spinning out of an USAID initiative also provides technology-related information to its users.

#### **A2.3.1.3. Experience in technology implementation**

Bangladesh has plenty of experience in implementing off-grid solar electricity projects. Other technologies such as biomass-fed cogeneration, or energy efficiency in the cement sector are new to Bangladesh, and demonstration projects may be needed to 'prove' these technologies to the market. Electric vehicles have been developed by local entrepreneurs, but still need to be deployed.

The conversion of gasoline cars to use CNG is an on-going government programme, started in the mid-eighties. The Government has a stated objective to build 100 filling stations by the year 2005. The fact that only about 1,000 vehicles of all types have been converted (the actual number of gasoline cars using CNG is unknown) in more than 10 years indicates that the conversion programme has not been successful. This is attributed to the fact that private sector participation in the scheme has been limited.

#### A2.3.1.4. Integration into other policy areas

Carbon values may improve the internal rate of return of greenhouse gas reduction projects, but, until carbon prices increase, carbon value in many cases will make a marginal difference. Fiscal incentives can be particularly important in helping to attract clean technology transfer.

There are no supporting fiscal or regulatory policies in the greenhouse gas mitigation sectors in Bangladesh, although there are some fiscal incentives for private investment generally.

Table A6 highlights the policy tools that Bangladesh currently applies to the greenhouse gas mitigation sectors.

**Table A6** Supporting sectoral policies

	<b>Sectoral strategy plan</b>	<b>Existing fiscal policies related to sectors</b>
CDM related	X	X
Sustainable development	☞	X
Poverty alleviation	☞	X
Fossil fuel energy	X	X
Renewable Energy	X	X
Energy efficiency	X	X
Transport	X	Progressive increase in import duties for two stroke vehicles.
General investment	☞	Generous tax holidays - of up to 5-7 years depending on the subsectors, and 10 years for all types of units established in the EPZs Tax holiday for power generation plant is 15 years.

## **Appendix A1.1 Stakeholders consulted**

### **Government**

1. Ministry of Environment & Forests
2. Ministry of Finance
3. Ministry of Agriculture
4. Ministry of Energy & Mineral Resources
5. Ministry of Science & Technology
6. Ministry of Industries
7. Ministry of Planning
8. Ministry of Agriculture
9. Ministry of Transport
10. Ministry of Foreign Affairs
11. Ministry of Local Government, Rural Development & Cooperatives
12. Ministry of Health & Family Planning
13. Ministry of Education

### **Departments**

1. Department of Environment
2. Department of Forests
3. Local Government Engineering Department
4. National Board of Revenue
5. Board of Investment
6. Directorate of Health & Family Planning
7. Directorate of Primary & Secondary Education
8. Public Works Department (PWD)
9. Power Development Board (PDB)
10. Rural Electrification Board (REB)
11. Palli Bidduth Samity (PBS)
12. Renewable Energy Division, Ministry of Science & Technology
13. Bangladesh Chemical Industries Corporation (BCIC)-for pulp & paper & fertilizer

### **Private Sector**

1. Dhaka Chamber of Commerce & Industry (DCCI)
2. Metropolitan Chamber of Commerce & Industry (MCCI)
3. Federation of Bangladesh Chambers of Commerce & Industries (FBCCI)
4. International Chamber of Commerce (ICC)
5. Bangladesh Cement Manufacturers Association
6. Bangladesh Brick Manufacturers Association
7. Building & Real Estate Developers Association (REHAB)- Compact Fluorescent Lamp

### **Local Groups**

1. Philips-Bangladesh
2. HRC Group

3. Summit Group
4. BEXIMCO
5. RahimAfroz

#### **Foreign Investors**

1. UNOCAL
2. Shell
3. AES
4. KAFCO (fertilizer)

#### **Consultants**

1. ARMCO, Dr. Khurshidul Islam

#### **Research Institutes**

1. Bangladesh Agricultural Research Council (BARC)
2. Bangladesh Institute for Development Studies (BIDS)
3. Bangladesh University of Engineering & Technology (BUET)
4. Bangladesh Unnayan Parishad (BUP)
5. Bangladesh Centre for Advanced Studies (BCAS)

#### **Training Institutes**

1. Academy for Planning & Development (Ministry of Planning)

#### **NGOs**

1. Association for Developing Agencies, Bangladesh (ADAB)
2. Coalition of Environmental NGOs (CEN)
  1. Bangladesh Rural Advancement Committee (BRAC) Micro-credit
  2. Grameen Bank – Micro Credit
  3. Palli Karma Shahayak Foundation (PKSF) Micro-credit
  4. IUCN-Bangladesh
  5. Bangladesh Environmental Lawyers Association (BELA)

#### **Financial Institutions**

1. Bangladesh Bank
2. Sonali Bank
3. Janata Bank
4. Industrial Promotion & Development Company (IPDC)
5. Industrial Development Leasing Company (IDLC)

#### **Donor Community**

1. Department for International Development (DFID)
2. European Union-Country Office
3. Canadian International Development Agency (CIDA)
4. USAID
5. Royal Netherlands Embassy

### **International Development Agencies**

1. United Nations Development Program (UNDP)
1. UNICEF
2. World Health Organization (WHO)

### **Multilateral Institutions**

1. World Bank, Bangladesh Resident Mission
2. Asian Development Bank- Bangladesh Resident Mission

### **Political Parties**

1. Mr. Imran Chowdhury, Member of Parliament, Awami League (AL), ruling party
2. Dr. Moyeen Khan, MP, Former Planning Minister, Bangladesh Nationalist Party (BNP), opposition
3. Mr. Hasanul Haque Inu, General Secretary, JSD & Leader of 11 Party Coalition

### **Media**

1. Forum of Environmental Journalists, Bangladesh (FEJB)
2. Bangladesh Shangbad Shanghstha (BSS) Mustafa Kamal Majumdar,
3. The Daily Star

## Appendix A1.2 Setting out the poverty baseline

The United Nations Development Program in their Human Development Report of 1996 provides findings from a nation wide study on Poverty for 1993, where

47.5 percent of the total population were **Income Poor**, and  
76.9 percent of the total population were **Capability Poor**

~~///~~ *Income Poor* findings are based on head count index

~~///~~ *Capability poor* reflects the percentage of people who lack basic or minimally essential human capabilities considered as the capability to be well-nourished and healthy, healthy reproduction, educated and knowledgeable

In Bangladesh, there are

- ~~///~~ over 52 percent of total population without access to health services
- ~~///~~ over 63 percent of total population without access to sanitation
- ~~///~~ over 26 percent of children not attending primary school
- ~~///~~ over 50 percent of adults still functionally illiterate

In 1977, Poverty classification was formulated as follows

POVERTY LINE 1

**ABSOLUTE POOR** = Those who cannot take more than 90 percent of the recommended calorie intake (2122 kcal)

POVERTY LINE 2

**EXTREMELY POOR** = Those taking below 80 percent of the recommended calorie intake (1805 Kcal/person/day)

Describing human poverty, the Human Development Report 2000 (UNDP) provides the following information

### Box A2 Bangladesh : Basic Poverty Baseline Indicators

People not expected to survive to age 40	1998	20.8 percent
Adult Illiteracy rate (% age 15 and above)	1998	59.9 percent
Population without access to safe water	1990-98	5 percent
Population without access to health services	1981-93	26 percent
Population without access to sanitation	1990-98	57 percent
Underweight children under age 5	1990-98	56 percent
Share of income or consumption	1987-98	
poorest 20%		8.7 percent
richest 20%		42.8 percent
Population below income poverty line		

**Table A7** Incidence of Poverty

Survey year	Number and percentage of population below poverty line indicator					
	<i>National</i>		<i>Rural</i>		<i>Urban</i>	
	No.	%	No.	%	No.	%
<b>Poverty Line-I: Absolute Poverty 2122 K.Cal per person per day</b>						
1995-96	55.3	47.5	45.7	47.1	9.6	49.7
1983-84	58.4	62.6	51.1	61.9	7.3	67.7
<b>Poverty Line-II: Extreme poverty 1805 K Cal per person per day</b>						
1995-96	29.1	25.1	23.9	24.6	5.2	27.3
1983-84	34.3	36.75	30.2	36.7	4.8	37.4

**TableA8** Setting out poverty baseline

	<i>Qualitative Discussion</i>	<i>Indicators</i>
<b>Food Security</b>	The Fifth Plan seeks an overall accelerated growth in agricultural production and productivity. While self sufficiency in food grains at a higher level of per capita consumption is a major objective of the Plan, a more nutritionally enriched diet of the population is envisaged through substantial increases in non-grain and livestock production. Distribution of food grain remains a critical issue, particularly among the poor.	<ul style="list-style-type: none"> <li>☞ Target for cereal production level set at 25 million tons by 2002;</li> <li>☞ Assurance of balanced nutritional intake exceeding 2200 Kcal/person/day among the absolute poor and extreme poor;</li> </ul>
	Concerns underlying food security includes those relating to <ul style="list-style-type: none"> <li>☞ adequate domestic production of food grains,</li> <li>☞ building up of public stocks to meet production short falls,</li> <li>☞ timely import of food grains to make up production and stock short falls, and</li> <li>☞ price stabilisation.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Daily per capita supply of calories were 2197 in 1970 and fell to 2,085 in 1997;</li> <li>☞ Daily per capita supply of protein fell by - 4.5% between 1970 and 1997;</li> </ul>
	Adequate availability of food grains at national level does not guarantee food security for the poor households due to their lack of access to food. Distribution of food grain out of public stock has been adequate in meeting emergency needs after natural disasters.	<ul style="list-style-type: none"> <li>☞ Food Production Index (1989-91 =100) in 1998 was 112;</li> <li>☞ Food Imports as % of Merchandise Imports during 1997-98 was 15%;</li> </ul>
There is a chronic problem of food insecurity for nearly half the population living below the poverty line. Historically, this was attempts were taken through programs like Food For Work and Vulnerable Group Development, mostly donor funded with grains supplied by food aid. The declining trend in food aid in the recent years has meant fewer resources	<ul style="list-style-type: none"> <li>☞ Food Aid in Cereals (metric tons) in 1998 was 1,557,000;</li> <li>☞ Food Consumption (as % of total household consumption was 41% in 1997;</li> </ul>	

available for targeting poorer households

## Income

The GDP per capita (at 1995 \$) or per capita income was USD 348, with an average annual rate of change between 1975-98 of 2.4%.

The UNDP published Human Development Report 2000 puts

✂ Bangladesh's Human Poverty Index (HPI-1) rank at 70 out of a range with a maximum rank of 85 (Niger).

Human Poverty is also expressed in the life expectancy of average Bangladeshi's. Over a fifth (20.8) of the population is not expected to live to the age of 40 years.

The share of income or consumption is very inequitable.

Between 1987-98,

✂ The poorest 20% of the population received or consumed only 8.7 percent of the total income or consumption

✂ The richest 20% of the population received or consumed almost 43 percent of the total income or consumption

✂ The ratio between the richest 20% to the poorest 20% was almost 5

None of the poor in Bangladesh receives any monthly stipends for survival. A very small percentage is covered by the Vulnerable Group Development Scheme, which provides basic cereal ration for one person.

Rural Income has been on a gradual decline over time. In fact, existing foodgrain and other agricultural product procurement systems (jute, sugarcane, etc.) discourages farmers participation.

## Health

Rapid population growth, increasing urbanisation and major shifts in disease patterns prevailing in the country contributes to the changes in health status.

Resurgence of malaria, kala-azar and other re-emerging diseases are a few examples of these changes, Risks of STD, HIV/AIDS and other infectious diseases menacing public health are on the rise. Increase in the incidence of cardiovascular diseases, renal disorders, mental illnesses, cancer and conditions related to substance abuse, smoking and alcoholism, increasing traffic and industrial accidents, etc. increase the disease burden of the population.

Environmental degradation due to air, water and industrial

✂ Share of people below income poverty line (defined as \$1 per day in 1993 Purchasing Power Parity in US\$) for the period 1989-98 was 29.1 percent

✂ The National Poverty Line put 35.6 percent of the entire population below income poverty line for the period 1987-97

✂ The percentage of income for each population quintile in 1992 were as follows

Poorest	income
0 – 20 percent	= 9.4 %
20 – 40 percent	= 13.5%
40 – 60 percent	= 17.2%
60 – 80 percent	= 22.0%
Richest	
80 – 100 percent	= 37.9%

✂ Between 1990-97, 50% of infants with low birth weights;

✂ One year olds fully immunized against tuberculosis = 91% in 1995-98;

✂ One year olds fully immunized against measles = 62% in 1995-98;

✂ Oral rehydration therapy use rate = 61% between 1990-98;

✂ Pregnant women with anaemia

pollution and deteriorating living conditions also pose significant adverse impact on public health. Increased concentration of arsenic in subsoil water in vast regions also poses a potential public health catastrophe. Diseases related to metabolic disorder, malnutrition, tuberculosis, reproductive health, diarrhoea, respiratory tract, etc., will continue to exert major impact on the health status of the population.

= 53% between 1975-91;

/// Tuberculosis Cases = 52 per 100,000 people in 1997;

/// Malaria Cases = 56 per 100,000 people in 1997;

/// People living with HIV/AIDS = 21,000 in 1997

/// Annual average Cigarette Consumption per adult = 237 between 1993-97;

/// Number of Doctors per 100,000 people was 18 between 1992-95

## Water Supply

The piped water supply in Dhaka city, Chittagong city and district towns hardly cover 65%, 50% and 51% of the population respectively. The target in the Fifth Five Year Plan is to increase this coverage 80%, 90% and 70% respectively by 2002

/// Assured quality of living through access to safe drinking water for all population

/// Annual Internal Renewable Water Resources (cubic meters per capita) = 813 for (2000)

In Thanas and Poursavas (lower administrative units), this coverage of water supply hardly exceeds 5 percent. The Plan targets were to increase this coverage to 25% by 2002

/// Annual Fresh Water Withdrawals: Per Capita in cu.m for (1987-97) = 134

Presently, there is one tube well for every 105 persons in the rural areas. Fifth Five Year Plan Period Targets to increase access to 80 persons per tube well.

/// The piped water supply in Dhaka city, Chittagong city and district towns hardly cover 65%, 50% and 51% of the population respectively.

In its objectives for water supply and sanitation in the rural areas, it is emphasized that poor will be provided water supply free of cost or at below cost price. However, in its policy statement in the same Plan, the Government has specifically stated that "Water supply and sanitation facilities to the poor will be given free of cost, while the rich will be given tax concessions for developing such facilities at their own cost."

/// In Thanas and Poursavas (lower administrative units), this coverage of water supply hardly exceeds 5 %.

/// Presently, there is one tube well for every 105 persons in the rural areas

Arsenic contamination of groundwater of over 70 percent of Bangladesh poses the biggest concern for the nation, as this is the major source of water supply for the rural population who accesses through hand tube wells. Assessment and Mitigation efforts on a national scale, from government, research institutes, NGOs, International Community and the Private Sector is on way but progressing slowly. Relative mass awareness of contamination achieved. However, little practical initiatives have been taken to develop options and supporting local community based institutions for planning

and managing safe water supply in the arsenic affected regions.

Sanitation	<p>The sanitation coverage in the rural areas is only 36 percent of the population. Even in Dhaka city the sewerage system covers only 35 percent of population.</p> <p>Fifth Five Year Plan targets to increase the sanitation coverage (sanitary disposal of excreta) in the rural areas to 70 percent by 2002</p> <p>Sanitation in rural areas much improved compared to sanitation in Urban Slums which are the most densely populated human settlements and a majority constitute of those regarded as poor</p> <p>The Fifth Plan also had in its objective the provision of sanitation facilities to the poor free of cost or at below cost price. Under its policies section, the Plan specifically states "Water supply and sanitation facilities to the poor will be given free of cost, while the rich will be given tax concessions for developing such facilities at their own cost."</p>	<ul style="list-style-type: none"> <li>/// Improvement of quality of life through access to hygienic sanitation facilities for all population</li> <li>/// The sanitation coverage in the rural areas is only 36 percent of the population.</li> <li>/// Even in Dhaka city the sewerage system covers only 35 percent of population.</li> </ul>
Transport	<p>The bulk of transport services are under private sector, owned or controlled.</p> <ul style="list-style-type: none"> <li>/// On land, road and railway are major types of transports. Passenger transport on railways has been declining dramatically. This was a major means of transport for poor in Bangladesh. Apart from this, major road transport services used by poor are Public and Private Bus services, Trucks, Tempo, Rickshaw Van, etc.</li> <li>/// Most of the short haul inland transport services used by poor are engine boats or country boats. A few river-crossing ferry and steamer services also support poor peoples' mobility.</li> </ul>	<ul style="list-style-type: none"> <li>/// Cost per person per mile travelled on roads, waterways</li> <li>/// Increase in road connections and access in rural areas</li> <li>/// Increase in public/private mass transport in land (rail and road) and river networks</li> </ul>
<b>Crime &amp; Security/ Peace</b>	<p><i>The general law and order situation is on a rapid decline and public security at one of the lowest levels today. This is more due to lack of enforcement of law, malpractice and corruption, nepotism, political interference,</i></p> <p>In 2001, Transparency International awarded Bangladesh as the most corrupt nations, an event that upsets our hopes for good governance. On the same line Amnesty International and other Human Rights watch groups also have repeatedly called on human rights violations in the country, targeting journalists, social activists and citizens.</p>	<ul style="list-style-type: none"> <li>/// Assured Social Stability, Law &amp; Order Individual Safety and Public Security</li> <li>/// Injuries and deaths from road accidents is one of the highest in the world</li> <li>/// Number and percentage of murders, robberies, thefts, rape, extortion, toll-collection,</li> </ul>

Violence against women, in public as well in the household has increased sharply. The response, notwithstanding the public outcry, has been lacklustre at most.

Housing	<p>The present facilities in respect of physical infrastructures, housing, water supply, sanitation, etc. are very inadequate. Housing shortage in the country in 1991 was estimated to be 3.1 million units, out of which 2.15 million units were in the rural areas. This trend sets the current shortage to be about 5 million units.</p> <p>In urban and peri-urban areas, squatter type dwellings in slums are inhabited by poor, who are over 15 million strong</p>	<p><del>///</del> Improved quality of life through access to safe housing facility for all population</p> <p><del>///</del> Current housing shortage about 5 million units, of which about 3 million is in rural areas</p>
Employment	<p>The level of employment is miserably low and unemployment rate is as high as 40 percent in rural sector, 50 percent in low income urban and peri-urban areas, and over 70 percent for High School and College Graduates.</p> <p>More underemployment, seasonal employment and disguised employment prevailing, and livelihood coping in the informal sector, which engages over 80 percent of population, forces simultaneous or serial rotation of employment</p> <p>Low technological base, poor access to markets and competitiveness, limited investment flows in home and cottage manufacturing and industries, and inconsistent and adverse policies and institutional frameworks, etc have also</p>	<p><del>///</del> Labour force unemployment rate Between 1972-73 and 1996-97, this rate fell from 38 percent to 28 percent</p> <p><del>///</del></p>
Energy	<p>Conventional grid electricity has been in the public sector domain until recently, although bulk of generation, transmission and distribution still is under control of public sector. However, existing grid electricity supply hardly covers 25% of the population. Power supply is not reliable, neither stable. Power cuts are frequent. There is a widening gap between the demand requirements and supply situation.</p> <p>Existing projections of supply generation leaves bulk of the population living in rural area excluded from conventional grid electricity connection.</p> <p>Availability of natural gas, which is available in considerable reserve in Bangladesh is limited to a few users in commercial and household sector, less than 10 percent of the population has gas connections for cooking.</p> <p>Under the present scenario, although the Government commits in its plans, goals and targets to provide access to energy for its population, in realistic terms the possibility of such happening is bleak.</p>	<p><del>///</del> Total Electricity Consumption in 1997 was 12,820 million kilowatt hours, with a per capita average consumption at just over 105 kilowatt hours per annum</p> <p><del>///</del> The Consumption has increased by almost five times since 1980</p> <p><del>///</del> Traditional Fuel Consumption as percentage of total energy use was 81.3% in 1980 which fell to 43.3% by 1997</p> <p><del>///</del> In 1997, only 5.1% of total energy consumption was accounted for by household sector</p> <p><del>///</del> Renewable Energy Production was 16,093,000 toe and constituted of 66% of total consumption from all</p>

sources

Biomass is a major source of energy used in the rural and peri-urban area for cooking.

<b>Education</b>	In Bangladesh, educational development has not been adequately geared to meet the human need. The overall literacy rate (7 years and above) in Bangladesh is about 44.3 percent (1995), the female literacy rate being 28.5 percent and the male, 50.4 percent. The gap of literacy rates between the urban and rural areas is very wide - 36.6 percent in rural and 63 percent in urban areas.	<ul style="list-style-type: none"> <li><del>///</del> Net Primary School Enrollment for 1996-97 was 70% for female and 80% for male</li> <li><del>///</del> Net Secondary School Enrollment for 1996-97 was 16% for female and 27% for male</li> <li><del>///</del> Gross Tertiary School Enrollment was only 6% during 1996-97</li> <li><del>///</del> Adult literacy rate is significantly less for female compared with male</li> </ul>
<b>Social Exclusion</b>	According to a study by John Hopkins University, USA ( "Physical Assault on Women by an intimate Partner", 1999), in 1992, about 47 percent of all women had been physically assaulted by an intimate partner in their lives. (UNDP HDR Table 2.3, page 36)	

Information Sources:

1. Fifth Five Year Plan, 1997-2002, Ministry of Planning, Government of Bangladesh
2. Human Development Report 2000, UNDP, New York
3. The Least Developed Countries 1999 Report, UNCTAD, Geneva
4. Country Presentation for Bangladesh at the Third United Nations Conference on the Least Developed Countries, Brussels, March 2001,UN
5. World Resources, 2000 – 2001, UNDP-UNEP-World Bank-WR

## Appendix A1.3 Description of projects selected

<p><b>1. Introduction of aero derivative turbines in place of conventional turbines for peak load generation</b></p>	<p>There is no mitigation opportunity in baseline electricity generation in Bangladesh. However, the daily load curve is such that at least 25% of the total generation capacity must cater to the peak load. Because of the abundance of natural gas, the peak generation capacity will be all combustion turbines. Given the poor financial position of the power company, the tendency would be to opt for the combustion gas turbines to have efficiencies as low as 25%.</p> <p>The mitigation technology to supply peak load can be aero derivative combustion turbines. These turbines cost one-and-one-half times more but can give efficiencies over 40%. Since these turbines will be used for peak load, the operating hours per day will be around five. Such low usage will naturally adversely affect the cost effectiveness but the total potential of mitigating CO<sub>2</sub> by this technology is fairly large. The mitigation project considered here is for a 100 MW electricity generation facility but can be extended to 600 MW at the present time and up to 1,000 MW in the year 2010. Aero derivative turbines will meet the technology additionality criterion of the CDM. In order to meet the demand in the cities during peak hours, power is not administered to rural areas. This has profound economic and social impact on the rural population as well as small-scale business in the peri-urban areas.</p> <p>The daily load shedding is around 400 MW.</p>
<p><b>2. Cogeneration in sugar mills</b></p>	<p>Bangladesh's economy is heavily dependent on agriculture. Cash crops are particularly important and, a large farming community is dependent on sugar cane cultivation. Most of the sugar mills are situated the Northern part of the country where sugarcane is grown. The region is economically depressed compared to the other regions. In the last decade locally produced sugar has been unable to compete with imported sugar because of high production costs. The reason for this is the highly inefficient sugar mills. Sugar mills burn bagasse in low-pressure boilers to raise steam. Cogeneration can improve efficiency and hence, increase profitability. Cogeneration is an ideal choice for a sugar mill because there exists a large demand for steam and process heat, which can be met from the waste heat of the generator turbines.</p> <p>The co-generated electricity sold to the national grid will displace natural gas-based electricity. The Northern region also faces acute shortage of power. This project could supply electricity to households and thereby empowering them with the capacity to engage in livelihood activities that they are unable to do at present.</p> <p>This is expected to be a low-cost option because of the large profit from the sale of electricity. This project should meet the CDM emission additionality criterion very well because it makes efficient use of a renewable resource. In an average mill that operates for 120 days in the year, a 10 MW electricity generation facility can be set up. There are 15 sugar mills in the</p>

	<p>country and the cogeneration scheme discussed above can be applied to all the mills.</p> <p>The direct effect on the sugar cane growers will be the increase in income as the mills will make higher profits.</p>
<p><b>3. Setting up a 20 MW power plant using municipal waste</b></p>	<p>The proposed project will use municipal waste generated in Dhaka to produce electricity. It is estimated that more than 3000 metric ton of municipal waste is generated in Dhaka every day. The waste consists of plastics, glass, papers and organic material. Except for the organic material the others are recycled by small scale recycling industries. It is estimated that 1000 Mt of organics waste is available every day. It is proposed that a 20 MW power plant requiring 1000 Mt of waste be set up. It is important to note that at present the waste is dumped as land fill. The technology used will be to manufacture biogas that will fuel the power stations.</p>
<p><b>4. Solar home system in remote rural areas.</b></p>	<p>This project would electrify 50,000 homes in remote rural areas. The total energy available will be 25 thousand Kwh/day (System-5). Which includes 100 peak Watt PV cell with 2 x 100 ampere home batteries. Individual households will be installed with a 100 Watt System and will operate on a deep cycle 12 volt battery. The module will power 10 Nos of 20 Watt DC lamp, a TV and Radio. Other permutation of utilisation of the power available can also be need. The system will be electronically controlled to ensure efficient running of the battery. The project life has been considered as 20 years. The capital cost for each household is about US \$ 1000 and the running cost of replacement of batteries and other accessories is about \$ 640 for the project life.</p> <p>The average size of rural household is 5 persons, therefore the proposed project will target population of 250,000 directly and will employ around another 1000 people for maintenance of batteries, accessories etc. The potential of SHS is very good as only approximately 30% of household have access to electricity.</p> <p>The households use kerosene lamps. The average consumption per hold is about 15 litres per month.</p> <p>Uninterrupted and reliable source of energy will result in an increase of employment and added income. [As an example it has been observed in a cluster of 750 SHS in Narsingdi in Bangladesh the earning specially of women has increased considerably by undertaking contracts to manual sewing job)</p>
<p><b>5. Stand alone solar power system for 5,000 health care centres</b></p>	<p>The project will provide solar power for the rural health care centres. The project will provide power to 2 fluorescent lamp of 15 W each, one fan of 40 W, one socket for vaccine refrigeration of 90 W to each of the health centres. The total source available within this module will be 160 W. The project will not only provide the system when there is no electricity available but to health centres where grid power is connected. The reason for this approach is because, in the rural areas the grid power is extremely unreliable especially during evening peak hours due to load shedding. The</p>

	<p>project life is considered to be 20 years and the cost of each system is US\$ 2000 and cost of replacement of batteries and other accessories is about US\$ 640 for the project life.</p>
<p><b>6. Solar panel street lighting for a typical village in Bangladesh</b></p>	<p>The project will install 500 solar panels for lighting the main and some arterial streets in a typical village in Bangladesh. These units will be stand-alone type. The fluorescent lamps will be of 35 W. The project life is considered as 20 years. The initial capital cost of the panel, battery and the poles is estimated at US \$ 220,000. The running cost of replacement of batteries and other accessories is estimated US \$ 640 per light for the whole project life.</p>
<p><b>7. Installation of 500,000 efficient cooking stoves</b></p>	<p>Traditional cooking Stoves, mostly used in the rural areas, have efficiencies between 5 – 15 percent. These stoves are normally 1 – 2 feet deep and have large flue gas – exit spaces between the three raised points on which the cooking pots are placed. Because of the high depth, the high temperature point of the stove remains near the bottom of the stove where the fuel burns, and as such heat transfer to the cooking pot is low. Moreover, because of the large flue-gas exit spaces, hot gases including flames get out of the stove through these spaces without coming in contact with the bottom, unburnt charcoal remains at the bottom. The traditional stoves are very inefficient due to these major drawbacks.</p> <p>Design of an improved stove to eliminate these drawbacks by placing, a grate 6 – 8 inches below the cooking pot, width of the flue gas-space is reduced to ½ inch and 6 – 8 holes are made on the wall just below the grate. This stove brings about a saving of 50 – 60 percent when compared with traditional stoves.</p> <p>The number of rural households in Bangladesh is about 20 million and most of them use traditional stoves for cooking. The total usage of biomass only for cooking purpose is estimated to be 40 million tons. With introduction of improved stoves, as much as 20 million tons of biomass can be saved in the country. This will improve the health of rural women population who do much of the cooking and are exposed to indoor air pollution. Respiratory illness and eye problems are common among women due to indoor air pollution. A CDM project may be designed for conversion of traditional stoves to improved cooking stoves for 10,000 villages having an average of 50 households per village. The number of improved stoves will be 500,000, targeting a similar number of households. This will cover 2.5% of total households of the country.</p>
<p><b>8. Cement manufacture (wet to dry process)</b></p>	<p>The project will install clay and limestone driers. The existing rotary kiln would be shortened and installation of blending silos for dry powder. Installation of suspension pre-heater and replacement of planetary coolers with conventional coolers. The direct benefit of this project is that it will not only reduce GHG but will make the product competitive with imported cement. Cement production is an energy-intensive activity. The energy cost of Portland cement production is 20% to 30% of the total production cost. Consequently, efforts have been made to reduce energy consumption in cement production through improvements in the process and other auxiliary</p>

	<p>facilities. Since the energy crisis of 1973, the dry process has replaced many of the wet processes for clinker production. The dry process uses up to 50% less energy than the wet process.</p> <p>Annual production for cement in 2000 is estimated at 4.5 million tons. The installed capacity of one very old integrated cement factory based on the wet-process and sixteen clinker-grinding plants is 4.3 Mt/yr. The nominal capacity of the wet-process plant is 0.233 mt/yr, which comprises only 5.4% of the national demand for cement. Clinker is imported from several countries and processed in finishing mills. The conversion of the wet-process in old cement plants to the dry process can be a CDM project. This will be a high-cost option because all old equipment has to be scrapped.</p> <p>In the present wet process the CO<sub>2</sub> emission is around 0.4 tone of cement production. The project opportunity is 0.2 tone of cement production</p>
<p><b>9. Conversion of four stroke vehicles to CNG</b></p>	<p>Urban air quality of Dhaka city ranks amongst the worst in the world. The government of Bangladesh is therefore very keen to promote measures that will alleviate the problem. Replacement of liquid fuels by compressed natural gas (CNG) is a particularly attractive proposition because of the abundance of sulfur-free natural gas. A large-scale conversion program can achieve significant reduction in urban air pollution, leading to more sustainable transportation. Such a program can bring large benefits to the country because expensive imported fuel will be displaced. This will also have direct impact on the livelihood of millions in terms of sustained employment as the GOB is thinking of banning three wheelers.</p> <p>The use of a conversion kit allows gasoline and diesel engines to use CNG. The conversion of gasoline cars to use CNG is an on-going program of the Government, started in the mid-eighties. The fact that only about 1,000 vehicles of all types have been converted (the actual number using CNG is unknown) in more than 10 years indicates that the conversion program has not been very successful. The CDM project envisaged will scope 15,000 gasoline and 5,000 diesel automobiles in 5 years. At the present moment the program to convert gasoline cars to CNG suffers from the drawback that there aren't enough re-filling stations. In the CDM project the building of 50 stations has been considered. However, the Government has a stated program to build 100 filling stations by the year 2005. For a CNG vehicle project to be successful, an attractive price differential between liquid fuels and CNG must be maintained. With respect to the CDM, the doubts about methane leakage and the fact that the present program is government owned are serious impediments. In fact for a large-scale program to be successful, private sector participation is essential.</p> <p>The project target is to convert 15000 gasoline and 5000 diesel vehicles in Dhaka city and setting up 20 refueling stations in 5 years. There are almost 500,000 vehicles plying on gasoline and diesel in Bangladesh. If the scoped project is successful, replication is very possible. This will provide employment in the technical and service sector.</p> <p>The baseline is the energy consumption of conventional gasoline and diesel</p>

	<p>vehicles.</p> <p>The level of impact is high indirectly in terms of reduced air pollution especially in Dhaka City. It is estimated that about 15000 people die of respiratory problems in Dhaka City itself.</p> <p>The country will save US\$ 13 million per year, which can be diverted to livelihood project.</p>
<p><b>10. Introduction of electric vehicles in urban areas</b></p>	<p>The product is to introduce 3000 electric vehicles in five different routes over three years, which provide services equivalent to 2000 existing tempos fuelled by gasoline. Auto rickshaw and tempo owners association will administer the battery charging stations for individual routes . The lifetime of the project is 10 years.</p>

## Appendix A1.4 Scoping of Project benefits

<i>Projects</i>	<i>Primary (direct) benefits</i>	<i>Secondary (indirect) benefits</i>	<i>Empowerment</i>
1. Aero derivative turbines for peak load generation	<ul style="list-style-type: none"> <li>?? Increased reliability of electricity. This will benefit households and small industries in peri-urban areas.</li> <li>?? Improve business climate due to fewer power shortages;</li> <li>?? Savings in household and small commercial sector income through spending less on diesel to compensate power shortages;</li> <li>?? Reduction of thermal pollution around the power plant</li> <li>?? Increased efficiency in peak load management</li> </ul>	<ul style="list-style-type: none"> <li>?? Increases the enabling environment for business management and expansion, in manufacturing as well as service sectors which suffer due to load shedding</li> <li>?? Assured supply of electricity at homes enable better services toward human development</li> </ul>	
2. Cogeneration in sugar Mills	<ul style="list-style-type: none"> <li>?? Increased diversification of electricity sources</li> <li>?? Increased reliability of electricity</li> <li>?? Income from sales of power</li> <li>?? Secures farmer and local community livelihoods because locally produced sugar more able to compete with imports.</li> <li>?? Supply of excess electricity to households</li> <li>?? Farmers get better prices for their sugarcane</li> </ul>	<ul style="list-style-type: none"> <li>?? Increased opportunities for rural production, processing, trade, shop keeping and other businesses, through supply of excess electricity to surrounding areas;</li> <li>?? Improved health and education through supply of excess electricity to surrounding areas;</li> <li>?? Increased access to information due to supply of excess electricity to surrounding areas.</li> </ul>	?? Encourage the supply of social interaction among villagers
3. Setting up a 20 MW power plant using municipal waste	<ul style="list-style-type: none"> <li>?? Diversification of energy supply sources</li> <li>?? Improved reliability of electricity supply</li> <li>?? Increased employment in the private and</li> </ul>	<ul style="list-style-type: none"> <li>?? Creation of value added products (electricity and organic fertilizer) and associated economic impacts;</li> </ul>	

	<p>public sector</p> <p>?? Improved health through avoidance of noxious emissions from waste dumps</p> <p>?? Save on import of diesel fuel for generation</p> <p>?? Recovery of organic fertilizer from waste</p>	<p>?? Improved garbage collection system and disposal in Dhaka</p> <p>?? Improved management of dump sites</p>	
<p>4. Solar home system in remote rural areas (50,000 houses) 25,000 Kwh/day</p>	<p>?? Increased reliability of electricity</p> <p>?? Electricity made available to 50,000 homes</p> <p>?? Improved standards in the physical quality of living</p>	<p>?? Improved access to education</p> <p>?? Improved access to knowledge and capacity building through electronic media (TV)</p> <p>?? Improved access to services using electrical appliances</p> <p>?? Increased opportunities for rural production, processing, trade, shopkeeping and other businesses</p> <p>?? Increased income due to reliability of electricity;</p> <p>?? Easier access to micro-credit (as witnessed by solar programmes in Bangladesh);</p> <p>?? Increased employment opportunities in servicing and maintenance of the home systems</p> <p>?? Increased income and employment from local manufacturers supplying accessories and peripherals for the systems</p>	<p>?? Increased ability to operate and maintain supply of electricity for home (and small scale demand) consumption</p> <p>?? Increased security during night in and around the rural homes</p> <p>?? Reduced dependence on power supply companies for electric supply and maintenance</p> <p>?? Encourage the supply of social interaction among villagers.</p>
<p>5. Stand alone solar power for 5,000 health centres</p>	<p>?? Increased reliability of electricity;</p> <p>?? Increased diversification of electricity;</p> <p>?? Improved health facilities and access to health facilities</p>	<p>?? Increased income and employment from supply of peripherals and accessories by local manufacturers</p>	<p>?? Improved health can translate into greater control over economic potential of household.</p>

	<p>?? Improved facility to maintain stock of essential life saving drugs in refrigerators</p> <p>?? Reduced cost and expenses incurred by patients and service users. Poor lighting arrangements often prevent health workers from delivering care services, particularly if it involves taking some tests, running laboratories, surgery, etc. Delays cost the patient unnecessary suffering which lead to further deterioration of the patients health and condition which requires attention from health care facilities available in urban centres, again adding to the cost and misery of the patient and family.</p>		
6. Solar panel street lighting for one typical village	<p>?? Diversification of electricity</p> <p>?? Increased safety and security</p> <p>?? Improved conditions for mobility</p> <p>?? Increased productivity because work times will increase</p>	<p>?? Increased livelihoods to maintain and service streetlights</p> <p>?? Increased trade</p>	?? Increased mobility and ability to undertake activities
7. Installation of 500,000 efficient biomass cook stoves in homes	<p>?? Increased efficiency in biomass use</p> <p>?? Decreased pressure on biomass resources - over 50% saving is possible;</p> <p>?? Improved air quality inside kitchen and associated with this is improved health in terms of respiratory illnesses and eye health, specially for women and children;</p> <p>?? Reduced time and effort in cooking releases more time for women to dedicate elsewhere</p> <p>?? Increased income and employment from supply of biomass cooking stoves by</p>	<p>?? Increased time for women could be put to more productive uses. For example, women could use the released effort into income generating activity or for family care</p>	<p>?? Women's decision making potential due to freed time could increase – For example, participation in work outside may become more attractive and ability of women to engage in work may increase social interaction which will improve women's position in decision making</p>

	local manufacturers		
8. Cement manufacture (wet to dry process)	<ul style="list-style-type: none"> <li>?? Increased efficiency of energy consumption (by 50%) in cement manufacture production</li> <li>?? Increased supply of electricity available for other uses due to reduced energy consumption</li> <li>?? Decrease foreign exchange spent on fuel imports</li> <li>?? Reduces cost of manufacturing</li> <li>?? Improved conditions for health and maintenance for workers</li> </ul>	<ul style="list-style-type: none"> <li>?? Increased competitiveness could instigate more cement business start-ups</li> </ul>	
9. Conversion of four-stroke vehicles with CNG engines	<ul style="list-style-type: none"> <li>?? Increased diversification of energy</li> <li>?? Increased savings from reduction in fuel imports</li> <li>?? Increased efficiency in energy consumption</li> <li>?? Reduced cost of operation due to cheaper fuel</li> <li>?? Improvement in urban air quality and associated health impacts;</li> <li>?? Longer engine life – more stable service assurance for customers and income stream for investor</li> <li>?? Increased income and employment from supply of peripherals and accessories by local manufacturers</li> <li>?? Reduced expenditure on imported fuel</li> </ul>	<ul style="list-style-type: none"> <li>?? Increased awareness of environmental and health issues</li> <li>?? Savings in foreign exchange can be used for poverty alleviation and livelihoods development projects</li> </ul>	
10. Introduction of electric vehicles in urban areas	<ul style="list-style-type: none"> <li>?? Improved air quality in urban areas and associated health benefits</li> <li>?? Save on imports of traditional transport fuels</li> </ul>	<ul style="list-style-type: none"> <li>?? Increased livelihoods for servicing and maintenance of EV –Number of EV introduced will be negligible to start with and size of gasoline</li> </ul>	

	fuels ?? Increased income and employment from supply of peripherals and accessories by local manufacturers	to start with and size of gasoline driven vehicle service centres will still be substantial for years to come. Also, the existing service centers will diversify and install EV servicing facilities, for example, battery charging centers.	
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## Appendix A1.5 Actors and Institutions - scoping of capacity needs

	<i>Development oriented CDM Project</i>	Actors and Institutions Involved in Supply
	Solar home systems in rural areas	<p><b>Project Promotion:</b> Private Sector, NGOs and Bangladesh Power Development Board, Rural Electrification Board and the Government of Bangladesh.</p> <p><b>Project Implementations:</b> The project would be implemented by private sector like Grameen Shakti, Rahim Afroz Bangladesh Ltd and Supported by Grameen Bank and BRAC and other micro finance organisation.</p> <p><b>Project Appraisal:</b> At present there is no mechanism to appraise CDM projects under CDM. However, REB having implemented 750 SHS a few years back and Grameen Shakti which currently commercialising SHS may be the potential appraisers.</p> <p><b>Project Monitoring :</b> There is no independent monitoring of the existing solar project. REB the operator of a cluster of Solar Home Systems and Grameen Shakti and vendors carry out their independent monitoring.</p> <p>Renewable Energy has been placed under the Ministry of Science &amp; Technology but they do not enough capacity to monitor. Ministry of Local Government, Rural Development &amp; Co-operatives (MLGRDC),</p>
	Solar electrification of rural health centres	<p><b>Project Promotion:</b> Since most of health care centers are state owned the project promotion will be effectively done. The Directorate of Health under the Ministry of Health will be main promoter of the project. As this particular department do not have adequate technical manpower required to promote this project, assistance from either Government organizations like Local Government Engineering Department (LGED), Power Development Board (PDB), Rural Electrification Board (REB) can be taken.</p> <p><b>Project Implementation:</b> The project may be implemented by the Directorate of Health assisted by technical experts drawn from REB, LGED or from the private sector like Grameen Shakti, Rahim Afroz Power Division.</p> <p><b>Project Appraisal:</b> The project can be appraised by Grameen Shakti, Rahim Afroz who are already involved in the Solar Energy Sector provided capacity building on CDM is required.</p> <p><b>Project Monitoring:</b> There is no independent monitors for projects under CDM in this sector. However after capacity building on CDM of project promoters can carry out the monitoring of the project.</p>
	Solar rural street lighting	<p><b>Project Promotion:</b> The project promoters will be private sector, local NGOs in collaboration with Rural Electrification Board (REB) of the GOB. The village committee may also be potential promoters.</p> <p><b>Project Implementation:</b> Grameen Shakti or the REB who are already experienced in setting solar systems may implement the project.</p> <p><b>Project Appraisal:</b> At present there is no organisation who can appraise this project from the CDM point of view. However with capacity building REB, Grameen Shakti, Private Sector, engaged in solar projects can be the potential appraisers of the project.</p> <p><b>Project Monitoring:</b> At present for solar projects monitoring is not done from the CDM point of view. With capacity building REB, Grameen Shakti and BRAC who has strong institutional background can be effective in monitoring the project.</p>
	Improved bio-mass	<p><b>Project Promotion:</b> The project may be promoted by the Local Government Engineering Department (LGED) which has a large network of</p>

	cooking stoves	<p>technical personnel engaged in various infrastructure development through the country. Local NGO's like Proshika, ASA, BRAC, etc. are also potential promoters of the project.</p> <p><b>Project Implementation:</b> The project may be implemented the project promoters themselves Consortium of private sector entrepreneurs may also implement the project.</p> <p><b>Project Appraisal:</b> At present there is no mechanism for appraisal of project under CDM. However with necessary capacity building the LGED, NGO's and private sector Consultant may be the potential project appraisals.</p> <p><b>Project Monitoring:</b> Local NGO's with strong presence in the project area may be involved in project monitoring.</p>
	Waste to energy project	<p><b>Project Promotion:</b> Dhaka City Corporation under the Ministry of Local Government and Rural Development has the responsibility to dispose the waste from Dhaka City. The DCC do not have the required manpower to promote the project. However expertise can be drawn from the Power Development Board (PDB) who have adequate expertise in the field of Power Generation and is the manor power generator in Bangladesh.</p> <p><b>Project Implementation:</b> The DCC is collaboration with PDB can implement the project.</p> <p><b>Project Appraisal:</b> At present there is no organization who can appraise projects under CDM. However for a project like this, with required capacity building of PDB who has adequate technical personnel can appraise the project.</p> <p><b>Project Monitoring:</b> There is no independent monitoring of Power Station from the CDM point of view. Power cell a Government agency who overviews all aspects of power Generation Transmission and Distribution in the country can be the potential monitors. But at the same time some amount of capacity building in the Power Cell will be required.</p>
	Cogeneration in sugarmills	<p><b>Project Promotion:</b> As most of the sugar mills except for a few private mills are under the control of Bangladesh Mills Corporation. The promotion can be undertaken the Corporation itself or through joint venture with national or international partners.</p> <p><b>Project Appraisal:</b> Currently there is no mechanism to appraise projects under CDM. The nature of the project is such that with capacity building, the project promoters should be able to appraise the project.</p> <p><b>Project Implementation:</b> The Bangladesh Sugar &amp; Food Industries Corporation along with its joint venture partner will have the capacity to implement the project.</p>
	Conversion of four wheelers into CNG	<p><b>Project Promotion:</b> Rupantarita Fetroleum and Gas Company Ltd. RPGCL a Subsidiary of Petrobangla under the Ministry of Energy and Mineral Resources of the Government of Bangladesh was formed to promote their energy efficiency program. Since its formation it has not been able carry out large scale conversions. This is due to lack of infrastructure in terms of filling inadequate number of filling stations and other facilities natural gas pipeline network etc. The private sector is now showing more interest and are approaching RPGCL for joint venture project. RPGCL is an efficient organisation with adequate capacity to promote this project under a joint venture scheme.</p> <p><b>Project Appraisal:</b> Currently there is no mechanism to appraise projects under CDM. However appraisal purely from the commercial perspective has already been done. Manpower resource at RPGCL with some capacity building can appraise this project from CDM point of view.</p> <p><b>Project Implementation:</b> RPGCL and the private sector under mutually agreed terms and condition through a joint venture can implement this project.</p> <p><b>Project Monitoring:</b> There is no monitoring body at the moment however there will be no monitoring problem if the operation remains under</p>

		the joint venture. RPGCL will carry out the conversion while the private sector will operate the service stations. The number of conversions will be monitored by RPGCL while the volume of CNG sold can be provided by the service stations. For this project to be under CDM an independent monitoring by private sector technical consultant/NGOs is suggested.
	Electric vehicles	<p><b>Project Promotion:</b> Bangladesh Road Transport Authority (BRTA) of GOB in collaboration with Autorickshaw and Tempo Owners Association.</p> <p><b>Project Implementation:</b> The project may be implemented by the private sector like Rahim Afroze &amp; Company who have already taken initiative to import 50 Electric Vehicles on a trial basis. They are also the largest battery manufacturer in Bangladesh. Dhaka Electric Supply Authority will also play vital role in implementation.</p> <p><b>Project Appraisal:</b> There is no mechanism to appraise CDM projects in Bangladesh. However Rahim Afroze having done considerable work on this type of project may appraise the project given capacity building on CDM.</p> <p><b>Project Monitoring:</b> There is no independent monitoring such project from the CDM view point. BRTA may be trained to monitor the project.</p>
	Aero-derivative turbines for peak load generation	<p><b>Project promotion:</b> This project could be promoted by local private sector, specially Summit Group, a private entrepreneur who have already set up a 100 MW barge mounted power plant and is now in the process of building three more each having a capacity of 10 MW in remote areas. IPPs presence in Bangladesh is quite strong and they are also potential promoters.</p> <p><b>Project appraisal:</b> The promoters are capable of appraising such a project.</p> <p><b>Project Implementation:</b> The promoters along with national and international technical and financial institutions have already implemented projects of this magnitude.</p> <p><b>Project Monitoring:</b> There is no formal monitoring process in place at the moment. Independent monitors who could be a combination of Accounting and Technical consultancy firms (International + National) could be set up. Monitoring of this project from CDM perspective should not pose any problems.</p>
	Energy efficiency in cement manufacturing	<p><b>Project Promotion:</b> The cement plant is under the Bangladesh Chemical Industries Corporation (BCIC) in the public sector. Since BCIC has no plans to privatise this factory, the project promotion will have to be done by BCIC itself with assistance of international consultants. (It may be mentioned that BCIC is one of the largest Public Sector Corporation having high quality resource persons like Engineers, Economist and Technicians who have the ability to promote large projects.</p> <p><b>Project Appraisal:</b> At present there is no existing organisation which can appraise a CDM Project Capacity building required.</p> <p><b>Project Monitoring:</b> There is no project monitoring body on Energy Efficiency Projects from the CDM point of view.</p>

Potential Investor & Market Participants	Potential Market Activity	Reason for Participation	Capacity needs
Non-Annex 1 Government (Bangladesh)	Investment in individual CDM projects or channel resources into domestic CDM funds	Promote national sustainable development objectives	<p>Develop knowledge base and awareness on sustainable development issues, their link to global and national climate change negotiations process</p> <p>Develop technical know how on CDM project development criteria, focusing on</p>

	<p>Climate Change Working Committee</p> <p>Board of Investment</p> <p>Department of Environment</p> <p>Line Ministries Government Departments, Agencies, Public Sector Corporations</p> <p>Niche company (solar, wind, etc. like Grameen Shakti, Rahimafroz, BRAC Solar, etc)</p> <p>Other private sector company (annex and non annex country)</p>	<p>Develop individual CDM projects</p> <p>Invest in projects or CDM funds</p>	<p>Commercial interests, technology diffusion</p> <p>Offset company emissions &amp; commercial interests</p>	<p>identification, scoping, approval, etc.</p> <p>Establish relevant body and dedicate staff towards CDM specific project development</p> <p>Initiate CDM learning groups and circles among relevant government agencies through training workshops and curriculum development organised under national training institutes like Academy for Planning and Development, Bangladesh Public Administration Training Centre, Bangladesh Management Development Centre</p> <p>Organise regular briefings on CDM updates and activities within country and abroad</p> <p>Organize overseas training and exposure on CDM</p> <p>Develop knowledge base and awareness on sustainable development issues, their link to global and national climate change negotiations process</p> <p>Facilitate Linking with and networking among these companies and other stakeholders in the government, finance institutions, other private companies, and other sectors</p> <p>Facilitate learning and application of development criteria, establishing baselines, appraising for additionality, calculations of carbon mitigation potential, etc</p> <p>Develop knowledge base and awareness on sustainable development issues, their link to global and national climate change negotiations process</p> <p>Facilitate Linking with and networking among these companies and other stakeholders in the government, finance institutions, other private companies, and other sectors</p>
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	<p>Institutional investors</p>	<p>Contribute to multilateral CDM funds</p>	<p>Portfolio diversification to lower risks, socially responsible investing</p>	<p>Facilitate learning and application of development criteria, establishing baselines, appraising for additionality, calculations of carbon mitigation potential, etc</p> <p>Develop knowledge base and awareness on sustainable development issues, their link to global and national climate change negotiations process</p> <p>Facilitate Linking with and networking among these companies and other stakeholders in the government, finance institutions, other private companies, and other sectors</p> <p>Facilitate learning and application of development criteria, establishing baselines, appraising for additionality, calculations of carbon mitigation potential, etc</p> <p>Facilitate Linking with and networking among these companies and other stakeholders in the government, finance institutions, other private companies, and other sectors</p>
	<p>Regional and Multilateral development banks (ADB, World Bank)</p>	<p>Develop and manage portfolios of CDM projects</p>	<p>Promote sustainable development of member countries and build markets</p>	<p>Develop knowledge base and awareness on sustainable development issues, their link to global and national climate change negotiations process</p>
	<p>Industry associations (DCCI, FBCCI)</p>	<p>Develop and manage project portfolio, invest members' capital in CDM funds or projects</p>	<p>Commercial interest of members or sector</p>	<p>Develop technical know how on CDM project development criteria, focusing on identification, s cooping, approval, etc.</p> <p>Establish relevant body and dedicate staff towards CDM specific project development</p> <p>Initiate CDM learning groups and circles among relevant private company association members through training workshops and curriculum development organised under their associations training cells or divisions</p> <p>Organise regular briefings on CDM updates and activities within country and</p>

	Non-government organizations	Design and develop CDM projects	Promote environment and development benefits	<p>abroad</p> <p>Organize overseas training and exposure on CDM</p> <p>Develop knowledge base and awareness on sustainable development issues, their link to global and national climate change negotiations process</p> <p>Develop technical know how on CDM project development criteria, focusing on identification, scooping, approval, etc.</p> <p>Establish relevant body and dedicate staff towards CDM specific project development</p> <p>Initiate CDM learning groups and circles among relevant private company association members through training workshops and curriculum development organised under their associations (ADAB, CEN) training cells or divisions</p> <p>Organise regular briefings on CDM updates and activities</p> <p>Develop knowledge base and awareness on sustainable development issues, their link to global and national climate change negotiations process</p> <p>Develop technical know how on CDM project development criteria, focusing on identification, scooping, approval, etc.</p>
	Brokers or other intermediaries	Match buyers and sellers, develop secondary markets, identify and develop projects, aggregate CDM projects into portfolios	Commercial interests	<p>Establish relevant body and dedicate staff towards CDM specific project development</p> <p>Initiate CDM learning groups and circles among relevant private company association members through training workshops and curriculum development organised under their associations (ADAB, CEN) training cells or divisions</p> <p>Organise regular briefings on CDM updates and activities</p>