ACCLIMATISE
building climate resilience

nacom

Climate Knowledge Development Network (CDKN)

Country scoping studies to support the Mobilising Private Investment for NDC implementation (MPI) project

Deliverable 5: Final report- Scoping study - Bangladesh

1st September 2017

Climate Knowledge Development Network (CDKN)
1 Embankment Place
London WC2 6RH
UK

Our reference	50158
Client reference	n/a

Project Manager

Virginie Fayolle

Approved by

John Firth

Acclimatise

Hexgreave Hall

Farnsfield

Newark

UK NG22 8LS

T: +44 (0) 1623 884347

E: v.fayolle@acclimatise.uk.com

W:www.acclimatise.uk.com

Contents

Acronyms

ABBL	Association of Bankers Bangladesh Limited
ACI	Advanced Chemical Industries
ADB	Asian Development Bank
AF	Adaptation Fund
BB	Bangladesh Bank
BBMOA	Bangladesh Brick Manufacturing Owners' Association
BARC	Bangladesh Agricultural Research Council
BAPA	Bangladesh Agro-Processors Association
BCAS	Bangladesh Centre for Advanced Studies
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BCCRF	Bangladesh Climate Change Resilience Fund
BCCTF	Bangladesh Climate Change Trust Fund
BGEF	Bright Green Energy Foundation
BIDS	Bangladesh Institute of Development Studies
BIFFL	Bangladesh Infrastructure Finance Fund Limited
BMB	Bangladesh Merchant Bankers
BOT	Build-Operate-Transfer
BRAC	Building Resources Across Communities
BRACB	BRAC Bank
BRACU	BRAC University
BRTC	Bureau of Research, Testing and Consultation (BUET)
BSREA	Bangladesh Solar and RE Association
BUET	Bangladesh University of Engineering and Technology
CB	City Bank
CDKN	Climate and Development Knowledge Network
CFF	Climate Fiscal Framework
CCRIP	Coastal Climate Resilient Infrastructure Project
CTEIP	Coastal Towns Environmental Infrastructure Project
CCTF	Climate Change Trust Fund
CIF	Climate Investment Funds
CIP	Country Investment Plan
CPD	Centre for Policy Dialogue
CPEIR	Climate Public Expenditure and Institutional Review
CRSAP	Climate Resilience Strategy and Action Plan
CSOs	Civil Society Organisations
DAE	Direct Access Entities
DANIDA	Danish International Development Agency
DCCI	Dhaka Chamber of Commerce and Industry
DoE	Department of Environment
EB	Eastern Bank
EC3R	BRAC consulting wing

EE	Energy Efficiency
EIDU	Energy Institute of Dhaka University
EPRE	Energy Pack- RE
ERD	Economic Relations Division
ESCO	Energy Service Company
FAO	Food and Agriculture Organization
FBCCI	Federation of Bangladeshi Chamber of Commerce and Industry
FC	Future Carbon
FD	Finance Division
FDI	Foreign Direct Investment
FI	Financial Institution
FIT	Feed-In Tariff
FP	Funding Proposal
GCF	Green Climate Fund
GCPF	Global Climate Partnership Fund
GDC	Green Delta Capital
GDI	Green Delta Insurance
GEF	Global Environment Facility
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoB	Government of Bangladesh
GP	Global Partnership
GDP	Gross Domestic Product
GS	Grameen Shakti
ICCCAD	International Center for Climate Change and Development
ICT	Information and communication technology
IDCOL	Infrastructure Development Company Limited
IDLC	Industrial Development Leasing Company
IE	Implementing Entities
IFC	International Finance Corporation
IKI	German Climate Fund
(I)NDC	(Intended) Nationally Determined Contributions
JICA	Japan International Cooperation Agency
JFPR	Japan Fund for Poverty Reduction
KCCI	Khulna Chambers of Commerce and Industries
LT	Lal Teer
LCDS	Low Carbon Development Strategy
LDCF	Least Developed Countries Fund
LEDS	Low-Emission Development Strategies
LEDS GP	Low-Emission Development Strategies Global Partnership
MBL	Mercantile Bank
MCCI	Metropolitan Chamber of Commerce and Industry
MDB	Multilateral Development Bank

MoA	Ministry of Agriculture
MoEF	Ministry of Environment and Forests
MoF	Ministry of Finance
MoI	Ministry of Industries
MoPEMR	Ministry of Power, Energy and Mineral Resources
MPI	Mobilising Private Investment
MSME	Micro, Small and Medium Enterprise
M&E	Monitoring and evaluation
MT	Megaton
MTBL	Mutual Trust Bank Limited
NACOM	Nature Conservation Management
NDA	National Designated Authority
NAMA	Nationally Appropriate Mitigation Action
NAP	National Adaptation Plan process
NAPA	National Adaptation Programme of Action
NSAPR	National Strategy for Accelerated Poverty Reduction
ODA	Official Development Assistance
PC	Power Cell
PCom	Planning Commission
PD	Power Division
PIL	Pragati Insurance Limited
PPCR	Pilot Program for Climate Resilience
PPP	Public-Private Partnership
PSMP	Power System Master Plan
R&D	Research & Development
RE	Renewable Energy
RREL	Rahimafrooz Renewable Energy Limited
RHD	Road and Highway Department
RTA	Road Transport Authority
RTHD	Road Transport and Highway Division
SCF	Strategic Climate Funds
SDG	Sustainable Development Goals
SL	Solaric
SME	Small and Medium Enterprise
SMEF	Small and Medium Enterprise Foundation
SPCR	Strategic Program for Climate Resilience
SREDA	Sustainable and RE Development Authority
SREP	Scaling Up RE In Low Income Countries Program
SIDS	Small Island Developing States
UIU	United International University
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank

1. Executive summary

In conjunction with the Low-Emission Development Strategies (LEDS) Global Partnership (GP), the Climate and Development Knowledge Network (CDKN) has secured funding from the German Climate Fund (IKI), to deliver the €5 million Mobilising Private Investment (MPI) project. Its objective is to support public actors and the private sector to create favourable conditions for private investment in implementing Nationally Determined Contributions' (NDCs) by de-risking investments and increasing the scale of demand. Through a process of in-depth analysis of barriers to financing, facilitation of dialogue between public and private sector stakeholders, and the sharing of learning and best practice through the wider LEDS GP, the project aims to support the mobilisation of private finance into these sectors. The project will be delivered over a three-year period in seven countries, including Bangladesh.

Informed by desktop research and focussed stakeholder consultation, this report presents the results of a study that aims to inform the scope of the work to be undertaken by the MPI project in Bangladesh. In particular, it aims to identify priority sub-sectors in relation to the Bangladesh's NDC that are the most conducive to private sector investment (i.e. low-hanging fruits) that could be taken forward by the MPI project.

Out of a total of 9 subsectors originating from Bangladesh's NDC (see Annex 1), five sub-sectors are identified with the biggest potential for private sector investment, including improved crop production (agriculture), Energy Efficiency (EE) (industry), Renewable Energy (RE) (power), modal shift (transport); and electric vehicles (transport). For each of these short-listed sub-sectors, a preliminary assessment of the type, scale and key barriers to private sector investment is provided in this report (see Table 1). Further information is provided in Section 5.

Table 1: Summary of the market maturity and key barriers for the five sub-sectors with the biggest potential for private sector investments

Sub-Sector	Investment types	Market maturity (from nascent = * to most significant= ***)	Key barriers
Improved crop production	Weather index-based agriculture insurance	*	• Policy and regulatory constraints • Inadequate infrastructure & data • Lack of internal capacity • High costs • Lack of awareness in the market
	Production, distribution and adoption of high-yielding and climate-resilient seeds	***	• Hampering seed regulation • Lack of low cost finance • Inadequate data • Lack of knowledge and capacity on climate change
EE (industry)	Promoting EE in the cement industry	*	• Lack of awareness ansd capacity in industry • Lack of finance to implement EE measures
	Promoting EE in the textile/garment industry	*	
RE	Biogas	**	• Limited access to low cost finance • Lack of access to land • Uncertainty about grid extension • Low/lack of feed-in tariff (FIT) • Lack of duty/tax waivers • Lack of awareness and capacity
	Biomass (rice husk and sugarcane)	**	
	Hydro	*	
	Solar nano /mini grid and utility-scale	***	
	Wind	*	
Modal shift	Operation of the metro rail stations, including e-ticketing	*	• Lack of reliable GHG data • Lack of awareness/ understanding • Lack of access to low-cost finance • Lack of access to land
Electric vehicle	Electric three wheelers with solar charging facilities in rural and peri-urban areas	*	• Lack of reliable GHG data • Lack of awareness/ understanding • Lack of access to low-cost finance

Out of these short-listed sub-sectors, three are recommended to be taken forward by the MPI project, namely the EE subsector focusing on the cement and garment/textile industries, the RE subsector focusing on biogas, biomass and possibly solar, as well as the electric vehicle subsector. This is informed by the potential for building on previous or ongoing work undertaken by development partners (including timeliness to capitalise on any results or lessons learnt). For each short-listed subsector, our key recommendations are presented in Table 2 below.

Table 2: Key recommendations per subsector

No	Sub-sector: EE (industry)
1	Promote the use of preferential duty waivers of imported capital machineries as well as EE equipment is critical for the update of EE measures, alongside preferential taxation policy for EE ventures such as Energy Service Companies (ESCOs)
2	Support access to low cost finance to cover upfront investment, addressing lack of financial packages by commercial banks tailored to EE projects, and implementing pilot projects for demonstrating the business cases of the uptake of specific EE measures. For instance by submitting a concept under the GCF's Micro, Small and Medium Enterprise (MSME) pilot programme (see Box 1).
3	Develop and roll out an awareness-raising campaign on EE savings/benefits in the cement industry. Training of energy audit consultants will also be required.
4	Develop and roll out an awareness-raising campaign on EE savings/benefits in the textile/garment industries. Training of energy audit consultants will also be required.
	Sub-sector : RE
5	Develop a case study to identify lessons learnt and challenges in developing biogas projects (in particular in the poultry and dairy sectors) with a view to support scaling up and replication in rural areas.
6	Conduct a detailed mapping of the potential for biomass (where and how much).
7	Support access to low cost finance, addressing lack of financial packages by commercial banks tailored to specific RE technologies (focusing on biogas, biomass and solar) and implementing pilot projects for demonstrating the business cases for promoting the uptake of specific RE technologies, for instance by submitting a concept under the GCF's MSME pilot programme (see Box 1).
8	Promote the use of preferential duty waivers of imported capital RE related technologies, alongside preferential taxation policy for RE ventures.
9	Develop/roll out an awareness-raising campaign on RE savings and business cases.
	Sub-sector : Electric vehicle
10	Carry out a market study about the potential for introducing electric three wheelers with solar charging in rural and peri-urban areas.

Box 1. Opportunity for the MPI project to support access to concessional funding under the GCF's Private Sector Facility (PSF)

Bangladesh has not accessed yet the dedicated instrument of the GCF for mobilising private investment- the Private Sector Facility**.** IDCOL has been currently accredited and could submit a concept under its MSME pilot programme, in particular under the RE and EE subsectors (areas of existing work of IDCOL). A second MSME RFP is expected to be presented at the 18th Board meeting (taking place between 30 September and 2nd October 2017), based on the lessons learned from the first round**.**

For each recommendation, further information on key stakeholders to further engage with under the MPI project is provided in Table 3.

Table 3: Summary of stakeholders for further consultation for each recommendation

No.	Maximising synergies by previous/ongoing initiatives	Policy dialogue	Private solutions provider	Co-financier
1	Global Climate Partnership Fund (GCPF)	Sustainable and RE Development Authority (SREDA)		International Finance Corporation (IFC) and BRAC Bank (BRAC-B)
2	GCPF	SREDA		IFC and BRAC-B
3	IFC	SREDA		
4	GCPF and IFC	SREDA		BRAC- B
5		Power division, Ministry of Power, Energy and Mineral Resources (MoPEMR) and SREDA		Infrastructure Development Company Limited (IDCOL), Bangladesh Infrastructure Finance Fund Limited (BIFFL), Bangladesh Bank (BB) and Mutual Trust Bank Limited (MTBL)
6		Power division, MoPEMR and SREDA		IDCOL, BIFFL, BB and MTBL
7	IDCOL, BB and BIFFL	Power division, MoPEMR and SREDA	Rahimafrooz Renewable Energy Limited (RREL), Solaric and Energy Pack- RE	IDCOL, BB and BIFFL
8	IDCOL, BB and BIFFL	Power division, MoPEMR and SREDA	RREL,Solaric and Energy Pack- RE	IDCOL, BB and BIFFL
9	IDCOL, BB and BIFFL	SREDA	RREL, Solaric and Energy Pack- RE	IDCOL, BB and BIFFL
10		Public-Private Partnership (PPP) Authority and Road Transport and Highway Division (RTHD)	RREL	

2. Introduction

In conjunction with the Low-Emission Development Strategies (LEDS) Global Partnership (GP), the Climate and Development Knowledge Network (CDKN) has secured funding from the German Climate Fund (IKI), to deliver the EUR 5 million Mobilising Private Investment (MPI) project. Its objective is to support public actors and the private sector to create favourable conditions for private investment in implementing Nationally Determined Contributions' (NDCs) by de-risking investments and increasing the scale of demand.

The project aims to drive private investment in activities laid out in NDCs by selecting sub-sectors that are most conducive to private sector investment. Through a process of in-depth analysis of barriers to financing, facilitation of dialogue between public and private sector stakeholders, and the sharing of learning and best practice through the wider LEDS GP, the project aims to support the mobilisation of private finance into these sectors. The project will be delivered over a three-year period in seven countries, including Bangladesh.

Acclimatise and Nature Conservation Management (NACOM) have been commissioned to undertake a scoping study for the MPI project in Bangladesh. The main aim of this study is to identify priority sub-sectors in relation to the Bangladesh's NDC that are the most conducive to private sector investment (i.e. low-hanging fruits).

In light of this, the overall objectives of this study are three-fold:

- Identify sub-sectors that are relevant to Bangladesh's NDC to be taken forward by the MPI project, based on a detailed rationale;
- Provide an initial assessment of the private finance landscape, as well as the scale of investment opportunities and the risks and barriers to investment within these sub-sectors. Recommendations for further analysis should also be provided; and,
- Map key actors and types of expertise required by the MPI project under each sub-sector for it to succeed in its expert facilitation and brokering role.

The rest of this report is structured as follows:

- Methodological approach (section 3);
- Context (section 4);
- Preliminary assessment of possible investment areas for the private sector in priority sub-sectors (section 5);
- Recommended capacity and expertise for MPI delivery (section 6);
- References (section 7); and,
- Annexes (section 8).

3. Methodological approach

Figure 1 provides an overview of the methodological approach to identify the most fundable subsectors related to Bangladesh's NDC that could be taken forward by the MPI project.

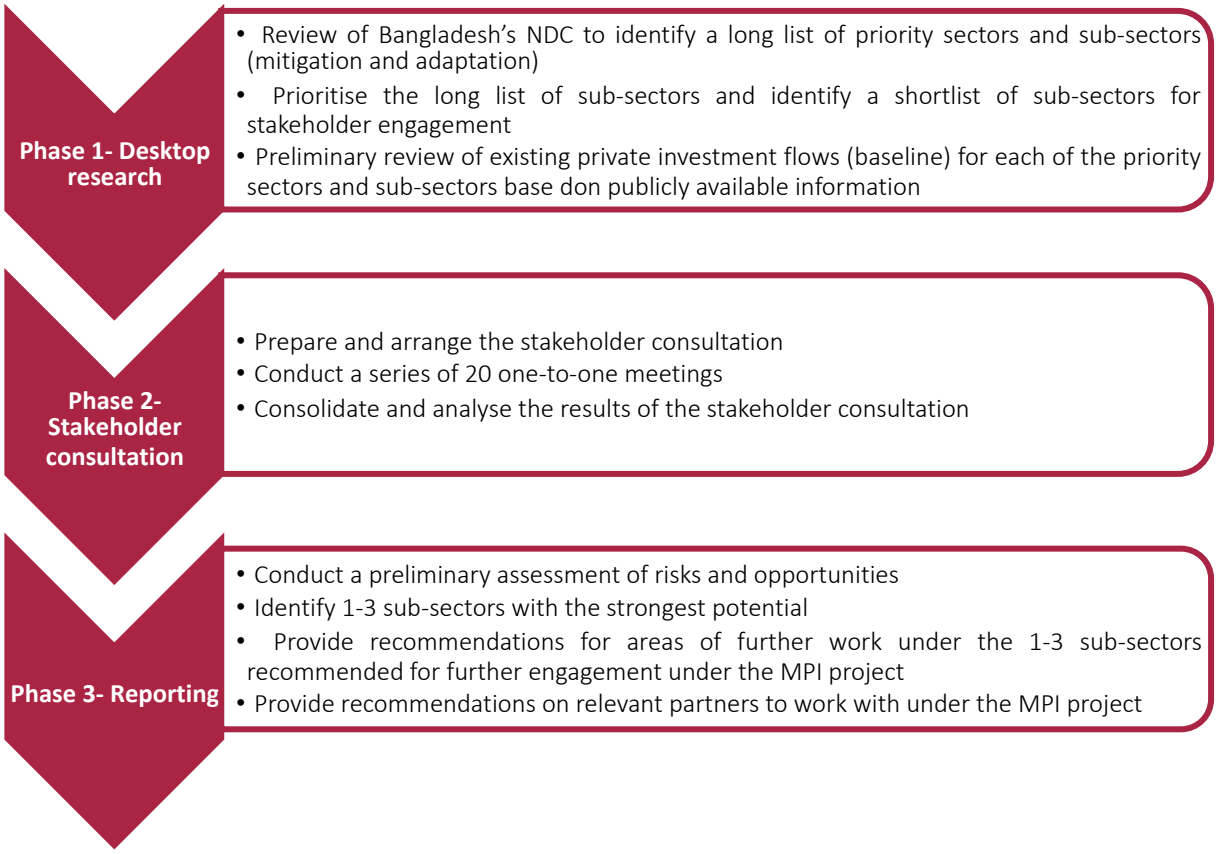


Figure 1: Overview of the methodological approach

Recommendations provided in this report were informed by desktop review of existing information on Bangladesh's climate change policy and finance frameworks, alongside bilateral consultation meetings with 19 stakeholders between 9th and 24thJuly 2017 (see Annex 2).

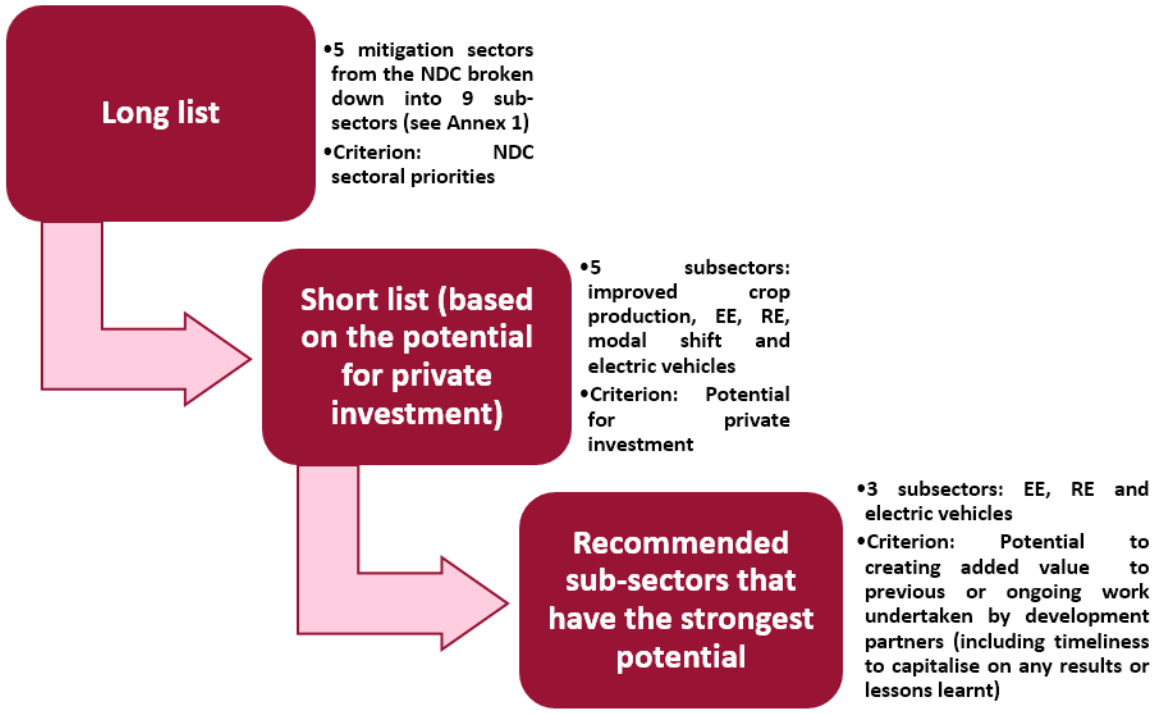


Figure 2: Process of subsectors' selection

The main outcome of this scoping study will be to recommend up to 3 sub-sectors which have the strongest potential, to be taken forward under the MPI project and for which further consultation and analysis will be conducted.

Based on a review of the key objectives and priority areas of the NDC, associated three sectoral action plans and implementation roadmap (see Section 4), a long list of 9 sub-sectors was first identified (see Annex 1).

After preliminary desktop review and consultation between the project team and CDKN, the following five relevant subsectors were selected for the stakeholder consultation phase:

- Improved crop production (agriculture);
- Energy Efficiency (EE) (industry);
- Renewable Energy (RE) (power);
- Modal shift (transport); and,
- Electric vehicles (transport).

The selection of these priority sub-sectors was based on their potential for private sector investment (based on our team's expert knowledge).

As a result of this prioritisation process, it was decided not to take forward under the power sector, the subsectors of conventional energy, EE of power plants and waste to energy, the reforestation and afforestation subsector under forestry. These short-listed subsectors provide a balance between markets that are mature (low-hanging fruits) and less mature with a development potential. Following the stakeholder consultation process and based on a better understanding of the investment potential and barriers for each pre-selected subsectors, we have recommended specific

subsectors to be taken forward by the MPI project. See Table 4 for an overview of the rationale for ruling out these sub-sectors.

Table 4: Overview of the rationale for ruling out the subsectors of conventional energy, efficiency improvement of power plants, reforestation and afforestation under the forestry sector and waste to energy under the power sector prior to the consultations (source: prepared by the authors)

Sub-sectors ruled out	Rationale
Efficiency improvement of power plants (power)	The potential for private sector investment in re-powering old-inefficient steam turbines with combined cycle power plants is limited in largely public-owned power plants. All old power plants are owned by the public sector and the GoB has already undertaken a repowering process that will be completed by 2020.
Conventional energy (power)	The GoB has introduced a stringent policy to accept only Ultra Super Critical technology for coal-fired power plants, while there is limited experience in Bangladesh with the Ultra Super Critical technology. The technology is still under the experimental phase and in many cases not proven yet. In addition, there are sensitivities around the use of coal technology and its health and environmental impacts.
Waste to energy (power)	There have been various initiatives led by NGOs and private investors but they have largely fail to deliver. The main challenge is the lack of availability of waste. The authority for collecting, storing and managing waste, the Municipal Cooperation is not incentivised to provide waste for this use.
Reforestation and afforestation (forestry)	Forest lands and resources are mostly owned by the government in Bangladesh. There are small social forestry1 initiatives by entrepreneurs with support from development partners (eg. Asian Development Bank - ADB) but they are very marginal to date.

Following stakeholder consultation which includes a preliminary assessment of the barriers and opportunities for each of the shortlisted sub-sectors (namely improved crop production, EE in industry, RE, modal shift and electric vehicles), our team identified the sub-sectors to be taken forward by the MPI project. This is informed by the potential for creating added value to previous or ongoing work undertaken by development partners (including timeliness to capitalise on any results or lessons learnt).

[1] The Food and Agriculture Organization (FAO) defines social forestry as 'any situation which intimately involves local people in a forestry activity'.

Table 5: Overview of selected subsectors

Selected subsectors	Investment types	Rationale
Energy efficiency	Promoting EE in the cement and textile/garment industries	There is a high number of initiatives already involving the private sector. There exists a high interest from the private sector in investing in renewable energy solutions, the main barrier being the lack of access to low cost finance.
Renewable energy	Promoting investments in biogas, biomass and solar	There is a high number of initiatives already involving the private sector. There exists a high interest from the private sector in investing in renewable energy solutions, the main barrier being the lack of access to low cost finance. In addition, the 2020 target to increase the share of renewable energy production up to 10% of the total energy mix creates a strong enabling environment.
Electric vehicles	Electric three wheelers with solar charging in rural and peri-urban areas	In Bangladesh, there are about six or seven lacs battery operated three wheelers that are in operation. These vehicles are connected to the national grid. Charging requires approximately six hours. RREL is developing a more efficient system which will allow charging in only one minute from solar power.

Table 6: Rationale for ruling out subsector of improved crop production after consultations with the stakeholders.

Subsector ruled out	Investment types	Rationale
Improved crop production	Production, distribution and adoption of high-yielding and climate-resilient seeds	The seed policy is the main barrier to this investment in Bangladesh as there is no strong enabling environment on the policy side. It takes up to 3 years to develop new varieties of seeds.
	Weather index-based agriculture insurance	The market is nascent in Bangladesh and primarily donor-led. There are various pilot projects supported by the Pilot Program for Climate Resilience (PPCR), IFC and ADB but without preliminary results, so there is no opportunity to capitalise in the short term on existing outcomes.
Modal shift	Operation of the metro rail stations, including e-ticketing	The mega project for Dhaka metro rail is still to be started- MRT Line-6.

Limitations of the study:

These include:

- Size sample and profile of the respondents

The existing sample is particularly biased towards the RE subsector (in particular solar), with nine out of the 19 stakeholders consulted (approximately 50%).

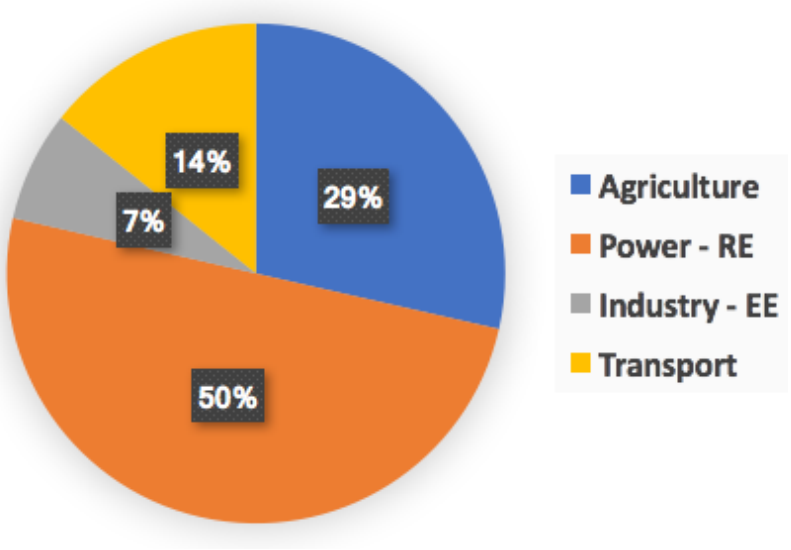


Figure 3: Breakdown of the sample of stakeholders consulted per sector (%) (source: prepared by the authors)

- The structure of the interview guide questions: With respect to interviews with private sector organisations following strictly the interview guide was challenging, as they frame their answers in terms of investment opportunities and barriers, as well as, size and maturity that they think suitable and attractive to them as an individual business, and not the overall market. As such, they are sharing some of the challenges/barriers they are anticipating and experiencing right now.

- Limited availability of interview respondents over a relatively short stakeholder consultation phase: Our team met 19 stakeholders between 9thand 24thJuly 2017. Closely related, some respondents had limited availability.

4. Context

4.1 Bangladesh's NDC

Bangladesh submitted its Intended Nationally Determined Contributions (INDC) to the UNFCCC in September 2015. The (I)NDC[2] describes Bangladesh's plans for tackling greenhouse gas (GHG) emissions and adapting to unavoidable climate change. In the INDC, Bangladesh committed to reduce GHG emissions in the power, industry and transport sectors by 5% below "business-as-usual" GHG emissions by 2030, or by 15% below "business-as-usual" GHG emissions by 2030 if sufficient and appropriate support is received from developed countries.

The (I)NDCs are central to achieving the global temperature rise this century well below 2 degrees Celsius. GoB under the Paris Agreement signed in December 2015. Bangladesh ratified the Paris Agreement on 21 September 2016 and its NDC can now be found on the UNFCCC's interim NDC Registry (UNFCCC, 2016).

The focus under the Paris Agreement now shifts towards implementation. It is important to note that the Paris Agreement states that the "least developed countries *may* prepare and communicate strategies, plans and actions for low greenhouse gas emissions development reflecting their special circumstances" (UNFCCC, 2015). As a progressive member of the UNFCCC, Bangladesh was one of the first countries following the Paris Agreement who prepared a NDC Implementation roadmap and sectoral action plans for the power, industry and transport sectors.

Bangladesh's NDC Implementation Roadmap – describes and guides the overarching NDC implementation process and covers cross-cutting NDC implementation issues, with a view to ensure that NDC implementation is taken forward in a holistic, joined-up and effective manner.

The implementation of Bangladesh's NDC builds on and supports existing actions that the GoB is taking on climate change, as well as on other key non-climate related strategies and plans. Before considering NDC implementation in more depth, it is helpful to first consider how NDC implementation fits with wider government policy. Indeed, it is helpful not to think of NDC implementation as an only climate change-focused and separate process, but instead as a vital component to deliver sustainable and low-carbon growth in Bangladesh and to meet a wider series of objectives and priorities, including energy access, economic growth, productivity, poverty reduction and improved quality of life. In this sense, it is closely linked to the United Nations' Sustainable Development Goals (SDG) agenda (UN, 2015).

In the NDC, it was mentioned that a number of businesses in Bangladesh are already benefiting from new opportunities related to tackling climate change, which include developing new technologies, accessing new markets and taking advantage of cost-saving efficient technologies. The private sector can come forward for new investments and scale up climate-related activities. This is why certain barriers such as lack of information, lack of access to finance and capacity constraints should be addressed.

[2] As countries have ratified the Paris Agreement, INDCs are turning into NDCs, which are binding actions countries will take to address climate change. They will have to be submitted every five years, with a progression beyond the country's previous NDC.

The NDC can be seen as a high-level communication to the international community of Bangladesh's overall approach to climate change action, covering both mitigation and adaptation. The NDC is, in turn, being implemented on the ground industry and transport sectors, through the NDC Implementation Roadmap and its action plans for the power. (Ministry of Environment and Forests, 2017).

Power action plan: The GoB is committed to reducing GHG emissions from the power sector by 5% below the 'business-as-usual' scenario by 2030, or by 18% below 'business-as-usual' scenario by 2030, conditional on support from developed countries. These targets are based on certain assumptions regarding the level of uptake of solar (both at utility- and small –scale); wind; biomass; biogas; repowering of steam turbines and clean coal technologies.

Industry action plan: The NDC anticipated that the industry sector would contribute to GHG emissions reductions of 4% below the "business-as-usual" scenario by 2030, or by 10% below the "business-as-usual" scenario by 2030, conditional on support from international funding sources to implement climate change mitigation measures.

In 2016, the GoB published the National Industrial Policy, which promotes an energy efficient industrial sector. The specific mitigation measures in industry include cogeneration, waste heat recovery mainly from captive generators/boilers, condensate recovery, heat recovery from the cooling system of generator, implementation of energy efficient measures such as leak sealing of steam and air flow systems, efficient chillers, boilers and motors.

The focus of efforts will be on the following sub-sectors:Textile and leather (because it is 24% of GHG emissions from manufacturing sub-sectors);Chemicals (4% of GHG emissions from manufacturing sub-sectors); Brick (55% of GHG emissions from manufacturing sub-sectors);Cement (as a growing sub-sector) and fertilizer; Food, beverages paper and tobacco (3% of GHG emissions from manufacturing sub-sectors and is a growing sub-sector); Ready-made garments; Steel re-rolling mills; Plastics; Leather ; and, Garments – standard EE improvement measures (e.g. boilers, lighting and natural ventilation etc.).

Transport action plan: The GoB is committed to reducing GHG emissions in the transport sector by 9% below the "business-as-usual" scenario by 2030, or 24% below the "business-as-usual" scenario by 2030, conditional on support from developed countries.

The transport sector in Bangladesh will contribute to GHG emissions reductions in a number of ways. These can be grouped according to the 'Avoid-Shift-Improve' framework (GIZ, undated): The GoB expects the transport sector to meet its conditional GHG reduction target (24% below "business-as-usual" emissions in 2030) through a range of additional measures, mostly around "improve measures" that will require further support from developed countries.

For the conditional scenario, the NDC assumes a 15% reduction in fuel consumed by road transport per km travelled. There are a number of measures that could be used to achieve this: Further improvements to vehicle fuel efficiency of key modes, focusing on the road sector, as the biggest contributor to overall transport GHG emissions in Bangladesh; Replacement of old locomotives with new units with lower fuel consumption and GHG emissions; Usage of low sulphur diesel fuel; Better road traffic management ;Segregated slow moving lanes for slow and non-motorised transport; Increased capacity at vehicle registration authority for emissions measurement stations; Reverse logistics, with the potential to reduce the empty running of freight road vehicles by encouraging

freight operators to share information on their vehicle movements, so returning empty-running freight vehicles get utilised to carry freight; Emissions graduated tolls, car scrappage, reduction of road roughness; and Information and communication technology (ICT) support, e.g. real-time information on public transport; and, Euro 4 engine.

Adaptation:

Adaptation policy and implementation in Bangladesh is being driven by the National Adaptation Plan (NAP) process (see next section). However, the NDC Implementation Roadmap and the accompanying NDC Sectoral Action Plans for power, industry and transport, also take adaptation into account by attempting to prioritise measures and actions that will have adaptation co-benefits, as well as by setting out how the three sectors are likely to be impacted by climate change and how they can take actions to address this.

Adaptation is a key priority for Bangladesh and the country has already undertaken initiatives to mainstream adaptation into national development such as in the water, health, forestry, agriculture and more prominently in the infrastructure sectors. Taking climate vulnerabilities into consideration, the GoB has identified adaptation priorities to address the adverse impacts of climate change. See Table 7 below.

Table 7: Adaptation priorities for Bangladesh as stated in the country's INDC (source: MoEF, 2015)

1	Improved Early warning system for tropical cyclone, flood, flash flood and drought
2	Disaster preparedness and construction of flood and cyclone shelters
3	Tropical cyclones and storm surge protection
4	Inland monsoon flood-proofing and protection
5	Climate resilient infrastructure and communication
6	Climate resilient housing
7	Repair and rehabilitate existing infrastructure (including coastal embankments, river embankments and drainage systems, urban drainage systems)
8	Plan, design and construction of urgently needed new infrastructure (various types of shelters, low cost disaster resilient housing, protection schemes, water management structures etc.)
9	Improvement of Urban resilience through improvement of drainage system to address urban flooding
10	River training and dredging (including excavation of water bodies, canals and drains)
11	Stress tolerant (salinity, drought and flood) variety improvement and cultivation (including livestock and fisheries)
12	Research and knowledge management
13	Adaptation on local-level perspectives etc
14	Adaptation to climate change impacts on health
15	Biodiversity and ecosystem conservation
16	Capacity Building at Individual and institutional level to plan and implement adaptation programmes and projects in the country

Investment needs for implementing the NDC

Implementing the NDC will require mobilising considerable resources from international donors and funds. Indeed, the NDC states that the delivery of the more ambitious target to reduce GHG emissions by 15% below business-as-usual emissions in 2030 in the power, transport and industry sectors, is conditional on Bangladesh receiving adequate support from the international community. Support will be needed not just for new technologies and infrastructure, but also for capacity building, further analysis, data collection and policy support. The NDC implementation sectoral action plans (MoEF, 2017) provide information on resourcing needs for specific sectors. Further work needs to be carried out to accurately cost up the priority measures. In some cases, initial assessments have been made. For example, the Bangladesh Road Transport Authority (BRTA) has estimated the cost of GHG emissions measurement and the development of a central repository for data combined would amount to USD 10 million.

In 2010, the World Bank estimated that by 2050, the investment costs linked to tropical cyclones and storm surges alone will reach USD 5.5 billion and the annual recurrent cost will be USD 1.1 billion (World Bank,2010). For inland monsoon flooding, the investment cost will be USD 2.7 billion and the annual recurrent cost will be USD 54 million. The cost of climate-related diseases and conditions, like Diarrhoea, Kalazar, Filariasis, Dengue/Malaria Chikungunya and chronic obstructive pulmonary diseases, would cost around USD 4.01 billion for the 15-year period (2015-2030) which is equivalent to USD 272.1 million per annum.

The GoB has estimated that USD 42 billion (World Bank, 2010) to be required to implement the adaptation measures identified in the NDC. The resource mobilisation framework to finance adaptation priorities will be based on the forthcoming NAP, while taking input from the National Sustainable Development Strategy, the Perspective Plan (Vision 2021), the Seventh Five Year Plan, the National Disaster Management Plan, the Disaster Management Act and the Country Investment Plan (CIP) of Bangladesh on Environment, Forestry and Climate Change.

The CIP's investment pillars are: Sustainable Development and Management of Natural Resources, Environmental Pollution Reduction and Control, Adaptation, Mitigation and Resilience to Climate Change, Environmental Governance, Gender &Human and Institutional Capacity Development. To be in line with the country's NDC, the CIP lists the three following investment areas under its mitigation component: climate smart technologies for industry and power generation, low cost transport and low emission vehicles and low emission from agriculture (Government of Bangladesh, 2016).

4.2. Linkages of the NDC to other climate and private sector development strategies and action plans

There are important linkages to make between the NDC and other policy and planning processes on climate change and private sector engagement. In addition to the adoption of the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008 and its NDC in 2015, Bangladesh has taken further steps on climate change adaptation, by developing a draft roadmap in 2015 to develop its National Adaptation Process (NAP), the document however has not yet been officially adopted by the GoB. A roadmap for developing the NAP process was prepared in 2015, supported

by the Norwegian Government. Institutional arrangements have been set up for the NAP process, through the formulation of an Inter-Ministerial Steering Committee, a Technical Advisory Committee and a core NAP formulation team. The NAP process will continue to be the primary forum for taking forward action on adaptation. The NDC implementation process, via the NDC-NAP Implementation Coordination Committee, liaises regularly with the NAP process to discuss synergies and to ensure a joined-up approach.

The GoB now aims at developing a comprehensive NAP process with the support of the GIZ NAP and NDC Support Programme. A draft study on the linkages between NDC, NAP and the BCCSAP, Sector Action plan and other policies relevant for climate change has been undertaken to this end. In addition, it should be noted that the BCCSAP is currently also being reviewed under the same GIZ NAP and NDC Support Programme.

GIZ is also now supporting the MoEF to carry out countrywide vulnerability assessments, both by district and by hotspot (e.g. specific vulnerable areas). Further work will be carried out to support the NAP process, including an exercise to model future climate scenarios, updates of projections of key parameters (e.g. population, employment growth, economic growth etc.) and comprehensive vulnerability analysis of key sectors. GIZ is also revising and updating the BCCSAP.

Figure 4: Overview of key milestones in national climate change policy in Bangladesh (source: prepared by the authors)

Table 8: Overview of relevant climate strategies and action plans (source: prepared by the authors)

Climate strategies and action plans	Description
Climate Change Strategy and Action Plan (BCCSAP), 2009	Aims to mainstream climate change into country's overall development strategy, including 5-year plans. The action plan is based on six pillars: (1) Food security, social protection and health, (2) Comprehensive disaster management, (3) Infrastructure development, (4) Research and knowledge management, (5) Mitigation and Low carbon development and (6) Capacity building and institutional development. Under the leadership of the Ministry of Environment and Forest, BCCSAP is currently being updated with support from GIZ.
Climate Fiscal Framework (CFF), 2014	Aims to ensure that external and internal finances are used most effectively in addressing climate change. Provides principles and tools for climate fiscal policy-making, helping to identify the demand and supply sides of climate fiscal funds (expenditures vis-à-vis revenue or finance,

	respectively), and to ensure that the climate fiscal policy (CFP) is transparent and sustainable in the longer term. Developed following the recommendations of a Bangladesh Climate Public Expenditure and Institutional Review (CPEIR).
Nationally Appropriate Mitigation Action (NAMA), Innovative Energy Optimisation in the Steel Sector, 2014	Locally produced heat recovery systems will be piloted at two steel factories, which will capture lost heat from steel melting furnaces and reuse the energy to preheat incoming scrap. The optimised production methods will be disseminated through training workshops for the staff involved in the daily production.
NAMA, Inter- Urban Rail Bangladesh, 2016	To reduce significantly inter-urban transport GHG and criteria pollutant emissions in Bangladesh by reverting the trend of a declining mode share of rail in passenger and freight transport. The estimated GHG reduction will be 3.03 $MtCO_{2e}$ by 2018-2030.
NAMA, Urban Passenger Transport, Dhaka, Bangladesh, 2016	To reduce significantly urban passenger transport GHG emissions and to improve sustainable development indicators of Dhaka. Main NAMA mitigation actions are MA1: Upgrading and extension of public transport services including the construction of 7 BRT and MRT lines MA2: Transit Demand Management measures MA3: Hybrid-CNG articulated buses for the Bus Rapid Transit (BRT)system.
NAP, expected in 2018	Currently being developed (due in 2018). Supported by GIZ, a draft NAP roadmap has been developed but it is not endorsed by the Government yet. GIZ conducted in 2016-2017 a Stocktaking for National Adaptation Planning(SNAP). A draft study on the linkages between NDC, NAP and the BCCSAP, Sector Action plan and other policies relevant for climate change have been conducted by a national consultant and will be further reviewed by an international consultant (Acclimatise).
National Adaptation Programme of Action (NAPA), 2005	Developed in the aftermath of COP7 in Marrakech, Morocco,it identifies areas of immediate priority response to the adverse impacts of climate change. It assesses the impacts, vulnerabilities and adaptation measures. Fifteen adaptation strategies are suggested in the NAPA.
Scaling Up RE In Low Income Countries Program (SREP)[3], 2015	Under this USD 839 million funding window of the Climate Investment Funds (CIF), channelled through five multilateral development banks (MDBs), three projects in Bangladesh are co-financed in Bangladesh: • Grid connected RE • Off-grid solar PV • Waste to energy advisory support

[3] SPREP aims to support scaled-up deployment of RE solutions to increase energy access and economic opportunities.

Strategic Program for Climate Resilience (SPCR), 2013	The Pilot Program for Climate Resilience (PPCR) of the Strategic Climate Funds (SCF) established under the Multi-donor Climate Investment Fund (CIF) aims to help countries transform to a climate resilient development path, consistent with poverty reduction and sustainable development goals. During the first phase of SPCR, outline of an underlying investment programme was developed. The second phase focuses on implementing the SPCR through actions such as support to policy reform, institutional capacity building, and scaling-up other investments in key sectors. Includes three projects (Government of the People's Republic of Bangladesh, 2012): • Promoting climate-resilient agriculture and food security • Coastal embankments improvement and afforestation • Climate-resilient infrastructure improvement in coastal zone
UNDP country work programme for the GCF, 2016	Identifies short, medium and long-term priorities for project proposals and concept notes in consultation with key stakeholders to be submitted to the GCF. The NDA and appointed consultants are in the process of finalising the document and expecting that it will be available by the end of 2017. ERD- GCF's NDA - held with UNDP an inception workshop on 1 June 2017 which gathered 11 potential DAEs, representatives of 15 international access entities active in the country, 14 ministries and governmental agencies related to core climate change activities along with a further 32 representatives of other ministries and government agencies, 8 civil society representatives and 15 development partners.

Attracting private finance for investment to support the implementation of national climate change priorities should be considered within the wider national and sectoral policies and strategies**.** Table 9 below provides an overview of the priorities of the GoB for each of the pre-seclected sectors and subsectors: Agriculture, industry, power and transport.

Table 9: Overview of relevant sectoral relevant policies and strategies (source: prepared by the authors)

Other relevant strategies and action plans	Description
Master Plan for Agricultural Development in the Southern Region of Bangladesh, 2013	The plan provides a road map for an integrated agricultural development in the coastal districts of Bangladesh, aiming at sustainable food security, poverty reduction and livelihood development for the poor. Its main areas of focus are: • Increasing agricultural productivity • Improving water management and rejuvenating productivity of degraded lands • Developing climate resilient infrastructure and improving surface water irrigation system • Improving productivity of brackish water shrimp and capture fisheries • Promoting small-holder poultry and dairy development
Medium Term Strategy and Business Plan (MTSBP), 2012-2016	A comprehensive plan for the MoA and all Agencies and Departments. It sets out the ministry's vision, mission, strategic goals, policies, programmes/projects/activities for a five-year period.
National Agricultural Extension Policy (NAEP), 2012	Sets extension policy directions for transferring technologies to crop, fisheries and livestock sector development.
National Seed Policy, 1993	Aims to make the best quality seeds of improved varieties of crops conveniently and efficiently available to farmers with a view to increasing crop production, farmer's productivity, per capita farm income and export earnings.
Crop Variety and Technology Development Policy, 2010	Sets directions for the development of crop variety and technology.
EE and Conservation Master Plan up to 2030	Bangladesh intended to improve energy intensity in 2030 by 20% compared to the 2013 level: A total of 95 million toe (113 billion m3 of gas equivalent) is expected to be saved in the mentioned period. It is estimated that energy savings will be BDT 51 billion per year at the current weighted average natural gas price. Under this Master Plan, three programmes will be promoted, namely, Energy Management Program, EE Labeling Program and EE Buildings Program, which will be targeted at large energy consuming entities and equipment in the industrial, residential and commercial sectors.
EE and Conservation Promotion Loan Programme	Promotes the adoption of the energy management programme described above as well as helps to create new markets in industrial energy efficiency.
National Industrial Policy, 2010	Presents governmental strategies and incentives to spur industrial investment in the country. It sets sectoral strategies and objectives, while establishing a list of 32 "thrust sectors" ranging from Agro-based activities; Production and Marketing of poultry and dairy products (can go

	under first sector); Transport and communication; and, Production, supply and distribution of power in the private sector.
RE Policy of Bangladesh, 2002	In Bangladesh efficient utilisation of RE resources is yet to assume commercial dimensions and hence rational policy dissemination on RE usage is essential. The RE includes solar, wind, biomass, hydro, geo-thermal, tidal wave etc. Goal of RE constituting 5% of total generation by 2015 and 10% by 2020. The GoB committed to facilitating public and private sector RE investments and scale up RE contributions to electricity and heat energy, and substitute RE for indigenous non- RE supplies, Government will facilitate RE use at every level of energy usage and develop legal environment that promotes RE use, government also encourage efficient and environmentally friendly use of RE, and promote clean energy
National Integrated Multimodal Transport Policy, 2013	Aims to build a multimodal transport system that is cost-effective, safe, and environment-friendly and efficient, hence reducing dependence on road transport and reducing transport cost and accidents, enhancing competitive edge and developing prioritising rail, domestic river transport and sea ports. In line with the second National Strategy for Accelerated Poverty Reduction (NSAPR II), covering the period from FY09-11, the GoB is committed to developing "an efficient transportation network with adequate coverage synchronized with sustained service delivery is an essential input for development of the economy".

4.3 Review of the country conditions with respect to private sector engagement in climate finance

4.3.1. Existing contribution of the private sector to Bangladesh's economy

According to the 2014 Economic Review, the private sector's contribution to the economy is substantial. For the fiscal year 2013-2014, it accounted for 74.55% of the total national investment (Ministry of Finance, 2014). Overall, the GoB is promoting a stronger private sector involvement in the economy in order to meet development and growth objectives, notably via the Public-Private Partnership (PPP) policy to implement infrastructure projects. It targets sectors that are seen as playing a vital role for the economic growth of Bangladesh through a direct contribution in consumption, investment and net export income, in turn contributing to achieve Bangladesh long-term sustainable development goals. Targeted sectors include the industrial and productive sectors and more particularly power and information and communication technologies. In the services sector, targeted sectors include air, inland and water transport, tourism, education, health and insurance. A particular emphasis is put on Small and Medium Enterprises (SMEs) given the employment opportunities they provide. The GoB aims to promote job creation via industrialisation (incl. manufacturing, construction, mining and quarrying and electricity, gas and water supply), a sector that accounted for 31.54% of the GDP in 2015-2016, ahead of agriculture (15.35%) and before services (53.12%) (Ministry of Finance, 2016). To achieve this goal, the GoB specifically targets the power sector through infrastructure development, the Information and Communication Technology (ICT) sector, telecommunications and transport (Ministry of Finance, 2014). In the services sector,

the GoB encourages private sector involvement in the tourism, education, health and insurance sectors (Ibid).

In addition, it should be noted that Foreign Direct Investment (FDI) represents USD 1,599.2 million in 2013 and was led by reinvestment, followed by equity and intra-company borrowing (Ministry of Finance, 2014). In terms of local investment, private sector investment grew steadily USD 14.9 billion in 2005-2006 to USD 35.6 billion in 2013-2014[4](Ibid). Over this period, about a third of local investment projects were service-based (31.53%) (Ibid).

[4] Converted from Tk.993 billion and Tk.2,889 billion with respective currency rates of 1 January 2006 and 1 January 2013.

4.3.2. Conditions for private sector investment

Attracting private finance for investment to support the implementation of national climate change priorities should be considered within the wider investment challenges Bangladesh faces in securing finance for development projects**.** Countries seen as high-risk on a global comparison, and rated as such by the credit rating agencies, will continue to experience difficulties in attracting private sector investment and securing competitive debt finance.

According to the 2017 report comparing business regulation for domestic firms in 190, Bangladesh is ranked 176th in ease of doing business economies published by the World Bank and IFC (World Bank, 2017)[5].Notably, the country is ranked 185th in terms of registering property, 187th in terms of getting electricity, 189th for enforcing contracts (World Bank, 2017).

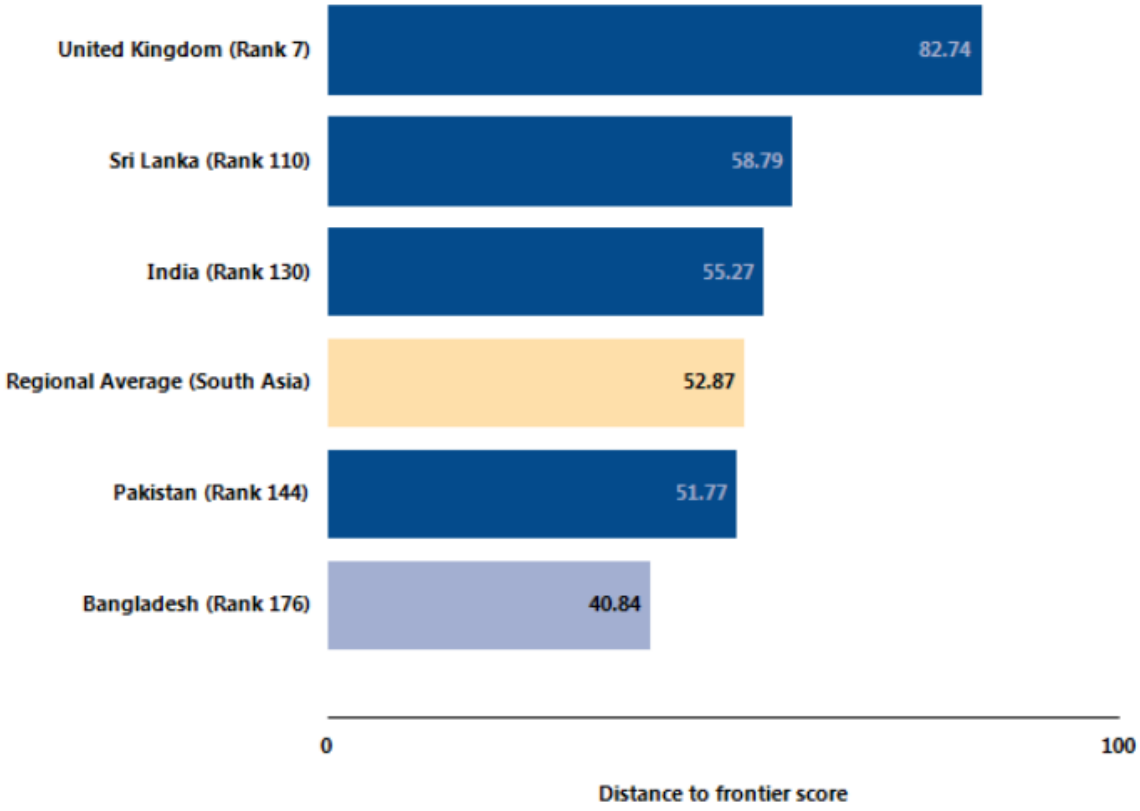


Figure 5: How Bangladesh ranks relative to comparative economies and relative to the regional average[6]

[5] The World Bank's Doing Business 2017 measures and tracks changes in regulations affecting 11 areas in the life cycle of a business while also comparing these to other economies'.

[6]"The distance to frontier score captures the gap between an economy's performance and a measure of best practice across the entire sample of 36 indicators for 10 Doing Business topics (the labor market regulation indicators are excluded)." The United Kingdom is used as a comparator economy (World Bank. 2017)

To finance and implement large-scale infrastructure projects, Public-Private Partnerships (PPPs) are an increasingly popular tool for procuring or managing public infrastructure projects (Ministry of Finance, 2010). Adopted in August 2010, GoB's PPP[7] policy recognises PPPs as an important instrument in achieving the country's key economic policy objectives: boosting growth and job creation, while improving fiscal and debt sustainability including by achieving greater efficiency in the public sector.

Box 2: Eligible activities for PPP in Bangladesh (source: Ministry of Finance, 2010) :

- Exploration, production, transmission, and distribution of oil, gas, coal and other mineral resources
- Oil refinery, and production of LPG
- Production of fertilizer
- Power generation, transmission, distribution and services
- Airports, terminals and related aviation facilities
- Water supply and distribution, sewerage and drainage, effluent treatment plans
- Land reclamation, dredging of rivers, canals, wetlands, lakes and other related facilities
- Highways and expressways including mass-transit, bridges, tunnels, flyovers, interchanges, city roads, bus terminals, commercial car parking etc
- Port development (sea, river and land) including inland container terminals, inland container depot and other services
- Deep sea port development
- Telecommunication systems, networks and services including information and communication technology (ICT)
- Environmental, industrial and solid waste management projects;
- Railway systems, rolling stock, equipment and facilities
- Tourism industry
- Economic zone, industrial estates and parks, city and property development, including services to support commercial and non-commercial activities
- Social infrastructure e.g. health, education, human resource development, research and development, and cultural facilities; E-service delivery to citizens
- Poverty alleviation projects
- Pourashava (municipality) and village water supply
- Remote area power supply systems
- Rural gas supply
- Rural Internet projects
- River passenger terminals /landing stations
- Rural health services and hospital
- Irrigation and other agricultural services
- Other urban, municipal and rural projects that the Government views as priority areas for development so as to support economic development activities.

[7] PPP is as a legally binding contract between a public sector entity and a private company—typically referred to as a concessionaire — where the partners agree to share some portion of the risks and rewards inherent in an infrastructure project.

4.3.3. Mapping of the sources of private climate finance in-country

It should be recognised that obtaining consistent and comparable data on climate-related investment is challenging, because entities that report such data use different definitions of climate change and report on different aspects of it. There is no standard definition of climate change that is universally used. While there is one statistical system in place that tracks international public climate finance in the form of Official Development Assistance(ODA)[8],it only covers bilateral donors. Limited data exists to track private climate finance. Most data sources that track investment do so for RE and EE, and some include low-carbon transport. For instance, the Climate Finance Landscape assessment only provides data for private finance in RE.[9] Furthermore, investments are not tracked consistently and separately for public and private sectors or for emerging or developed markets. In addition, private climate finance data, limited as it is, tends to be commercial and available only upon subscription[10].

Nevertheless, it is useful to understand the existing climate finance landscape in Bangladesh. Most climate finance in Bangladesh to date has been targeted at adaptation and climate resilience, which has been to date mostly public-funded, while there is no information available on private climate finance. Figure 6 below provides an overview of climate finance flows in Bangladesh based on the Climate Public Expenditure and Institutional Review (CPEIR) conducted in 2012. Based on the recommendation provided by the CPEIR, a Climate Fiscal Framework (CFF) was developed in 2014 to help ensure that external and internal finances are used most effectively in addressing climate change. It provides principles and tools for climate fiscal policy-making, helping to identify the demand and supply sides of climate fiscal funds (expenditures vis-à-vis revenue or finance, respectively), and to ensure that the CFF is transparent and sustainable in the longer term.

[8] The so-called Rio Markers are policy markers that are used to monitor climate change specific aid. See OECD Development Assistance Committee—Creditor Reporting Service (DAC-CRS).
[9] See http://www.climatefinancelandscape.org/
[10] See also Buchner, Barbara, Jessica Brown and Jan Corfee- Morlot. (2011). Monitoring and Tracking Long-term Finance to Support Climate Action. May 2011. OECD/IEA Project for the Climate Change Expert Group on the UNFCCC.

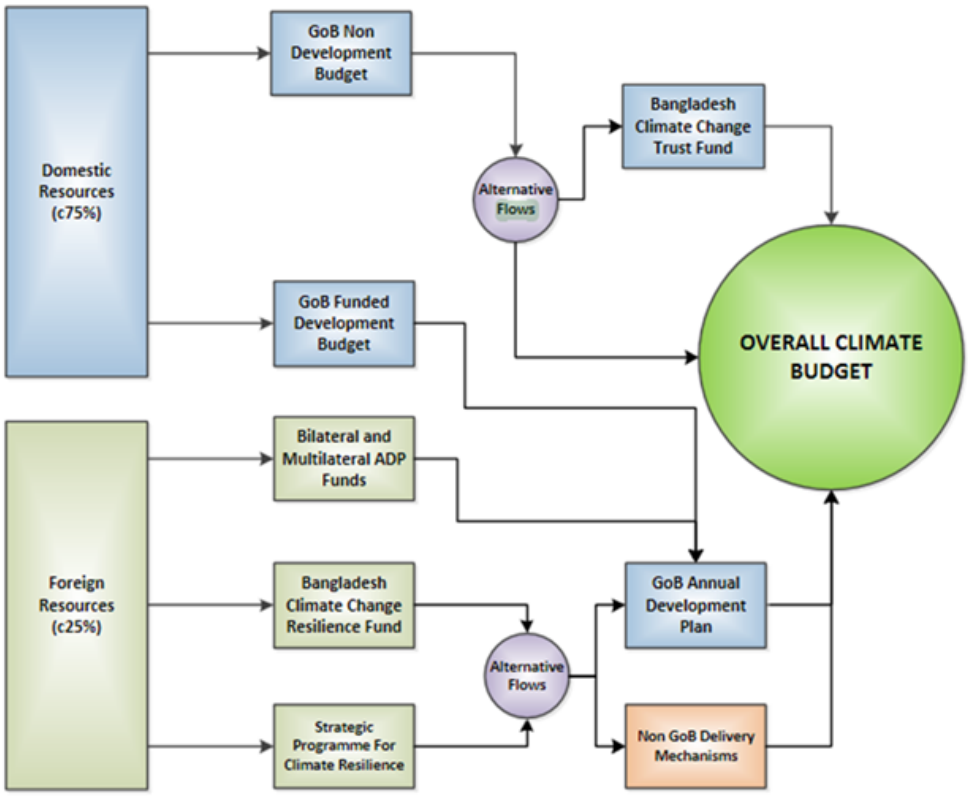


Figure 6: Overview of climate finance flows in Bangladesh (source: CPEIR, 2012)

Domestic public flows for climate-related activities are channelled and accessed through the **Bangladesh Climate Change Trust Fund (BCCTF**) to implement the BCCSAP, allocated a total of USD 340 million from the national budget. 66% of the BCCTF's projects are aimed at enhancing Bangladesh's adaptation capacity, comprising a large number of small-scale projects (under USD 2.5 million) across the country. Projects are implemented by government bodies as well as non-governmental and civil society organisations, research institutions and the private sector. The remaining 34% is kept as a fixed deposit, earning interest for emergency projects and programmes. So far 139 government projects and 63 non-government projects have been approved, to a total of USD 190.78 million (Transparency International Bangladesh. 2013).

International public flows: The **Bangladesh Climate Change Resilience Fund (BCCRF),** a trust fund managed by World Bank and sponsored by development partners was established in 2010 to address the negative impacts of climate change. It was designed such that all investment projects are executed by the GoB and its designated agencies or other eligible institutions. As of September 2013, donor agencies contributed USD 188.2 million to the BCCRF and 81% of this was already disbursed to 13 projects, including the NGO window. Apart from this NGO window, six analytical studies are funded under the thematic area of research and knowledge management, and there are an additional five investment projects. Of the five investment projects, three are stand-alone projects and the rest are co-financed with other ongoing World Bank projects. The BCCRF currently

faces difficulties regarding its resources and is almost non-existent (Bangladesh Climate Change Resilience Fund, 2012).

The Pilot Program for Climate Resilience (PPCR) established under the mulit-donor Climate Investment Funds (CIFs) aims to help developing countries transform to a climate resilient development path, consistent with poverty reduction and sustainable development goals. In Bangladesh, the PPCR is implemented mainly through IFC, ADB, KFW and IMF. PPCR aims to help foster private sector development and leverage additional private investment for adaptation. National governments have proposed specific climate resilient actions that they anticipate to deliver by engaging the private sector, for example – in Bangladesh, the IFC is working with private stakeholders to promote climate resilient agriculture and food security (e.g. through improved practises and distribution chains) using USD 13 million from the PPCR grant and concessional financing. IFC is also exploring ways to engage the private sector in providing low-cost housing for coastal populations. There is also an important focus on engaging with the private sector including local financial intermediaries (insurance companies and commercial banks).

During the first phase of the PPCR, a Strategic Program for Climate Resilience (SPCR) was developed for Bangladesh in 2010, outlining an underlying investment programme. The second phase focuses on implementing the SPCR through actions such as support to policy reform, institutional capacity building, and scaling-up other investments in key sectors. Investments in Bangladesh total USD 109.4 million, with USD 572 million leveraged in co-financing, for a total portfolio of USD 681.4 million. The project includes:

- Climate Resilient Agriculture and Food Security ;
- Feasibility Study on Climate Resilient Housing(technical assistance) ;
- Coastal Embankment Improvement Project (Phase -1) ;
- Coastal Climate Resilient Infrastructure Project (CCRIP) ;
- Coastal Towns Environmental Infrastructure Project (CTEIP) ; and,
- Climate Change Capacity Building and Knowledge Management (technical assistance).

Other emerging international (multilateral and bilateral) flows for climate activities include:

Green Climate Fund (GCF): Bangladesh is targeting the GCF for support for mitigation and adaptation actions. The Economic Relations Division in the Ministry of Finance has been designated as the National Designated Authority (the national focal point for the GCF in Bangladesh) and they have submitted a proposal to the GCF for building GCF readiness, for example by strengthening the country's coordination mechanism for GCF-related activities and identifying transformational investment opportunities in accordance with GCF's Investment Framework and Result Management Framework (GCF, 2015). Thus far, Bangladesh has received USD 40 million from the GCF for climate resilient infrastructure mainstreaming in Bangladesh, with a further USD 40 million of co-funding from the German Ministry for Economic Cooperation and the Bangladeshi Ministry of Local Government (GCF, 2015).It should also be noted that Bangladesh has not accessed yet the dedicated instrument of the GCF for mobilising private investment- the Private Sector Facility (PSF). See box below.

The Global Environment Facility's Least Developed Countries Fund (LDCF): This fund was established to address the special needs of the 51 Least Developed Countries (LDCs) that are especially vulnerable to the adverse impacts of climate change. The LDCF reduces the vulnerability of sectors and resources that are central to development and livelihoods, such as water, agriculture and food security, health, disaster risk management and prevention, infrastructure, and fragile ecosystems. Bangladesh has received allocated 34.4 million for 7 projects.

The Global Environment Facility's Trust Fund: The Fund supports the implementation of multilateral environmental agreements, and serves as a financial mechanism of the UN Framework Convention on Climate Change, UN Conservation of Biodiversity and UN Convention of Combating Desertification. Bangladesh received grant USD 9.2 million for Improvements of Kiln Efficiency in the Brick Making Industries in Bangladesh.

The GEF: The GEF together with the UNDP and the GoB also support the "National Capacity development for implementing Rio Conventions through environmental governance" project. The goal is to strengthen Bangladesh's capacities to implement and manage Rio Convention obligations. The project's strategy emphasises a long-term approach to institutionalise capacities to meet the Rio Conventions' obligations through a set of learn-by-doing activities to integrate Rio Conventions and other key related MEA obligations into the country's national development framework. The total budget of the project is US $ 1320,000. GEF contribution amounts to USD 660,000, UNDP contributes another USD 200,000 and the GoB with USD 460,000.

The UN REDD+ Programme: This is a national programme that aims to reduce emissions from deforestation and forest degradation. The GoB has taken the initial steps to prepare for the implementation of REDD+ activities and approved the UN-REDD National Programme on 19 June 2016. The objective of the programme is to initiate the implementation of its REDD+ Readiness Roadmap by establishing the necessary REDD+ management processes, identifying strategic readiness options for completing its National REDD+ strategy, and developing the capacities required to begin the implementation of REDD+. Total budget for this initiative is about USD2.3 million (UN REDD Programme, 2015).

The NAMA Facility, set up by the UK and German Governments and now also supported by the Danish Government and the European Commission, could be a source of funding for mitigation action.

Japanese bilateral funds are routed directly to government agencies via the coordination of ERD. They are: the Japan International Cooperation Agency (JICA), Japan Bank for International Cooperation (JBIC), Japan International Cooperation Center (JICE), Japanese Grant Aid for Human Resource Development Scholarship (JDS). JICA has disbursed the following amounts in ODA (ODA loan (2011-2015): USD 4,337,990,000), grant ((up to 2014): USD 1,136,720,000) and technical assistance (Assistance (2010-2014): USD 146,289,000)[11]. JICA focuses on the following sectors: power, transportation, urban development, private sector, education, health, governance, rural development & agriculture and disaster management. JICA runs a "Private Sector Development

[11] Using exchange rate of JPY 1 = USD 0.00903, 6 August 2017 on http://www.xe.com.

Programme" that focuses on SMEs and PPPs' development. JICA also undertakes an Energy Efficiency and Conservation Promotion Financing project which aims to promote efficient use of energy in Bangladesh by introducing and disseminating energy efficient equipment through concessional loan, technical support, incorporating latest technical trends of Energy Efficiency, creating awareness thereby contributing to balance energy demand-supply and mitigate climate change. It provides financing to financial intermediaries. (JICA, 2010) Eventually, the Japanese Government is also present in Bangladesh through the Joint Crediting Mechanism (JCM)/Bilateral Offset Credit Mechanism (BOCM) which promotes climate change mitigation actions through bilateral agreements mainly between developing and developed countries (Global CCS Institute, 2013). There currently are six JCM model projects in Bangladesh (Ministry of Environment And Forests Bangladesh, 2017):

- Energy Saving for Air Conditioning & Facility Cooling by High Efficiency Centrifugal Chiller in Sugar Mill
- Installation of High Efficiency Loom at Weaving Factory
- Introduction of PV-diesel Hybrid System at Fastening Manufacturing Plant
- 50MW Solar PV Power Plant Project
- Installation of High Efficiency Centrifugal Chiller for Air Conditioning System in Clothing Tag Factory
- Energy Saving of Air-Conditioning System by Recovering Waste Heat from Engine in Textile Factory

Private finance :While no data exist on international private finance flows, domestic private finance is mainly provided through the local commercial banks and other financial institutions who offer concessional loans and refinancing, following the adoption of the Bangladesh Bank policy guidelines for Green Banking in 2011. In the 2014 Climate Fiscal Framework, green banking is a method of finance designed to encourage environmentally responsible investments, extending priority to enterprises and industries that are trying to "grow green".

According to the Bangladesh Bank (BB) guidelines (GBCSRD Circular No 4) on August 11, 2013 all operating banks and financial institutions need to take effective measures to conduct environment-friendly banking activities in the country. BB has also issued a common reporting format to all the commercial banks to report green banking activities. Commercial banks and financial institutions now regularly submit a quarterly report to the Bangladesh Bank on their performance of green banking activities.

BB has also enhanced the product line under its green banking scheme from 6 to 47 and segregated these products into 10 categories which are: RE, EE, solid waste management, liquid waste management, alternative energy, fire burnt brick, non-fire block brick, recycling & recyclable product, green Industry and miscellaneous. This includes various types of solar power plant (SHS, solar mini grid, solar irrigation pumping system, solar PV assembly plant), bio-gas plant, effluent treatment plant, substitution of energy-efficient kilns for conventional lime kilns, vermi-compost, hydropower (pico, micro, and mini), PET bottle recycling plant, solar battery recycling plant, LED bulb

manufacturing plant, and Hybrid Hoffman Kiln (HHK)/tunnel kiln/equivalent technology in the brick manufacturing industry. More than 3.1 million improved cook stoves and nearly 4.5 million SHS have already been distributed across the country and under the solar roof-top program around 14 MW of solar has been installed on the vacant roof-tops of government and private buildings. Nearly 300 solar irrigation systems are being installed in different parts of the country. In response to the BB "Policy Guidelines for Green Banking" issued by the BB, IDLC has also adopted its own green banking policy in 2013 which aims to institutionalise green banking across the organisation by focusing on the following major aspects:

- Governance ;
- Environmental and social risks in credit risk management ;
- In-house environment management ;
- Green finance, products and marketing ;
- Climate risk fund ;
- Training, awareness and green events; and,
- Disclosure and reporting.

The table below summarises the major green banking activities undertaken by banks and financial institutions (FIs) in Bangladesh:

Table 10: Major Green Banking Activities at a Glance in January-March, 2017 (source: Bangladesh Bank, 2017)

Issue	Bank	FI
Number of banks/FIs having Sustainable Finance unit	55	30
Number of banks/FIs having Green banking policy	56	32
Number of banks/FIs having Green office guide	56	32
Number of environmental risk rated projects	17,442	734
Number of environmental risk rated projects and financed	14,870	811
Amount disbursed against rated projects (in million Taka)	668,190	32,833
Number of solar powered branches	493	3
Number of solar powered ATM/SME units	249	0
Online branches (as % of total branches)	74.87%	N/A
Amount disbursed as green finance (in million Taka)	132,385.92	3,232.36
Direct green finance as % of total funded loan disbursement	0.56%	2.02%
Amount utilized for climate risk fund (in million Taka)	147.78	1.00
Amount utilized for green marketing, training and development (in million Taka)	15.64	0.75

The GoB has also extended a re-financing scheme through the state-owned intermediary Infrastructure Development Company Limited (IDCOL), to finance alternative energy generation

projects such as small scale solar and micro grids, to improve energy access for those living in off-grid areas (Ministry of Power, Energy and Mineral Resources, 2016). As of now, 450 MW renewables are being implemented having a share of 2.97% in the overall energy generation mix[12].

4.4 Institutional landscape

This section presents an overview of the key actors relevant for mobilising private sector investment for climate change, followed by a summary of past or ongoing initiative from other development partners to address barriers to private sector investment.

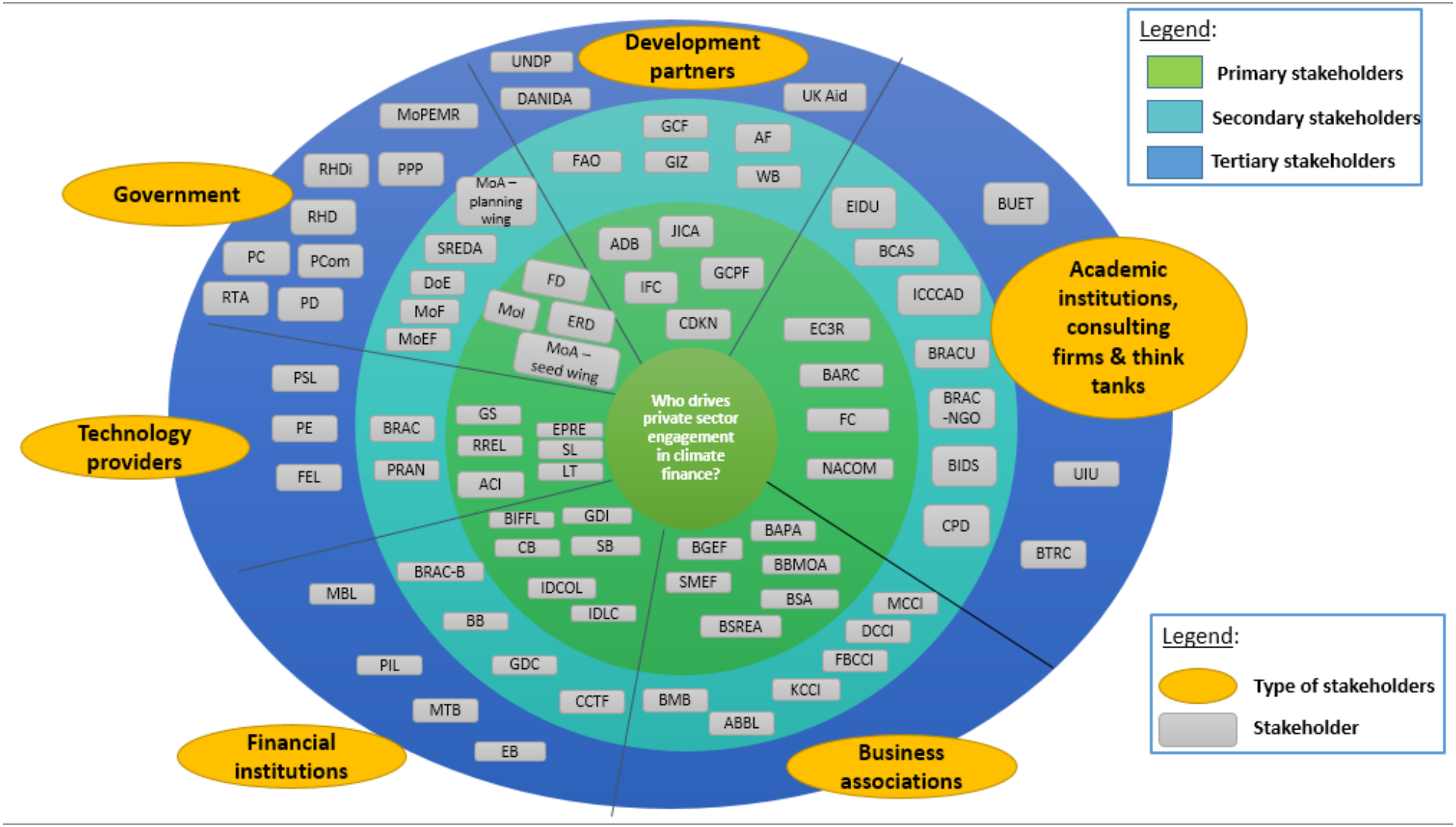
4.4.1 Review of key actors relevant with respect to private sector engagement in climate finance

This section provides an overview of Bangladeshi actors who play a role in engaging the private sector in financing climate-related projects.

- **Government institutions and regulatory agencies:** Ministries and agencies with a mandate on private sector engagement and development, PPP, resource/finance mobilisation and climate policy;
- **Solutions and technology providers/manufacturers:** Industrial companies and manufacturers developing low-carbon and climate resilient goods and services in the four sub-sectors: improved crop production, EE in main industries, RE and transport;
- **Commercial banks and other financial institutions:** Commercial banks, insurance and other financial institutions can provide access to funding to solutions and technology providers in the four sub-sectors;
- **Academic and research institutions, consulting firms and think tanks:** These organisations are relevant since they have a specialised and in-depth knowledge of specific sectors that can be leveraged to support investment decisions and provide general guidance.
- **Business and industry associations:** These associations bring different business categories together and are key in raising awareness and providing capacity building to solutions and technology providers in the four sub-sectors;
- **Development partners and international finance institutions:** These are international and regional development organisations who are engaged in Bangladesh and can support private sector-investments through technical assistance programmes and low-cost concessional funding.

Figure 7 provides an overview of the key actors in each of the above categories in the context of selected sub-sectors for Bangladesh

[12] Please see http://www.sreda.gov.bd/ for more information.


Development partners
UNDP
DANIDA
UK Aid
GCF
AF
FAO
GIZ
WB
Government
MoPEMR
RHDi
PPP
RHD
PC
PCom
RTA
PD
MoA – planning wing
SREDA
DoE
MoF
MoEF
ADB
JICA
FD
IFC
GCPF
MoI
ERD
CDKN
MoA – seed wing
Who drives private sector engagement in climate finance?
EIDU
BUET
BCAS
ICCCAD
Academic institutions, consulting firms & think tanks
EC3R
BRACU
BARC
BRAC -NGO
FC
NACOM
BIDS
UIU
CPD
BTRC
PSL
PE
FEL
Technology providers
BRAC
PRAN
GS
RREL
ACI
EPRE
SL
LT
BIFFL
GDI
CB
SB
BRAC-B
IDCOL
IDLC
MBL
BB
PIL
GDC
MTB
CCTF
EB
Financial institutions
BGEF
BAPA
BBMOA
SMEF
BSA
BSREA
BMB
ABBL
MCCI
DCCI
FBCCI
KCCI
Business associations
Legend:
Primary stakeholders
Secondary stakeholders
Tertiary stakeholders
Legend:
Type of stakeholders
Stakeholder

Government institutions and regulatory agencies	Solutions and technology providers/manufacturers	Commercial banks and other financial institutions	Academic institutions, consulting firms and think tanks	Business and industry associations	Development partners and international finance institutions
1. Ministry of the Environment and Forests (MoEF) 2. Department of the Environment (DoE) 3. Ministry of Industries (MoI) 4. Ministry of Finance (MoF) 5. Economic Relations Division (ERD) 6. Finance Division (FD) 7. Power Division (PD) 8. Power Cell (PC) 9. Planning Commission (Pcom) 10. Road and Highway Department (RHD) 11. Road and Highway Division (RHDi) 12. Road Transport Authority (RTA) 13. Sustainable & Renewable Energy Development Authority (SREDA)	1. Advanced Chemical Industries (ACI) 2. Lal Teer (LT) 3. PRAN 4. Rahimafrooz (RHF) 5. Grameen Shakti (GS) 6. Solaric (SL) 7. Energy Pack-Renewable Energy (EPRE)	1. Bangladesh Infrastructure Finance Fund Limited (BIFL) 2. Green Delta Insurance (GDI) 3. Pragati Insurance Limited (PIL) 4. Bangladesh Bank(BB) 5. BRAC Bank 6. City Bank (CB) 7. Eastern Bank (EB) 8. Green Delta Capital (GDC) 9. Industrial Development Leasing Company (IDLC) Finance Limited 10. Infrastructure Development Company Limited (IDCOL) 11. Mercantile Bank (MBL) 12. Mutual Trust Bank (MTB)	1. Bangladesh Agricultural Research Council (BARC) 2. Bangladesh University of Engineering and Technology (BUET) 3. Bangladesh Institute of Development Studies (BIDS) 4. BRAC NGO/University 5. ICCAD 6. Centre for Policy Dialogue (CPD) 7. Future Carbon (FC)	1. Association of Bankers, Bangladesh Limited (ABBL) 2. Bangladesh Merchant Bankers(BMB) Association 3. Bangladesh Agro-Processors Association (BAPA) 4. Bangladesh Brick Manufacturing Owners' Association(BBMOA) 5. Bright Green Energy Foundation and Bangladesh Solar and Renewable Energy Association (BGEF) 6. Dhaka Chamber of Commerce and Industry (DCCI) 7. Federation of Bangladeshi Chamber of Commerce and Industry (FBCCI) 8. Metropolitan Chamber of Commerce and Industry (MCCI) 9. SME Foundation (SMEF)	1. Asian Development Bank (ADB) 2. Climate Knowledge Development Network (CDKN) 3. UK Aid 4. Food and Agriculture Organisation (FAO) 5. Die Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Gm 6. International Finance Corporation (IFC) 7. Japan International Cooperation Agency (JICA) 8. United Nations development Programme (UNDP) 9. Danish International Development Agency (DANIDA)

Figure 7: Stakeholder map (source: prepared by the authors)

In terms of resource mobilisation, it should be noted that the Economic Relations Division (ERD) under the Ministry of Finance (MoF) deals with bilateral and multilateral development partners in order to mobilise external economic and technical assistance for the development of Bangladesh. ERD is also acting as the National Designated Authority (NDA) under the Green Climate Fund (GCF), and is a political focal point for the Global Environment Facility (GEF), while the MoEF is the designated authority for the Adaptation Fund and the operational focal point for the GEF. It should be noted that IDCOL got accredited at the 17th GCF Board meeting in July 2017 as a direct access accredited entity and as such, can submit funding proposals and concept notes directly to the GCF.

Further information about these primary and secondary stakeholders can be found in Annex 4.

4.4.2 Review of past and existing donor-led initiatives in-country to address barriers

Table 11 presents an overview of past and ongoing initiatives by development partners to address barriers to private sector investment.

Table 11: Review of development partners' programmes to tackle investment barriers (source: prepared by the authors)

Institution	Programme	Description
Asian Development Bank (ADB)	Pilot Program for Climate Resilience (PPCR) interventions: Coastal Towns Infrastructure Improvement Project (2013-2020) Strengthening the Resilience of the Urban Water Supply, Drainage, and Sanitation to Climate Change in Coastal Towns (2012) Climate Change Capacity Building and Knowledge Management (2011-2013) Non PPCR interventions:	ADB is the lead agency operationalising the PPCR in Bangladesh, with the WB and IFC taking responsibility for specific investment components. These two investment projects administered by ADB aim to enhance the resilience of critical freshwater systems in vulnerable coastal towns, and all-weather roads and coastal infrastructure in 12 rural coastal districts to improve social services and economic opportunities in rural and coastal communities. This project aims to equip MoEF with the requisite human resources and technology for managing and coordinating investments in and knowledge on climate-resilient initiatives. Since 2009, ADB's non-PPCR infrastructure interventions have included climate proofing aspects, as well as climate disaster risk reduction (DRR) projects.
Climate and Development Knowledge Network (CDKN)	Readiness of private sector investment in climate change, (2015 – 2016)	Funded a technical assistance project to raise awareness and supporting the private sector in accessing the Green Climate Fund (GCF) and the opportunity that the Private Sector Facility (PSF) under GCF presents for accessing funds for climate and development investments. This project was implemented by Acclimatise in collaboration with International Institute for Environment and Development (IIED) and International Centre for Climate Change and Development(ICCCAD). Also funded a project involving Ricardo and NACOM to support the Government of Bangladesh in implementing its NDC. The aim was to provide the Government of Bangladesh (GoB) with support in preparing and planning for implementation of the quantified mitigation contribution in its INDC, by developing sectoral mitigation action plans for the power, transport and industry sectors, along with an overarching NDC implementation roadmap for these sectors.
Danish International Development Agency (DANIDA)	Inclusive green growth, (2016-2021)	Through a thematic focus on improving climate resilience and income generation among the poor and vulnerable to climate change as well as promoting private sector investments in sustainable and efficient energy solutions.
Food and Agriculture	Bangladesh Country Programming	A strategic document for FAO in Bangladesh. It sets out FAO's priorities for the current 5 year period, in its

Organization (FAO)	Framework (CPF), (2014 – 2018)	technical and development assistance to the GoB and is aligned with the 6th Five-Year Plan for 2011-2015 of the GoB. It is also a tool to help mobilize resources in a programmatic manner, rather than on a project-by-project basis. (FAO, 2014)The FAO provides a coherent set of 12 priority investment programmes to improve food security and nutrition in an integrated way. The total cost of the CIP is estimated at USD 7.8 billion. Of this, USD 2.8 billion are already financed through allocated Government budget resources and contributions by Development Partners. The financing gap is therefore USD 5.1 billion, of which USD 3.4 billion have been identified as first priority requirements.
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	Climate Finance Readiness. Supporting Strategic Engagement of the Private Sector' project, (2015 – 2016)	It aims at undertaking a desk-based study, country focused case studies, and finally workshops facilitating public-private dialogue in two partner countries, so that NDA and Accredited Entities (AEs) will be better equipped to adopt more strategic approaches to engage the private sector and financial actors to undertake climate investments. The study will target two countries and Bangladesh has been identified as one potential recipient. This study was undertaken from December 2015 till June 2016.
Global Climate Partnership Fund (GCPF)	EE in the textile industry	Works with the Bangladeshi textile industry by providing funding to two partner banks that support garment companies in increasing their energy efficiency. They fund the deployment of EE machineries in the ready-made garment sector, financing equipment such as label weaving machines, dryers, irons and washing machines (Global Climate Partnership Fund, 2016). • City Bank received USD 30 million in 2016. • Southeast Bank received USD 10 million in 2016.
Green Climate Fund (GCF)	Readiness support from GCF for the strategic framework for engagement with the Fund, including the preparation of country programmes, (2016)	• Identifying opportunities to involve the private sector, including MSMEs, and leveraging their ability to implement Bangladesh's programming priorities; • Clarifying the roles of prospective public and private sector entities in implementing Bangladesh's programming priorities with respect to GCF, and; • Developing clear metrics to screen project proposals for GCF submission, based on policies and strategies of the GoB GCF and other global commitments
Infrastructure Development Company Limited (IDCOL)	Sustainable and environment-friendly investments, ongoing	Catalyse and optimise private sector participation in promotion, development, and financing of infrastructure, RE and energy efficient projects in a sustainable manner through public-private-partnership initiatives. Specific programmes are support to the infrastructure, RE, EE and advisory services.
International Finance Corporation (IFC)	Strategic Program for Climate Resilience (SPCR), (2010- on-going)	Bangladesh's Strategic Program for Climate Resilience (SPCR) was developed in 2010 under the IFC, the World Bank (WB) and the Asian Development Bank (ADB). There

		is an important focus on engaging with the private sector including local financial intermediaries (insurance companies and commercial banks). There are important opportunities to learn from their experience in engaging with the private sector on adaptation (including private financial and banking institutions).
Japan International Cooperation Agency (JICA)	EE and Conservation Promotion Financing Project (2016-2022)	Provides concessional funding to the Sustainable And RE Development Authority (SREDA) to finance EE measures in the cement and textile industries, with IDCOL acting as a fund manager of this scheme. Meghna Cement Mills has received Tk 127 crore (1.27 billion) at 4 percent interest rate for its Vertical Roller Mill (VRM) plant in Mongla. Bangladesh Export Import Company Ltd, Pretty Eco Village Ltd, and Tithi Textile Mills (Pvt) Ltd. also received Tk 110 crore, Tk 84.4 crore and Tk 57.76 crore respectively from the SREDA financing scheme.
Sustainable Energy for All (SE4ALL)	Bangladesh Cookstove Program (2014 – 2018)	Launched by UN Secretary Ban Ki Moon in 2011 along with a UN General Assembly Resolution declaring 2012 the Year of Sustainable Energy for All. Pursues the following objectives: • Energy Access: ensure universal access to modern energy services, to include electricity and clean cooking facilities by 2030; • Energy Efficiency: double the rate of increase in energy efficiency by 2030; • RE : double the share of RE in the global energy mix by 2030 SE4ALL is involved in the country via the Bangladesh Cookstove Program
United Nations Development Programme (UNDP)	Country work programme, (2017-2020)	Priorities are: • Ensuring economic growth is inclusive and supports economic opportunities, particularly for women • Improving social policies and programmes,with a focus on good governance and structural inequalities • Building resilience and improving environmental sustainability. UNDP intends to mobilise resources to secure private sector partnerships opportunities. Partnerships with the private sector will be explored through "Business Initiative Leading Development", the Federation of Bangladesh Chambers of Commerce and Industry, and the Business Call to Action.
World Bank	Bangladesh Insurance Sector Development Project, (2017 – 2022) Power System Reliability and	Aims to strengthen the institutional capacity of the regulator and state owned insurance corporations and increase the coverage of insurance in Bangladesh (World Bank, 2017). Aims to improve the reliability and efficiency of the power system in Bangladesh through optimization of dispatch

	Efficiency Improvement Project, (2017-2021) Bangladesh Weather and Climate Services Regional Project, (2016 – 2022)	operation (World Bank, 2017). Aims to strengthen national capacity for weather and climate services. The main objective is to strengthen the capacity of the GoB to deliver weather and climate information in priority sectors (including agriculture) and to prepare for climate variability and hydro-meteorological disasters (World Bank, 2015).

5 Preliminary assessment of possible investment areas for the private sector in priority sub-sectors

5.1. Priority sub-sector 1: Improved crop production

During the stakeholder consultations, it was mentioned that there is an immense opportunity for private entities to invest in the agricultural sector as it plays a vital role in the country to feed 160 million people and represents 15% of its GDP (World Bank, 2016).

Businesses in the agriculture sector know that erratic rainfall trends, flooding, sea level rise and salinisation, and increasing temperatures directly affect agricultural production and yields, along with food security and livelihoods. Climate change is expected to lead to significant agricultural losses, corresponding to approximately 3.1% of GDP estimated annually between 2005 and 2050. These losses will amount to USD 36 billion in lost economic value (World Bank, undated).

Four relevant actors in the agribusiness sector were consulted as part of this study, including three private-sector entities: Advanced Chemical Industries (ACI), Green Delta Insurance Company(GDIC) and Lal Teer along with a research institution, the Bangladesh Agricultural Research Council (BARC).

Based on this consultation and desktop research, two types of investment were identified for this subsector:

- Weather index- based agriculture insurance, mentioned by two interviewees (BARC and GDIC); and,
- Production, distribution and adoption of high yielding and climate-resilient seeds, mentioned by three of the respondents (ACI, BARC and Lal Teer).

For each of these investments, key opportunities and barriers are presented in the following sub-sections.

5.1.1. Weather index- based agriculture insurance:

Scale and development stage: Overall, the market for weather index- based agriculture insurance and related products is nascent in Bangladesh, with a significant potential for future growth if existing barriers to development and uptake are overcome. As an example of the potential market size, 9 million farmers had weather index insurance in India between 2010 and 2011, with a total premium value of USD 258 million[13].

Opportunities: GDIC will work towards multiple pilots in 2017 and 2018 to deliver agriculture insurance as a bundled product with banks, MFIs, seed companies, input suppliers and contract farming entities. These pilots are expected to create a demonstration effect in Bangladesh as well as

to global observers, highlighting the value of agriculture insurance in the agriculture value chain. The project plans to leverage the existing network of GDIC to link up with several distribution channels, targeting a variety of farmers for scale and volume to reach commercial sustainability.

GDIC started an initiative in 2015 with the International Finance Corporation (IFC) and PRAN, to launch a localised weather index-based agriculture insurance for cassava farmers in a Dhaka district (Green Delta, 2015). The insurance programme aims to insure cassava farmers for damages due to low temperatures and excessive rainfall. Weather index-based insurance means that insurance payments are triggered if a rainfall index, for example, falls below a certain level over a predefined period. The product is based on modelling of weather risks and does not require the services of a claims assessor, allowing for claims settlement process to be quicker and more objective. The indemnity is calculated based on a pre-agreed sum insured per unit of the index (e.g. dollars/millimetres of rainfall). PRAN is bearing all expenses, while farmers are just providing labour and land. Other partners running crop insurance schemes are Supreme Seeds Limited for hybrid rice and Renaissance, an NGO, for tomatoes (World Bank, 2015-2016).

Another pilot project funded by the Japan Fund for Poverty Reduction (JFPR) is currently implemented and provides a USD 2 million grant to develop and implement weather index-based crop insurance as an adaptation tool to reduce the climate variability and extreme weather (ADB, undated). As of February 2017, 18 training programs were organized to train 430 officials from IDRA, SBC, Bangladesh Meteorological Department (BMD), private insurance companies, non-government organizations (NGOs) and microfinance institutions (MFIs). Work on preparing data grid for Bangladesh and drought index product design is completed. The contract has been awarded for automated weather-stations equipment and 20 weather stations were installed. Contract award for Poverty impact evaluation and MIS is completed. A total of 10,007 farmers joined in the awareness program, and 5,399 farm households were enrolled in the crop insurance programme.

Barriers :

- **Policy and regulatory constraints**, that were mentioned by Lal Teer and GDIC. A clear policy signal would help encourage crop insurance uptake. For example, crop insurance is mandatory in India, which has stimulated a large market for weather index-based insurance products. A concrete example was provided by GDIC, who highlighted that the Ministry of Agriculture was not ready to design a policy aimed to support insurance crop schemes until the results of the pilot activity are known. ACI underscored the issue of policy implementation in the country and the need of awareness raising and capacity building to encourage action from government institutions.
- **Inadequate infrastructure and data:** Automated weather stations are few and the data required for modelling risks is often poor or inaccessible.
- **Lack of internal capacity**: Bangladeshi insurance companies often do not have the capacity to design and price complex index insurance products; further capacity building is required, as in the case of GDIC, where IFC provided technical advisory services for product development.
- **Lack of awareness in the market:** Farmers are often not aware of the benefits of insurance, thus hindering demand and market penetration. Insurance awareness is a totally new concept; the risks that farmers face due to changing future climate cannot be assessed by

referring to past experience, therefore insurance may seem very costly to them (IFC, 2010). Greater information to build awareness of climate risks and risk management tools is needed.

- **High costs:** Premiums are currently very high due to the high risk in Bangladesh, taking into account factors such as climate change and the increasing frequency of extreme events. Subsidies would help to overcome initial investment barriers, introduce the benefits of these products and help stimulate demand.

Recommendation: Conduct a high-level market assessment of the potential for scaling up weather-index insurance for farmers building on the preliminary results from the pilot scheme implemented by PRAN, IFC and GDIC. GDIC mentioned that the MoF and MoA are interested in developing/expanding crop insurance, but low-awareness exists within both institutions. They would like to see the pilot project's results first before going for a larger scale introduction of crop insurance schemes. Policy and guidelines will be necessary to support the mainstreaming of this type of insurance.

Further research/consultation: Consultation with PRAN, IFC and GDIC is required to confirm opportunities for collaboration. This will be dependent on when preliminary results of the pilots can be shared and disseminated (expected to end in 2018-2019). Consultation with MoA will also be required to confirm their interest in partnering with the MPI project to move this forward.

5.1.2. Production, distribution and adoption of high yielding and climate-resilient seeds

Scale and development stage: From a global perspective, climate-resilient seeds represent a significant market opportunity. World seed markets were worth USD 45 billion in 2012. If a low estimate of 20% of those markets were at risk, then there could be a market of USD 9 billion for climate resilient seed types (PricewaterhouseCoopers, 2013). In Bangladesh, the market for Research & Development (R&D) and marketing of high yielding and climate-resilient seeds have entered the growth and maturity stage. The yearly turnover of ACI and Lal Teer is over USD 10 million each, encompassing all activity types.

Opportunities: In Bangladesh, there is challenges faced by farmers (Wardad, 2015). During the consultations, Lal Teer mentioned that a number of private companies had already been working on seed production and high yielding varieties for several years and were able to develop a market for their products., including saline resistant varieties of vegetable seeds and production technologies for high salinity affected coastal areas of Bangladesh. Both ACI and Lal Teer are engaged in seed production and see a potential an overall demand for quality seeds, a sector in which the private sector's share rose from 11% in 2005 to 34% in 2013 (Parvez, 2015). Private sector actors acknowledge that the development of climate resilient seeds is the next challenge on the agenda, since increasing salinity and inundations are pressing for its development in Bangladesh. Their view was supported by the representative from the Bangladesh Agricultural Research Council (BARC).

It should be also noted that under the PPCR, the investment project "Promoting Climate Resilient Agriculture and Food Security" focuses on introducing climate resilient technologies and training

farmers to use these. The project is USD 3 million in total funding and runs from 2013 until 2019 (Climate Investment Funds, 2010).

Barriers :

- **Seed regulation**: it is difficult to release new seeds; under the current Seed Policy, it takes at least 2-3 years for approval and release;
- **Lack of low cost finance**: at the moment agribusinesses must use commercial finance at 16-18% interest rates. Low cost or concessional finance is mostly unavailable, which would help stimulate further investment in climate resilient activities;
- **Inadequate data**: there is a lack of weather and climate data in Bangladesh which would help guide the planning of R&D activities. Relevant data is not always accessible, for example on cropping patterns; furthermore there is no analysis of this data; and,
- **Lack of knowledge and capacity on climate change**: in-house capacity is sometimes lacking, particularly when it comes to developing project proposals for external funding.

Recommendation: Companies producing high-yielding and climate-resilient seeds need to be provided with adequate R&D support in order to be able to invest in developing new products. Low cost finance is needed for this sector to access affordable capital and cover the technology risks that arise from developing new seed varieties. In addition, farmers would benefit from awareness raising events that highlight the advantages of such seeds, which are sometimes seen as costly investments since they can require complementary cultivation techniques. To face these constraints, low cost finance would also support farmers in progressively resorting to climate-resilient seeds.

Further research & consultation: Consultation with IFC is required to confirm opportunities for collaboration. This will be dependent on when preliminary results of the pilots can be shared and disseminated (PPCR project is expected to end in 2019). Consultation with ACI, Lal Teer, BARC and MoA will also be required to confirm their interest in partnering with the MPI project to move this forward.

5.2. Priority sub-sector 2: RE in the power sector

The current total power generation capacity of Bangladesh is 15,599.73 MW, including 2.89% of renewables (SREDA, 2017). During the stakeholder consultations, it was mentioned that the installed transmission capacity of Bangladesh national grid has reached 15,379 MW as of February 2017. The GoB intends to install 60,000 MW of additional electricity generation capacity by 2040, including at least 10% of total capacity coming from RE (SREDA, 2017).

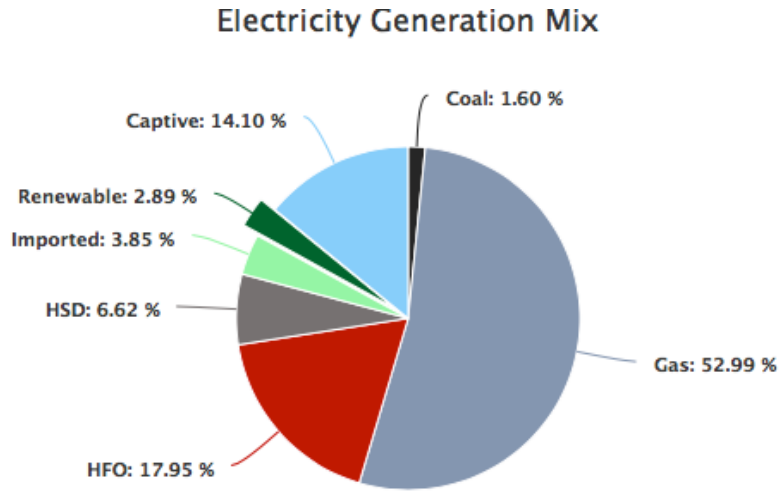


Figure 8: Breakdown of the energy mix (%) (source: SREDA, undated)

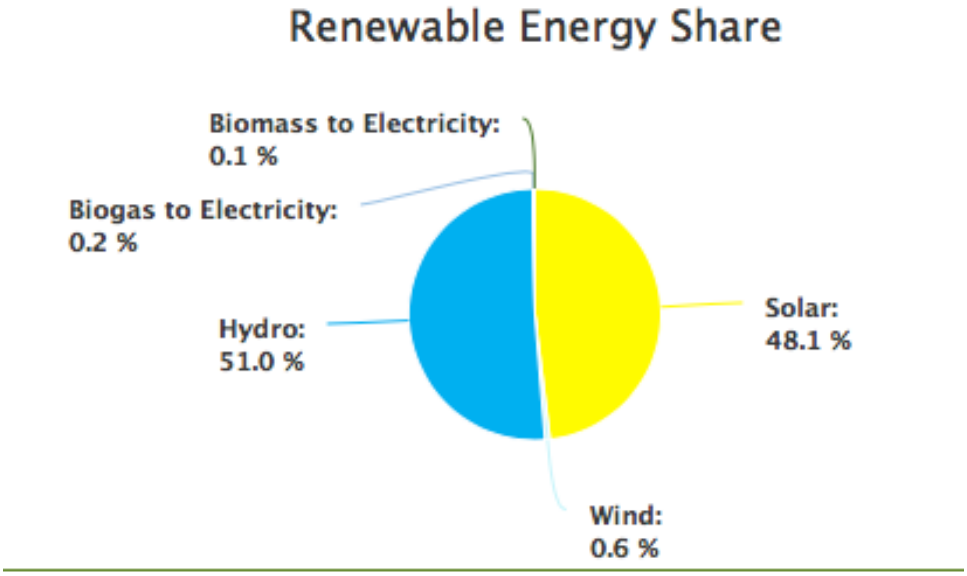


Figure 9: Breakdown of the RE share (%) (source: SREDA, undated)

The energy sector is an important contributor to GHG emissions. Furthermore, increasing access to the electricity network is a key developmental priority (SREDA, 2015). Although 18% of the country has no access to electricity the remaining 82% significantly rely on fossil fuel based energy with a majority of the electricity coming from gas-powered thermal stations and diesel generators used substantially to meet increase in demands during summer months (SREDA, undated). Although the overall GHG emissions of the country remain relatively low in comparison to its neighbouring countries, the share of energy sector in GHG emissions is substantial (i.e. nearly 30% to total GHG emissions). The emissions from the energy sector alone have increased by 154% between 1994 to 2005, particularly due to an increase in fugitive emissions (unintended gas leaks from pipes and valves) from burning fossil fuels (UNFCCC, 2006). Bangladesh's NDC also recognises power sector as one of the focus sectors (amongst transport and industry) to meet the target of 5% reduction in GHG by 2030 (MoEF, 2015).

- Investments in RE can help to achieve this target, as Bangladesh has a considerable RE potential. So far, the country has significantly invested in RE projects in rural areas through projects such as Solar Home Systems (SHS), solar micro grids and solar irrigation pumps. Targets are also set for grid based technologies such as utility scale solar and wind. Despite great prospects, utility-scale projects have been less successful in harnessing renewable sources of energy. This is mainly due to land scarcity, the distance to grid power evacuation facility from the site location, as well as the predominance of low-lying lands (which means high upfront costs for protecting them from flooding). Hydro Power Generation Company Ltd. in 2016 to tap into the potential of hydropower that has not been fully explored so far (Gulf Times, 2016). Bangladesh is a relatively flat country without mountainous areas which leads to limited river currents and hampers a detailed assessment of hydropower potential.
- **Solar:** Has an immense potential, given Bangladesh's geographical location. The country receives an average daily solar radiation of 4-6.5kWh/m2 (Rahman and all, 2013). The GoB expects to deliver both utility-scale and smaller-scale solar. Small-scale solar include rooftop solar on large private buildings/factories, government buildings and solar home systems (SHS) for off-grid residential properties, and solar mini-grids and solar photovoltaic (PV) cells are gaining acceptance for providing electricity to households and small businesses in rural areas; and,
- **Wind:** The Power System Master Plan (PSMP) estimated the potential wind power energy to be about 637 MW (MoPEMR, 2016). An onshore wind power potential mapping study is currently being carried out and will inform decisions on the desired level of uptake in onshore wind.

For each of these investments, key opportunities and barriers are presented in the following sub-sections. Other RE sources include biofuels, geothermal, river currents, and wave and tidal energy, however the potential of these sources is yet to be explored.

Scale and development stage:

Based on IFC's assessment of opportunities for climate-smart investments in the NDC of Bangladesh, the overall potential market for RE in Bangladesh is worth $17 billion .IFC estimated Bangladesh will attract $7.1 billion for renewables by 2020. In 2008, the GoB adopted a RE policy, with the ultimate goal of reaching 5% of total generation from renewable sources by 2015 and 10% by 2020 (IFC, 2016).

- **Biogas:** Presently there are about 50,000 household and village biogas plants throughout the country (Khan and Shahjahan, 2014). There is a huge potential for expansion in rural areas. In addition, this sector is largely controlled by the private sector who will want to actively manage their waste streams and maximise the potential returns from them;
- **Rice husk and sugarcane-based biomass**: IFC estimated that biomass will attract $100 million by 2020, with a total potential from biomass is about 286 MW (IFC, 2016). There is the potential for biomass-based electricity to be generated from sugar cane, rice husks as well as wheat straw and animal waste from livestock industry. The scope for generation of electricity from sugar cane is greater, with the possibility of delivering more than expected by the NDC by 2030 under the right conditions and with appropriate support through a Feed-In Tariff (FIT). However, it

should be noted than raw materials from sugar and rice husks are generally a scarce commodity with other potential conflicting uses, and this could be a limiting factor to take-up. Furthermore, current usage of sugar cane and rice husks to produce energy is inefficient. And biomass is geographically scattered across Bangladesh and also has seasonal variation. It is therefore, reasonable to assume that more would need to be done to encourage more efficient generation of energy from biomass and to increase overall levels of electricity generation from biomass. It is important to note that the scope for increased delivery of electricity from sugar cane could be achieved through more efficient cogeneration process (such as boosting the existing boiler pressures) as opposed to through increased uptake;

- **Hydro:** The potential for hydroelectricity has not been explored yet. While hydropower assessments have identified some possible sites which could supply 10kW to 5MW, these have not been built yet. Micro and mini hydro have also limited potential in Bangladesh, with the exception of Chittagong Hill Tracts (Khan and Shahjahan, 2014);
- **Solar:** IFC estimated that solar PV will attract $4 billion by 2020.About 264,000 households currently use solar energy (IFC, 2016). 161MW of SHSs were installed by 2016, with 6 million SHSs to be financed by IDCOL by 2021 (IDCOL, 2017). This will lead to an estimated generation capacity of 220 MW of electricity. IDCOL has also approved 18 solar mini-grid projects, among which 7 are operational while the rest are under construction, providing access to low-emission electricity for almost 5000 rural households in Bangladesh. IDCOL has further targets to install 50 solar mini-grids by 2018. The 2016 Power System Master Plan (PSMP) indicated that solar power potential in the country is about 2,675 MW; and,
- **Wind:** The potential for wind is not fully understood yet (Khan and Shahjahan, 2014). IFC estimated that wind will attract $3 billion by 2020 (IFC, 2016). An onshore wind power potential mapping study is currently being carried out and will inform decisions on the desired level of uptake in onshore wind.

Bangladesh's RE sector has so far primarily focussed on small scale off grid renewable technologies, such as SHS and mini/mano solar grids. However, Bangladesh's GHG reduction potential significantly lies with investment in large scale infrastructure. In comparison to the off-grid market, the renewable market in the utility sector is a new but evolving market. Bangladesh's NDC, the SREP and the RE development targets (2105-2021) all call for most of new energy capacity to come from utility scale solar and wind. In fact the RE targets specifically propose to hold auctions for IPP investment on government land and to negotiate fixed tariffs for private investment. The private investment community is now investing in these markets but it is still at an early stage.

Table 12: Potential types of investment for RE resources (source: Khanand M. Shahjahan, 2014)

Resources	Potential	Description
Solar	Enormous	Public and private sector
Wind	Resource mapping required	Public/PPP
Hydro	Limited potential for macro or mini	Mainly public sector
Domestic biogas system	8.6 m^3 as the average size of a domestic biogas plant	Public and private sector
Rice husk-based biomass	300MW considering 2kg of husk	Mainly private sector
Cattle waste-based biogas	350MW considering 0.752 m^3	Mainly private sector

Opportunities:

To meet the RE target of 10% of the overall energy mix by 2020 (for a total of 2,000 MW) under the RE Policy, the GoB has prepared the following year-wise implementation plan.

Table 13: RE year-wise targeted plan (source: SREDA, undated)

Technology	Achievement up to 2016 (MW)	2017 (MW)	2018 (MW)	2019 (MW)	2020 (MW)	2021 (MW)	Total (MW)
Solar	200	120	350	250	300	250	1470
Wind	2.9	50	150	350	300	300	1153
Biomass	0.4	6	6	6	6	6	30.4
Biogas	0.63	0.65	1	1	2	2	7.28
Hydro	230	-	1	1	2	2	236
Total	434	175.65	508	608	610	560	2897

SREDA is responsible to promote and develop RE and EE activities in all sectors, public and private. The Power division initiated a program to generate 500 MW of solar based electricity for the national grid. In this program, the private sector has been identified as an essential partner to implement a lion share of RE on commercial basis. The main features of this program include:

- Replacement of diesel irrigation pumps with solar power;
- Solar mini grid power system at remote villages;
- Solar parks ;
- Roof-top solar power solution for government owned buildings, industrial and residential buildings; and,
- Electrification of health centres, educational Institutions, E - centres at union levels, religious establishments and railway stations.

Commercial projects with opportunities for PPPs in the form of a Build-Operate-Transfer (BOT) mechanism are shown in Table 14 below.

Table 14 Commercial projects with PPP/BOT opportunities in the RE sector (source: Power Division, undated)

No	Type of projects	Capacity addition in MW
1	Solar irrigation	150
2	Solar mini-grid	25
3	Solar park	135
4	Solar roof-top, residential and commercial building	10
5	Solar roof-top, industrial building	20
Total		340

It is estimated that USD 2.76 billion will be required to implement this 500 MW solar programme, out of which USD 2.23 billion is expected to be mobilised from development partners while the rest will come from the GoB and private sources (Power division, undated).

It should also be noted that the Mutual Trust Bank Limited (MTBL) offers a green product called Green Energy Loan which finances customers to set up RE projects such as solar, biogas, wind, hydro, brick kiln financing. The bank lends to microfinance entities who lend to small borrowers for home and commercial uses. Through microfinance institutions they have funded 12 solar irrigation projects in North Bangladesh. Other examples of projects financed include green agro projects such as biogas, recyclable cups.

Barriers:

- **Limited access to low cost finance for small-scale projects:** RE projects require considerable concessionary support as projects are not viable in pure commercial terms. Financial markets are less interested in providing affordable capital to such markets. Commercial interest rates typically range between 11 percent and 14 percent for RE projects, although the government sometimes provides loans at lower rates for the purchase of capital equipment;
- **Limited access to low cost finance for large-scale projects:** Apart from a range of financing programs for off-grid solar, solar irrigation, mini-grids, biogas, and biomass projects, the country does not have specific incentives for larger projects. A draft feed-in tariff for wind and solar projects has stalled since 2015[14];
- **Lack of access to land for solar and wind technologies** particularly above the scale of 10 MW (IFC, 2016);
- **Uncertainty about long term grid extension** by the government (especially for mini-grid investors**);**
- **Low FIT for solar** in the context of high costs of generation;
- **Lack of FIT for biogas :** especially for the industrial scale, feed-in tariff could encourage poultry and dairy owners to sell surplus power to the electricity grid;
- **Lack of duty and tax waivers** to promote renewables;

[14] Further information is available at: https://www.ifc.org/wps/wcm/connect/51183b2d-c82e-443e-bb9b-68d9572dd48d/3503-IFC-Climate_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES

- **Lack of awareness and capacity gaps** regarding technical know-how and technology transfers;
- **Lack of access to low cost finance** for upfront capital investment; and,
- **Lack of awareness regarding the business models** for RE.

Recommendation: There is a lack of expertise and capacity amongst commercial banks to conduct financial due diligence on RE projects**.** Preferential duty waivers of imported capital RE related technologies, alongside preferential taxation policy for RE ventures, alignment of commercial banks to finance RE projects, grant or government budgetary support to implement pilot projects for demonstrating the business cases for promoting the uptake of specific RE technologies. It is also recommended to develop/roll out an awareness-raising campaign on RE savings and business cases. A detailed assessment of the biomass potential would be required. A case study to identify lessons learnt and challenges in developing biogas projects (in particular in the poultry and dairy sectors) with a view to support scaling up and replication in rural areas.

Further research & consultation: Consultation with commercial banks to understand barriers to providing financial packages tailored to specific RE technologies. Further consultation with RREL, Grameen Skhakti, Solaric and Energy Pack- RE to identify specific opportunities for collaboration. Further consultation with actors active in biomass, biogas and wind is required, as our sample of stakeholders consulted is biased towards solar. Consultation regarding the pre-assessment and mapping study for assessing respectively the hydro power and onshore wind power potential.

5.3. Priority sub-sector 3: Industrial EE

The Power Division was consulted as part of this study. Its representative confirmed that EE was one of the division's main priorities. Based on this consultation and desktop research, two priority industries were identified for this subsector:

- **Cement** – moving from traditional rolling mills to vertical rolling mills, and more efficient drive systems;
- **Garment/ Textile** – standard EE improvement measures (e.g. boilers, lighting and natural ventilation etc.), and changing to efficient air jet looms and high efficient centrifugal chillers, attaining water and energy efficiencies, introducing less energy and water consuming chemical dyes, rain water harvesting, efficient boilers and motors etc.

According to IFC (2012), both industries have a substantial CO_2 saving potential, respectively 374,041 Mega Tons (MT) and 112,000 MT CO_2 savings per year. The same study describes the garment industry as being in a high-growth stage. Textiles along with the Ready-Made-Garment (RMG) sector contribute to 13% of the country's GDP and represented a USD 3.5 billion investment in 2012. It should also be noted that Bangladesh holds 2% of the market share in the global textile sector (IFC, 2012). The cement industry is also an important player in the Bangladeshi economy as the country is the 40th largest market in the world. The industry demand and production has been steadily rising since 2005, going from a 5.20% growth rate to almost 15% five years later (IDLC, 2011). As a consequence of population growth, it is expected that the demand for cement will be

maintained for construction purposes. As of now, estimates point to an annual 9% growth up until 2021 (World's cement, 2017).

For each of these investments, key opportunities and barriers are presented in the following sub-sections.

Other industries not covered in depth in this study include :

- Chemicals and fertilisers – new efficient plant with advanced features of carbon and energy recovery and process optimization;
- Steel – moving from induction furnaces to electric arc furnaces, scrap pre-heating using furnace waste heat, Combustion control of the furnace;
- Food and beverage – CO_2 recovery from the exhaust of boilers/captive generators
- Paper – CO_2 recovery from the exhaust of the boilers/generators for the production of filler materials such as calcium carbonate; and,
- Bricks– Mainly tunnel kilns and introduction of non-fired brick-making technology.

Scale and development stage:

Overall, the market for EE measures in the industrial sector is nascent in Bangladesh but presents a significant potential for future growth if existing barriers to development and uptake are overcome. According to IFC (2016), the investment potential for EE could reach USD 600 million by 2020 according to conservative valuations (IFC, 2016).

Opportunities:

The GCPF is currently working with City Bank and Southeast Bank to finance EE measures in the ready-made garment sector, financing equipment such as label weaving machines, dryers, irons and washing machines. Government-owned financial intermediaries (IDCOL and BIFFL) have also available funding for the private sector to invest in the area of efficient brick kiln, furnace efficiency improvement and EE equipment for the SME sector, alongside efficient house-holds electronics.

In addition, SREDA has developed the EE and Conservation Master Plan with the help of JICA and identified major industry types and mitigation measures especially for private sector. With the financial support of SREDA, it has developed financing facilities for private sector to avail soft loans and implement the following EE measures :

- Waste heat recovery ;
- Efficient air jet loom ;
- Vapor absorption chillers;
- Co-generation and tri-generation;
- EE furnace for re-rolling mills etc.; and,
- EE standard appliance which can be run from solar energy.

SREDA received concessional funding support from JICA under the EE and Conservation Promotion Financing Project to finance EE measures in main industries. The bucket is not enough to finance all

measures being forwarded to SREDA to receive soft financing support. IDCOL, fund manager of this scheme, has arranged a fund for Meghna Cement Mills Ltd, a concern of Bashundhara Group, to introduce energy-efficient equipment under the. Meghna Cement Mills has received Tk 127 crore (1.27 billion)at 4 percent interest rate for its Vertical Roller Mill (VRM) plant in Mongla. Bangladesh Export Import Company Ltd, Pretty Eco Village Ltd, and Tithi Textile Mills (Pvt) Ltd. also received Tk 110 crore, Tk 84.4 crore and Tk 57.76 crore respectively from the SREDA financing scheme.

BB has also extended its green banking scheme to support similar types of EE measures led by private sector. In collaboration with IFC, BRAC Bank (BRAC- B) has also recently developed a product called - Planet Solution an Energy Efficiency Financing Loan to assist readymade garments and textile industries to invest in energy efficiency technology. These include audit and EE equipment for borrowers at the rate of 6%. This is an unsecured loan (no collateral) offered to manufacturers and exporters in textile.

The key measures for EE improvements in industry are presented in Table 15 below.

Table 15: Overview of the EE measures, resources requirements, complexity and timeline for implementation (source: NDC Industry Action Plan, 2017)

Measure	Description	Resources required	Complexity	Timeline for implementation
Cogeneration	Cogeneration (Combined Heat and Power or CHP) is the simultaneous production of electricity and heat, both of which are used. Cogeneration can offer energy savings ranging between 15-40% when compared against the supply of electricity and heat from conventional power stations and boilers (COGEN Europe).	Medium to large scale of upfront investment by the owner of the facility	Standard technology and equipment are available in the market	Medium to long term / by 2030
Waste heat recovery (mainly from captive generators/boilers)	Waste heat is available in the industrial faculties where electrical power is generated from the reciprocating gas engine based captive power plant. The average efficiency of this type of engine is roughly around 30~35%, which means	Small to medium scale of upfront investment by the owner of the facility	Standard technology and equipment are available in the market	Short to medium term /by 2020

	a good amount of useful energy is being left in the form of exhaust, that has potential for recovery to produce secondary steam and hot water for the same industrial facilities with the help of waste heat recovery equipment like waste heat recovery boilers.			
Condensate recovery	Condensate is the hot, treated water produced as steam releases its heat energy. It's a valuable resource that contains around 25% of the useful energy in the original steam. It makes sense to return it to the boiler, instead of dumping it to drain. It may be impractical to return all the condensate to the boiler for various reasons, but in most applications a goal of 75-80% condensate return is reasonable.	Small upfront investment by the owner of the facility	Small upfront investment by the owner of the facility	Short term / by six to twelve months
Heat recovery from the cooling system of generator	Useful energy can be recovered to produce hot water for industrial operation or to pre-heat the water of the boilers from the low gradient heat of the cooling system of the captive generators. It has good potential wherever captive power generation systems are in operation.	Small to medium scale of upfront investment by the owner of the facility	Standard technology and equipment are available in the market	Short to medium term /by 2020
Implementation of EE measures like leak sealing of steam and air flow systems	Leaks in steam distribution and air flow systems cause huge amounts of energy being drain-out	Small upfront investment by the owner of the facility	Can be implemented with little modification and	Short term possibly by six to twelve months

	from the industrial facilities. Proper identification of this leaks and timely repair can ensure a significant energy savings in the industrial facilities.		equipment support	
Efficient chillers	Chillers with higher coefficient of performance (COP), can ensure optimized delivery of cooling capacities of chiller. In the textile facilities, where it requires huge space cooling, efficient chiller can play an important role in reducing the overall demand of energy for space conditioning.	Medium to large scale of upfront investment by the owner of the facility	Standard technology and equipment are available in the market	Medium to long term / 2030
Efficient boilers	Boilers having efficiency 90% or higher can be an ideal choice for the industrial owners to effectively address the issue of overall energy reduction in the operation and gain economic benefit.	Medium to large scale of upfront investment by the owner of the facility	Standard technology and equipment are available in the market	Medium to long term / 2030
Efficient motors	The incremental efficiency difference of the energy efficient motors over the traditional induction motors can ensure significant reduction of demand for electrical energy and ensure economic benefit.	Small to medium scale of upfront investment by the owner of the facility	Small to medium scale of upfront investment by the owner of the facility	Short to medium term / by 2020

Barriers:

- Lack of awareness regarding the business case of specific EE measures;
- Lack of energy savings/audits advertise as energy savings are not always easily measured;
- Upfront capital investments of EE measures; and,
- Interruption of production operations when installing new EE measures, leading to extra costs to private companies.

Recommendation:

Preferential duty waivers of imported capital machineries as well as EE equipment is critical for the update of EE measures, alongside improved access to low cost finance to cover upfront investment, such as preferential taxation policy for EE ventures such as ESCOS, aligning commercial banks to finance EE projects, grant or government budget or support to implement pilot projects for demonstrating the business cases of the uptake of specific EE measures. It is also recommended to develop/roll out an awareness-raising campaign on EE savings/benefits in the cement and textile/garment industries. Training of energy audit consultants will also be required.

Further research & consultation: Consultation with the GCPF, IDCOL, BIFFL, BB and SREDA under their respective initiatives is required to define possible collaboration opportunities, ensure synergies and avoid duplication of work. Further consultation may also be required with energy audits consultants and a group of industrial units (it should be noted that no consultation with these two groups was undertaken as part of this study, but results of the consultation under the previous CDKN-funded NDC implement support project were integrated in the analysis).

5.4. Priority sub-sector 4: Modal shift

During the stakeholder consultations, it was mentioned that there are a number of mega infrastructure projects in the transport sector, such as the Dhaka Mass Rapid Transit (MRT) (expected to be completed in 2021), the Dhaka Metro rail (MRT) 1-6 line (expected to be completed in 2021), the Dhaka Bus Rapid Transit (BRT) line 3 (expected to be completed in 2018), the Dhaka Bus Rapid Transit (BRT) line 7 (expected to be completed in 2035), the Dhaka circular road (currently at feasibility study stage), and the Dhaka- Chittagong elevated express highway (under a PPP arrangement, currently at feasibility study stage, expected to start in January 2018).

The Road Transport and Highway Division was consulted as part of this study.

Based on this consultation and desktop research, a type of investment were identified for this subsector, namely the operation of the metro rail stations, including e-ticketing.

Because of lack of information, other investments were not included in the study such as fuel optimisation devices for marine transportation (e.g. ferry) and road fleets (e.g. lorries and buses) and rool road /fly over highway road infrastructure on a BOT basis, and vehicle testing centres.

For this investment, key opportunities and barriers are presented in the following sub-sections.

Scale and development stage:

Overall, the market for the low-carbon transport sector is nascent in Bangladesh but presents a significant potential for future growth if existing barriers to development and uptake are overcome.

Based on IFC's assessment of opportunities for climate-smart investments in the NDC of Bangladesh, the overall potential market for low-carbon transport is worth $ 2 billion by 2020 (IFC, 2016). In 2013, the GoB adopted a National Integrated Multimodal Transport Policy which mentions the modernization of ticketing system as a priority.

Opportunities:

The Road Transport and Highway Division has expressed their interest in engaging with the private sector to meet the growing needs for a more efficient and multimodal transport infrastructure, in particular through PPPs, including BOT or management contracts. Table 16 provides an overview of existing PPPs on transport in Bangladesh.

MRT Line-6 is an elevated Metro Rail system to be implemented in Dhaka, running from Uttara to Motijheel and serving 16 stations. The project will alleviate traffic congestion and improve air pollution in Dhaka City by constructing 20.1 kilometres of MRT, thereby contributing to regional economic development and improvement to the urban environment (JICA, 2016).The project is jointly financed by the Government of Bangladesh and JICA. The partial trial operation of MRT Line-615up to Agargaon is expected to start by the end of 2019, while the commercial operation of the full system is expected by the end of 2020.

Table 16: 13 PPP transport projects underway in Bangladesh (source: Public Private Partnership Authority, 2017)

Project	Status	Description
Dhaka-Elevated Expressway	Construction Stage	The purpose of the Expressway is to increase traffic capacity within and around the city by improving connectivity between northern part of Dhaka City with the Central, South and South-Eastern part. In addition to providing a much-needed increase in traffic capacity, the Expressway will be designed to relieve existing overloaded roads. Access and distribution to the Expressway will be designed to avoid adding congestion to existing facilities.
2 Jetties at Mongla Port	Award Stage - Contract Signed	The project aims to develop international standard port facilities for berthing of ships and cargo handling.
Upgrading of Dhaka Bypass to 4 Lane (Madanpur-Debogram-Bhulta-Joydebpur)	Procurement Stage - RFP	The objective of the project is to provide an alternate route for road users with high level of travel time reliability and reduced vehicle operating cost in National Highway N105. The upgrading of the road will also enhance the connectivity of the road network to meet forecast economic and traffic growth targets.
Flyover from Santinagar to Mawa Road via 4th (New) Bridge over Buriganga River	Project Development Stage - Feasibility	The project intends to: • Divert traffic from Mawa road to Dhaka city. People who will be traveling from southern part of the country using Padma Bridge now

[15] Further information is available at: http://www.dmtc.org.bd/about/about-mrt-line-6

	Study	can easily enter the city center without congestion. • Reduce travel time cost • Facilitate north south traffic movement of Dhaka city. People traveling in old part of city will be benefited from this project. • Facilitate the traffic movement for the inhabitants of Jhilmil Project of RAJUK.
Hemayetpur-Singair-Manikganj PPP Road	Project Development Stage - Feasibility Study	The project aims to upgrade the existing 2-lane Hamayetpur–Singair– ManikganjRoad into a 4-lane highway to reduce travel time, alleviate congestion, meet the demand of existing traffic and reduce the road accident.
Construction of Laldia Bulk Terminal	Procurement Stage - RFQ	The project's objectives are to: • Set up a dedicated terminal with specialist equipment to handle bulk cargo. • Enhance capacity at Chittagong Port to deal with additional cargo volumes and meet future demand. • Enhance operational performance at Chittagong Port and reducing ship waiting time.
Construction & Operation of Inland Container Terminal (ICT) at Khanpur	Project Development Stage - Feasibility Study	It is expected that redevelopment of Khanpur ICT through PPP will reduce congestion and transportation cost. The cost savings aspect of IWT in comparison with other modes would create remarkable margin as it is less than half the cost of transporting through rail and less than one-fourth than that of road. In addition to this it is safer than road transportation.
Construction of a New Inland Container Depot (ICD) near Dhirasram Railway Station	Project Development Stage - Feasibility Study	The proposed ICD near Dhirasram Railway station is planned to cater the rapid growth of containerized traffic handled in the Chittagong Port. Moreover, industries like Ready Made Garments in particular which are shifting to areas North of Dhaka, the woven mills situated in Mirpur, Tejgaon, Demra and factories on Dhaka-Sylhet Highway, Dhaka EPZ, Savar,Tongi, Gazipur etc. are accessible to the proposed ICD Site at Dhirasram. It is also ideally suited for containerization of Indo-Bangla trade in the near future.
Improvement of Hatirjheel (Rampura Bridge)-Shekherjaiga-Amulia-Demra Road	Project Development Stage - Feasibility Study	The objective of improving Chittagong Road-Demra-Amulia-Shekherjaiga-Hatirjheel (Rampura Bridge) into 4-lane Access Controlled Road is to create an alternate and congestion free new gateway of the Dhaka City, to provide better connectivity of Dhaka with Narayangonj, Chittagong, Sylhet and other eastern and south eastern districts of Bangladesh and to enhance the quality of life of the road users using the corridor.
Dhaka-Chittagong Access Controlled Highway	Project Development Stage - Feasibility	The project aims to enhance and ensure safer and more reliable road communications between Dhaka and Chittagong.

	Study	
3rd Sea Port	Project Development Stage - Advisor Appointment	n/a
2nd Padma Multipurpose Bridge at Paturia-Goalundo	CCEA Approved	n/a
Build and Construct Khulna Khan Jahan Ali airport and Special Tourism Zone (STZ) in Khulna under PPP Mode	CCEA Approved	n/a

Barriers:

- **Lack of reliable GHG data** in the transport with any degree of certainty;
- **Lack of understanding of co-benefits** of transport sector mitigation measures;
- **Lack of awareness regarding the business models** for BOT/PPP arrangements in the operation of management of e-ticketing and station management related services;
- **Lack of access to low cost finance**; and,
- **Lack of access to land** : 60% of Bangladesh land is under agricultural use and 43% of the country's land is privately owned. In addition, population pressure on urban areas is growing very fast and increasing land price in urban centres (Barkat A., 2004);
- Prolonged and contentious public procurement processes (US Department of State, 2016);
- Weak domestic and regional connectivity, contributing to vast regional inequality in access to markets and services;
- High logistical costs and weakening competitiveness;
- Limited operations and maintenance of transport services (ADB, 2015).

Recommendation: A pre-assessment of mega transport projets and the potential opportunities for PPP/BOT arrangements is recommended. Necessary government budgetary support to provide Viability Gap Funding (VGF) to the PPP projects. Long tenure soft financing for mega-scale transport sector projects will also need to be secured.

Further research & consultation: Consultation with the Road Transport and Highway Division (RTHD) and Dhaka Mass Transit Company Ltd. (DMTC), the implementing agency of MRT Line-6 project, to confirm opportunities for collaboration for supporting private sector engagement in mega projects including the MRT Line-6 project.

5.5. Priority sub-sector 4: Electric vehicles

During the stakeholder consultations, it was mentioned that rural transportation was a key development priority for the government (including under the Sustainable Development Goals).

RREL was consulted as part of this study.

Based on this consultation and desktop research, a type of investment was identified for this subsector: Electric three wheelers with solar charging facilities in rural and peri-urban areas.

For this investment, key opportunities and barriers are presented in the following sub-sections.

Scale and development stage:

As for subsector 4, the market for the low-carbon transport sector is nascent in Bangladesh but presents a significant potential for future growth if existing barriers to development and uptake are overcome.

Opportunities:

In Bangladesh, there are about six or seven lacs battery operated three wheelers that are in operation. These vehicles are connected to the national grid. Charging requires approximately six hours. RREL is developing a more efficient system which will allow charging in only one minute from solar power.

Barriers:

As for subsector 4, many of the same barriers apply, with a focus in particular on:

- **Lack of reliable GHG data** in the transport with any degree of certainty;
- **Lack of understanding of co-benefits** of transport sector mitigation measures; and,
- **Lack of access to low cost finance**.

Recommendation: A market study for introducing electric three wheelers

Further research & consultation: Consultation with RREL to confirm opportunities for collaboration regarding the introduction of electric three wheelers.

6. Conclusion

The MPI project has the potential to play an important catalytic role in the objective of engaging the private sector in implementing Bangladesh's NDC by providing the critical technical assistance and project finance/development/management skills that will be important in ensuring funds are effectively utilised.

Based on the preliminary assessment of opportunities and barriers (see previous section), this section provides an overview of the three priority sub-sectors with the strongest potential for the MPI project. For each of these priority sub-sectors, the following recommendations are provided :

- **Recommendation 1:** Promote the use of preferential duty waivers of imported capital machineries as well as EE equipment is critical for the update of EE measures, alongside preferential taxation policy for EE ventures such as ESCOs.
- **Recommendation 2:** Support access to low cost finance to cover upfront investment, addressing lack of financial packages by commercial banks tailored to EE projects, and implementing pilot projects for demonstrating the business cases of the uptake of specific EE measures.
- **Recommendation 3:** Develop and roll out an awareness-raising campaign on EE savings/benefits in the cement industry. Training of energy audit consultants will also be required.
- **Recommendation 4:** Develop and roll out an awareness-raising campaign on EE savings/benefits in the textile/garment industries. Training of energy audit consultants will also be required.
- **Recommendation 5:** Develop a case study to identify lessons learnt and challenges in developing biogas projects (in particular in the poultry and dairy sectors) with a view to support scaling up and replication in rural areas.
- **Recommendation 6:** Conduct a detailed mapping of the potential for biomass (where and how much).
- **Recommendation 7:** Support access to low cost finance, addressing lack of financial packages by commercial banks tailored to specific RE technologies (focusing on biogas, biomass and solar) and implementing pilot projects for demonstrating the business cases for promoting the uptake of specific RE technologies, for instance by submitting a concept under the GCF's Micro, Small and Medium Enterprise (MSME) pilot programme (see Box 1).
- **Recommendation 8:** Promote the use of preferential duty waivers of imported capital RE related technologies, alongside preferential taxation policy for RE ventures.
- **Recommendation 9:** Develop/roll out an awareness-raising campaign on RE savings and business cases.
- **Recommendation 10:** Carry out a market study about the potential for introducing electric three wheelers with solar charging in rural and peri-urban areas.

The MPI project team should further engage during the project inception phase with key stakeholders active in these subsectors to identify possible collaboration opportunities, ensure synergies and avoid duplication of work. See Table 17 below.

Table 17: Key stakeholders to engage per recommendation

Stakeholders /Recommendations	BB	BIFFL	BRACB	EPRE	GCPF	GS	IDCOL	IFC	MoEF	MoPEMR	MTBL	PD	PPP Authority	RTHD	RREL	Solaric	SREDA
1			☒		☒			☒									☒
2			☒		☒			☒									☒
3								☒									☒
4			☒		☒			☒									☒
5	☒	☒					☒			☒	☒	☒					☒
6	☒	☒					☒			☒	☒	☒					☒
7	☒	☒		☒			☒			☒		☒			☒	☒	☒
8	☒	☒		☒			☒			☒		☒			☒	☒	☒
9	☒	☒		☒			☒		☒						☒	☒	☒
10													☒	☒	☒		

7. References

Asian Development Bank. (undated). Linked Document 4a: Adb Support For Climate Change Adaptation And Mitigation In Bangladesh. [Online]. Available from:https://www.adb.org/sites/default/files/linked-documents/Linked-Document-4a-ADB-Support-for-Climate-Change-Adaptation-and-Mitigation-in-BAN.pdf

Asian Development Bank. (undated). "Initial poverty and social analysis". Weather Index-Based Crop Insurance Pilot Project. [Online]. Available from: https://www.adb.org/sites/default/files/project-document/76838/46284-001-ban-ipsa.pdf

Asian Development Bank. (2015). "Sector assessment (summary): transport". Country Partnership Strategy: Bangladesh, 2011–2015. [Online]. Available from: https://www.adb.org/sites/default/files/linked-documents/cps-ban-2011-2015-ssa-02.pdf

Bangladesh Bank. (2017). Quarterly Review Report on Green Banking Activities of Banks & Financial Institutions and Green Refinance Activities of Bangladesh Bank. [Online]. Available from: https://www.bb.org.bd/openpdf.php

Bangladesh Climate Change Resilience Fund (BCCRF). (2012). Annual report. [Online]. Available from:http://documents.worldbank.org/curated/en/267181468210282725/pdf/842480AR0BCCRF020120FINAL0June62013.pdf

Barkat A. (2004). Poverty and Access to Land in South Asia: Bangladesh Country Study. National Resources Institute, University of Greenwich. [Online]. Available from: http://hdrc-bd.com/admin_panel/images/notice/1380084890.03.%20poverty%20and%20access%20to%20land%20in%20south%20asia_bangladesh%20country%20study.pdf

Climate Investment Funds. (2010). Strategic Program for Climate Resilience (SPCR). [Online]. Available from: https://www.climateinvestmentfunds.org/sites/default/files/PPCR%205%20SPCR%20Bangladesh%20nov2010.pdf

COGEN Europe. What is cogeneration?). [Online]. Available from:http://www.cogeneurope.eu/what-is-cogeneration_19.html

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (undated). Sustainable Urban Transport: Avoid-Shift-Improve (A-S-I), [Online]. Availale from: http://www.sutp.org/files/contents/documents/resources/E_Fact-Sheets-and-Policy-Briefs/SUTP_GIZ_FS_Avoid-Shift-Improve_EN.pdf

Food and Agriculture Organization (FAO). (2014). Bangladesh Country Programming Framework (2014 – 2018). [Online]. Availale from:http://www.fao.org/3/a-i4236e.pdf

Global Climate Partnership Fund (GCPF). (2016). Annual report: Mitigating climate change together. [Online]. Availale from:http://www.gcpf.lu/files/downloads/annual_reports/GCPF_AR-2016_web.pdf

Global CCS Institute. (2013). Insights. "JCM/BOCM: Japan's Proposal on New Credit Mechanism". [Online]. Available from: https://www.globalccsinstitute.com/insights/authors/yasuki/2013/06/20/jcmbocm-japan%E2%80%99s-proposal-new-credit-mechanism

Green Climate Fund (GCF). (2015). Bangladesh GCF Readiness Proposal. [Online]. Available from: https://www.greenclimate.fund/documents/20182/466992/Readiness_proposal_-_Bangladesh.pdf/

Green Climate Fund (GCF). (2015). Climate-Resilient Infrastructure Mainstreaming in Bangladesh. [Online]. Available from: http://www.greenclimate.fund/-/climate-resilient-infrastructure-mainstreaming-in-bangladesh

Green Delta Insurance Company (2015). "Green Delta Insurance signs MoU on Agriculture Weather Index Insurance with Sylvan Agriculture Limited (Sister Concern of PRAN-RFL GROUP)". [Online]. Available from: http://green-delta.com/green-delta-insurance-signs-mou-on-agriculture-weather-index-insurance-with-sylvan-agriculture-limited-sister-concern-of-pran-rfl-group/

Government of Bangladesh. (2016). Bangladesh Environment, Forestry andClimate Change Country Investment Plan. [Online]. Available from:http://www.fao.org/fileadmin/user_upload/FAO-countries/Bangladesh/News/CIP_Draft_27_May_2016.pdf

Gulf Times. (2016). Bangladesh considers hydropower generation. [Online]. Available from: http://www.gulf-times.com/story/512814/Bangladesh-considers-hydropower-generation

IDLC. (2011). Research Report: CementSector of Bangladesh. [Online]. Available from:http://www.idlc.com/sector_coverage/1332569363Research%20Report%20on%20Cement%20Sector%20of%20BD-Initiation,%20April%2005,2011.pdf

Infrastructure Development Company Limited (IDCOL). (2017). RE. [Online]. Availale from: http://idcol.org/home/solar

International Finance Corporation (IFC). (2011). Climate Finance. Engaging the Private Sector. A background paper for mobilising climate finance. A report prepared at the request of G20 finance ministries. [Online]. Available from :https://www.imf.org/external/np/g20/pdf/110411c.pdf

International Finance Corporation (IFC). (2012). Industry Specific Study on Sustainable Energy Finance Market Potential for Financial Institutions in Bangladesh. [Online]. Available from :https://openknowledge.worldbank.org/bitstream/handle/10986/26557/114453-WP-BD-SEF-Market-potential-study-Bangladesh-PUBLIC.pdf?sequence=1&isAllowed=y

International Finance Corporation (IFC). (2016). *Climate Investment Opportunities in Emerging Markets*. [Online]. Available from: https://www.ifc.org/wps/wcm/connect/51183b2d-c82e-443e-bb9b-68d9572dd48d/3503-IFC-Climate_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES

Khan. R and M. Shahjahan. (2014). *Low-carbon South Asia: Bangladesh*, Christian Aid. [Online]. Available from :http://www.christianaid.org.uk/Images/low-carbon-south-asia-bangladesh-november-2014.pdf

Japan International Cooperation Agency (JICA). (2010). Our Work, Environmental and Social Considerations. Information Disclosure under New Guidelines: "Energy Efficiency and Conservation Promotion Financing Project". [Online]. Available from: https://www.jica.go.jp/english/our_work/social_environmental/id/asia/south/bangladesh/c8h0vm000095qf8w.html

Japan International Cooperation Agency (JICA). (2016). Energy Efficiency and Conservation Promotion Financing Project. [Online]. Available from: https://www.jica.go.jp/english/news/press/2016/c8h0vm00009wura6-att/(5)EnergyEfficiency.pdf

Japan International Cooperation Agency (JICA). (2016). Dhaka Mass Rapid Transit Development Project. [Online]. Available from: https://www.jica.go.jp/english/news/press/2016/c8h0vm00009wura6-att/(1)Dhaka.pdf

Ministry of Agriculture of Bangladesh (MoA). (1993). National seed policy. [Online]. Available from :http://moa.portal.gov.bd/sites/default/files/files/moa.portal.gov.bd/policies/4e465eac_1da9_48b0_91e2_f2c07d54ae63/NSP.pdf

Ministry of Agriculture of Bangladesh (MoA). (2012). National Agricultural Extension Policy (NAEP).[Online]. Available from :http://dae.portal.gov.bd/sites/default/files/files/dae.portal.gov.bd/page/dd7d2be1_aeef_452f_9774_8c23462ab73a/National%20Agricultural%20Extension%20Policy_%28NAEP%29.pdf

Ministry of Agriculture of Bangladesh (MoA). (2012). Medium TermStrategy and Business Plan. [Online]. Available from :http://moa.portal.gov.bd/sites/default/files/files/moa.portal.gov.bd/page/d1b6b62d_3a81_4de5_816a_207191d89d9a/mtsbp.pdf

Ministry of Agricultureof Bangladesh (MoEF). (2013). Master Plan for Agricultural Development in the Southern Region of Bangladesh. [Online]. Available from :http://moa.portal.gov.bd/site/page/01372ba9-c85f-445a-adbd-3d23fea949d8

Ministry of Environment and Forests of Bangladesh. (2005). National Adaptation Programme of Action (NAPA). [Online]. Available from: https://unfccc.int/resource/docs/napa/ban01.pdf

Ministry of Environment and Forests of Bangladesh (MoEF). (2009). Climate Change Strategy and Action Plan (BCCSAP).

Ministry of Environment and Forests of Bangladesh (MoEF).(2012). Implementing a Simplified Results Framework.[Online]. Available from: https://www.climateinvestmentfunds.org/sites/default/files/Bangladesh%20-%20Implementing%20a%20Simplified%20PPCR%20Results%20Framework.pdf

Ministry of Environment and Forests of Bangladesh (MoEF). (2015). Intended Nationally Determined Contributions (INDC). [Online]. Available from:http://www4.unfccc.int/ndcregistry/PublishedDocuments/Bangladesh%20First/INDC_2015_of_Bangladesh.pdf

Ministry of Environment and Forests of Bangladesh (MoEF). (2017).NDC Sectoral Mitigation Action Plan for Power.

Ministry of Environment and Forests of Bangladesh (MoEF). (2017). NDC Sectoral Mitigation Action Plan for Industry.

Ministry of Environment and Forests of Bangladesh (MoEF). (2017). The current status of the JCM in Bangladesh. [Online]. Available from: http://www.iges.or.jp/files/research/climate-energy/mm/PDF/20170301/4_Bangladesh.pdf

Ministry of Finance of Bangladesh (MoF). (2010). Policy And Strategy For Public-Private Partnership (PPP). [Online]. Available from: http://www.pppo.gov.bd/download/ppp_office/Policy-Strategy-for-PPP-Aug2010.pdf

Ministry of Finance of Bangladesh (MoF). (2012). Guideline for Public-Private partnership technical

assistance financing. [Online]. Available from:http://www.pppo.gov.bd/download/ppp_office/Guideline-for-PPPTAF-2012-Scheme-for-PPPTAF-2012.pdf

Ministry of Finance of Bangladesh (MoF). (2014). Chapter 14: Private sector development, *Bangladesh Economic Review 2014*. [Online]. Available from: https://mof.gov.bd/en/budget/14_15/ber/en/Ch-14%20(English-2014)_Final_Draft.pdf

Ministry of Finance of Bangladesh (MoF). (2014). Climate Fiscal Framework. [Online]. Available from: https://www.climatefinance-developmenteffectiveness.org/sites/default/files/publication/attach/Bangladesh%20Climate%20Fiscal%20Framework%202014.pdf

Ministry of Finance of Bangladesh (MoF). (2016). Chapter 1: Macroeconomic situation. *Bangladesh Economic Review 2016*. [Online]. Available from :https://www.mof.gov.bd/en/budget/15_16/ber/en/Ch-01.pdf

Ministry of Planning (MoP). (2012). Bangladesh Climate Public Expenditure and Institutional Review (CPEIR). [Online]. Available from :https://www.unpei.org/sites/default/files/e_library_documents/Bangladesh_Climate_Public_Expenditure_and_Institutional_Review_2012_0.pdf

Ministry of Power, Energy and Mineral Resources (MoPEMR) (2016). Power System Master Plan 2016. [Online]. Available from: https://drive.google.com/file/d/0B5U58g3xLD-Nd3BadlRNYXpzWlE/view

Nationally Appropriate Mitigation Action (NAMA), Database (2014).
Innovative Energy Optimisation in the Steel Sector. [Online]. Available from: http://www.nama-database.org/index.php/Innovative_Energy_Optimisation_in_the_Steel_Sector

PARVEZ S. (2015). "Seed market grows, led by private firms". The Daily Star. [Online]. Available from:http://www.thedailystar.net/seed-market-grows-led-by-private-firms-39920

PricewaterhouseCoopers (PWC). (2013). Stimulating private sectorengagement and investment inbuilding disaster resilience andclimate change adaptation. [Online]. Available from:http://www.lcgbangladesh.org/Environment/reports/2013/PwC%20Stimulating%20Private%20Sector%20Engagement%20in%20Climate%20and%20Disaster%20Resili....pdf

Prime Minister's Office, Government of Bangladesh. (undated). Public Private Partenrship Authority. [Online]. Available from: http://www.pppo.gov.bd/ppp_office.php

Prime Minister's Office, Government of Bangladesh. (2015). Bangladesh Public-Private partnership act [Online]. Available from: http://www.pppo.gov.bd/download/ppp_office/PPP_Law_2015_(Approved_Translation).pdf

Prime Minister's Office, Government of Bangladesh (2017). Policy for Implementing PPP Projects through Government to Government (G2G) Partnership. [Online]. Available from: http://www.pppo.gov.bd/download/ppp_office/Policy_G2G_Partnership-2017.pdf

Public Private Partnership Authority. (2017). PPP Projects. [Online]. Available from:http://www.pppo.gov.bd/projects.php

Rahman Md. S. And all. (2013). Present Situation of Renewable Energy in Bangladesh: RE Resources Existing in Bangladesh. [Online]. Available from: https://globaljournals.org/GJRE_Volume13/1-Present-Situation-of-Renewable.pdf

Scaling Up RE In Low Income Countries Program (SREP). (2015). Investment Plan for Bangladesh. [Online]. Available from: http://www.climateinvestmentfunds.org/sites/default/files/meeting-documents/srep_bangladesh_ip_presentation.pdf

Sustainable And RE Development Authority (SREDA). (2015). Investment Plan for Bangladesh. Scaling up RE Programme for Climate Change, October 2015. Developed by Power Division. Ministry of Power, Energy and Mineral Resources, Govt of the People's Republic of Bangladesh. Available fromhttp://www-cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/bangladesh_srep_ip_final.pdf

Sustainable and RE Development Authority (SREDA). (2017). RE to Electricity installed. [Online]. Available from: http://www.sreda.gov.bd/index.php/site/re_present_status

Transparency International Bangladesh. (2013). Climate Finance in Bangladesh: Governance Challenges and Way Out. [Online]. Available from:https://www.ti-bangladesh.org/beta3/images/max_file/es_cfg_executive_summary_english.pdf

United Nations Development Programme (UNDP). (2016).Country work programme for the Green Climate Fund.

United Nations Development Programme (UNDP). (2017 – 2020). Country programme document for Bangladesh. [Online]. Available from:http://www.asia-pacific.undp.org/content/dam/rbap/docs/programme-documents/Sept-2016/Bangladesh%202017-2020%20CPD.pdf

United Nations Framework Conventionon ClimateChange (UNFCCC), Nationally Determined Contributions Registry.[Online]. Available from:http://www4.unfccc.int/ndcregistry/Pages/Home.aspx

United Nations Framework Convention on Climate Change (UNFCCC). (2015). Paris Agreement. [Online]. Available from:https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

United Nations Framework Convention on Climate Change (UNFCCC). (2006). Bangladesh's GHG emissions profile. Avaialblefrom :https://unfccc.int/files/ghg_data/ghg_data_unfccc/ghg_profiles/application/pdf/bgd_ghg_profile.pdf

United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing countries (REDD), Bangladesh. (2015). [Online]. Available from:https://info.undp.org/docs/pdc/Documents/BGD/Signed%20Project%20Document%20UN%20REDD+.pdf

United Nations, Sustainable Development Goals, [Online]. Available from: https://sustainabledevelopment.un.org/?menu=1300

United States Department. (2016). Bangladesh. Bureau of Economic and Business Affairs. [Online]. Available from: https://www.state.gov/e/eb/rls/othr/ics/2016/sca/254475.htm

Wardad Y. (2015). “Private sector powers seed business growth”. The Financial Express. [Online]. Available from:http://print.thefinancialexpress-bd.com/2015/08/11/103502

World Bank. Bangladesh country profile.[Online]. Available from:http://databank.worldbank.org/data/Views/Reports/ReportWidgetCustom.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=BGD

World Bank. Bangladesh DashboardOverview. [Online]. Available from:http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=BGD&ThisTab=Dashboard

World Bank. (2015-2016). Global Index Insurance Facility: Bangladesh. [Online]. Available from:http://documents.worldbank.org/curated/en/701551490621497020/pdf/113711-BRI-Bangladesh-new-v2-PUBLIC.pdf

World Bank. (2010). Economics of Adaptation to Climate Change: Bangladesh. [Online]. Available from:http://documents.worldbank.org/curated/en/841911468331803769/pdf/702660v10ESW0P0IC000EACC0Bangladesh.pdf

World Bank. (2015). Bangladesh Regional Weather and Climate Services Project. [Online]. Available from:http://documents.worldbank.org/curated/en/118291468298141575/pdf/PID-Print-P150220-02-18-2015-1424259576240.pdf

World Bank. (2017).Bangladesh Insurance Sector Development Project. [Online]. Available from:http://projects.worldbank.org/P156823?lang=en

World Bank. (2017). Power System Reliability and Efficiency Improvement Project. [Online]. Available from:http://projects.worldbank.org/P159807?lang=en

World Bank. (2017). *Doing Business 2017: Equal Opportunity for All*. Washington, DC: World Bank. [Online]. Available from: http://www.doingbusiness.org/~/media/wbg/doingbusiness/documents/profiles/country/bgd.pdf

World's cement. (2017). Bangladesh to be a bright spot for cement demand. [Online]. Available from:https://www.worldcement.com/indian-subcontinent/02062017/bangladesh-to-be-a-bright-spot-for-cement-demand/

8. Annexes

Annex 1. Long list of sub-sectors

Number	Sector	Subsector	Investment types
1	**Agriculture**	Improved crop production	Weather-based index insurance for crop
			Introduction of drip irrigation
			Solar irrigation systems/pumps
			Production of resilient quality seeds
			Demonstration of the seeds performance
			Demonstration of the fertilization component
			Marketing of the new seed varities
			Less tillage cropping to limit soil emission
2	**Forestry**	Reforestation and afforestation	Social Forestry
			Road-side plantation
			Mangrove plantation at the newly raised Islands
3	**Industry**	Energy efficiency	Waste heat recovery (chemical fertilizer)
			Energy audit at factories with annual reporting of large consumers and implementation of recommendations
			Vapor absorption chillers (used in a variety of industries as well as commercial buildings for process-cooling and air-conditioning)
			Efficient Brick-kilns, Mainly Hoffman and tunnel kiln
			Furnace efficiency improvement, mainly in the re-rolling mills (steel)
			Process change in the cement factories from wet to dry
			Efficient Air Jet Looms in the textiles
			Co/tri-generation (textile and garment)
			Diesel/PV hybrid Power Generation systems at the factory roof-top
4	**Power**	Efficiency improvement of power plants	Re-powering of old-inefficient steam turbines with combined cycle power plants
		Conventional energy	Gaz exploration

			Clean coal technologies
		RE	Solar home systems
			Solar mini-grid
			Solar irrigation systems/pumps
			Solar micro-nano grid
			Solar roof-top solution
			Solar Pico-pV/lantern
			Grid connected power plants
			Utility-scale solar
			Wind: grid connected/stand-alone wind turbines
			Bio-mass: Bagasse/rice husk fired power generation
			Biomass: bio-gas plants at rural households
			Biomass: poultry and dairies
5	**Transport**	Modal shift from road to rail and water transport for cargo handling/ Reduced congestion and improved running of traffic	Metro-rail
			Bus rapid transit
		Electric cars	Electric vehicle for rural transportation
6	**Waste**	Waste to energy	Small scale power plant

Annex 2. List of stakeholders consulted

#	Stakeholder	Contact name
1	**Advanced Chemical Industries (ACI)**	Mr. Shamim Murad
2	**Bangladesh Agricultural Research Council (BARC)**	Dr. Ghulam Hossain
3	**Bangladesh University of Engineering and Technology (BUET)**	Prof. Ijaz Hossain
4	**Bangladesh Institute of Development Studies (BIDS)**	M. Asaduzzaman
5	**Bangladesh Infrastructure Finance Fund Limited (BIFFL)**	Mr. S.M. Formanul Islam
6	**Dhaka Chamber of Commerce and Industry (DCCI)**	Mr. A H M RezaulKabir
7	**Department of Environment (DoE)**	Md. ZiaulHaque, Mirza Showkat Harun-or-Rashid
8	**Energy Pack- RE**	Md. NurulAktar
9	**GrameenSkhakti**	Mr. Sohel Ahmed
		Md. Mahmodul Hasan
10	**Green Delta Insurance Company (GDIC)**	Ms. Farzana Chowdhury
11	**Infrastructure Development Company Limited (IDCOL)**	Mr. NazmulHaque
12	**Lal Teer**	Mr. Abdur Rashid
		Mr. Faisal Rahman
13	**Ministry of Industries (MoI)**	Ms.Yasmin Sultana
14	**Ministry of Environment and Forests (MoEF)**	Nurul Karim Nurul Karim, Dr. Azizul Haque
15	**Power Division**	Mr. Alauddin
16	**Rahimafrooz RE Limited (RREL)**	Mr. MunawarMisbahMoin
17	**Road Transport and Highway Division (RTHD)**	Ms. ZahidaKhanam
		Mr. ApurbaKimar
		Mohammad Belayet Hossain
18	**Sustainable And RE Development Authority (SREDA)**	Siddique Zobair
19	**SME Foundation**	Mr. Mohammed Mamunur Rahman
		Mr. Tanvir Faisal

Interview guide: Country scoping study to support the Mobilising Private Investment for NDC implementation (MPI) project in Bangladesh

A) Background information about the respondent and his/her organisation (5 min):

1. In 2-3 sentences, could you please describe what your organisation does and what your specific role is?

2. On a scale of 1 to 5 (*with 1 being very low and 5 being very high),* how would you define your knowledge of Bangladesh's Nationally Determined Contribution (NDC)?

3. On a scale of 1 to 5 (*with 1 being very low and 5 being very high),* how would you rate your/the private sector's awareness of the opportunities and benefits of engaging in climate-change related activities? This includes activities that contribute to the reduction of GHG emissions (such as RE or energy efficiency measures), as well as activities that help adapt/build resilience to the effects of a changing climate (such as drought or saltwater resistant crops, water conservation methods)

B) Types and scale of private sector investment opportunities in your sector (15 mins):

4. **Which of the following investment opportunities are relevant to your sector /your business? [only refer to relevant sector/subsector(s) in the table below]**

Sector/subsector	Types of investment	Tick the box for relevant investments
Agriculture/improved crop production	Weather-based index insurance for crop	☐
	Introduction of drip irrigation	☐
	Development of high yielding varieties	☐
	Less tillage cropping to limit soil emission	☐
Industry/energy efficiency	Waste heat recovery (chemical fertilizer)	☐
	Energy audit at factories with annual reporting of large consumers and implementation of recommendations	☐
	Vapor absorption chillers (used in a variety of industries as well as commercial buildings for process-cooling and air-conditioning)	☐
	Efficient Brick-kilns, Mainly Hoffman and tunnel kiln	☐
	Furnace efficiency improvement, mainly in the re-rolling mills (steel)	☐
	Process change in the cement factories from wet to dry	☐
	Efficient Air Jet Looms in the textiles	☐
	Co/tri-generation (textile and garment)	☐
	Diesel/PV hybrid Power Generation systems at the factory roof-topp/.l/.	☐
Power/ RE	Solar Home Systems	☐
	Solar Mini-grid	☐
	Solar irrigation systems/pumps	☐
	Solar Micro-nano grid	☐
	Solar Roof-top solution	☐
	Solar Pico-pV/lantern	☐
	Grid connected power plants	☐

	Wind: grid connected/stand-alone wind turbines	☐
	Bio-mass: Bagasse/rice husk fired power generation	☐
	Biomass: bio-gas plants at rural households	☐
	Biomass: poultry and dairies	☐
Transport	Metro-rail	☐
	Bus rapid transit	☐

5. **Are there any other investment opportunities for [your sector/business] that we have not mentioned above?**

6. **For each of the investments mentioned above,** could you please indicate:

6.1. The investing trend:

☐ Introductory stage (product launch and market entry with low sales)
☐ Growth stage (strong growth in sales and profits)
☐ Maturity stage (product is established and the aim is to maintain the market share)
☐ Decline stage (market starts to shrink and sales decrease)

6.2. The potential market size:

☐ Micro: US$0 to 1 million
☐ Small: US$1 to 5 million
☐ Medium: US$5 to 10 million
☐ Large: More than US$10 million

6.3. The time frame for tapping into the potential market:

☐ Short term (less than 1 year)
☐ Medium term (over 1 to 5 years)
☐ Long term (over 5 years)

6.4. What would be the main opportunities resulting from the investments you have mentioned above ?

☐ Development of new products and services in alignment with the country's low carbon and climate resilient objectives/priorities
☐ New or expanded markets for products and services
☐ Cost savings/efficiency
☐ Securing sustainable or green supply chains
☐ Reputation and brand value
☐ Other (Please specify _____)

C) Barriers and constraints to market growth in your sector (5 mins):

7. **For each of the investments mentioned above, what are the barriers and constraints to taking advantage of these opportunities?**

☐ Policy and regulatory and enabling environment constraints
☐ Information gaps leading to market failure
☐ Substantial physical risks that imperil supply chains, assets and operations

- ☐ Weak or shallow financial markets
- ☐ Lack of access to low cost finance or preferential/concessionary financing
- ☐ Capacity constraints
- ☐ Market size
- ☐ Transaction costs
- ☐ Technology risks
- ☐ Other (Please specify _____)

8. Could you tell us more about barriers and constraints you have mentioned above ? Please specify

D) <u>Enabling actions to overcome barriers to market growth (15 mins):</u>

9. Do you already receive support to address the barriers identified above?

- ☐ Yes
- ☐ No
- ☐ Unsure

10. [If yes to question 9/ above], what sort of support has been received to address the barriers identified above in your sector?

Tick box below if relevant	10.1. Institutional support:	Tell us more: What type of support have you received? From whom?
☐	Capacity building to enhance risk awareness/management awareness	
Tick box below if relevant	**10.2. Technical support:**	**Tell us more: What type of support have you received? From whom?**
☐	Support for research and development (R&D)	
☐	Knowledge sharing	
☐	Market testing or pilot project	
☐	Provision of access to data and technical support	
Tick box below if relevant	**10.3. Financial support:**	**Tell us more: What type of support have you received? From whom?**
☐	Access to affordable capital for inputs, tools, and implementation (public sector-funded low-cost finance): grants, debt, equity instruments, price support instruments?	
☐	Access to affordable financial risk-sharing products: partial risk guarantees, partial credit guarantees, loan guarantees, policy guarantees, insurance products?	
Tick box below	**10.4. Enabling environment**	**Tell us more: What type of support**

if relevant		have you received? From whom?
☐	More flexible policy, regulatory and legal environment	
☐	Mitigation of local governance and security risks	
☐	Fostering public/private partnerships associated with concession agreement between the government and a private company	

11. **Has this support sufficient to address the barriers you have identified above?** Please specify why and if relevant what additional support may be required to support market growth?

12. **If the respondent has answered no to question 7,ask what would help to overcome these barriers?(Please refer to the list of possible actions under question 8)**

[Questions #13-17 for public sector; for private sector actors skip to question # 17]

13. **What is in your opinion the role of the private sector investments in this sector?**

14. **What are the potential challenges/barriers to private sector investment in this sector?**

15. **To what extent have you engaged with the private sector in this sector? Are you incentivized to do so?**

16. **What support could the public sector provide to unlock these private sector investments?**
    - ☐ Awareness-raising and capacity-building
    - ☐ Access to affordable capital for inputs, tools, and implementation (public sector-funded low-cost finance): grants, debt, equity instruments, price support instruments
    - ☐ Access to affordable financial risk-sharing products: partial risk guarantees, partial credit guarantees, loan guarantees, policy guarantees, insurance products
    - ☐ Policy, legal and regulatory reform
    - ☐ Other (Please specify _____)

E) <u>Existing business associations engaged in climate-related activities (10 mins):</u>

17. **Do you know existing business associations engaging in climate-related activities in your sector?** Please specify

18. **Could you please tell us more about the sort of support and engagement they provide to private sector on climate-related activities in your sector?**

Thank you very much for your time. Should you request it, we will keep you updated regarding the identified climate investment opportunities in Bangladesh along with the options that could support your business in this area.

F) Staying in touch (5 mins):

19. Would you like to remain informed about the MPI project's upcoming developments?

- ☐ Yes
- ☐ No
- ☐ Unsure

20. [If yes to question 19/above], please provide us with your contact details:

Email: _____

Telephone: _____

Annex 4. Stakeholder mapping

Type	Name	Relevant mandate	Relevant subsectors
Government institutions and regulatory agencies	**Ministry of Agriculture (MoA) – Seed wing**[16]	The administrative authority of the Seed Certification Agency (SCA). It deals with the personnel management and fund release for the development projects of SCA. It deals with seed dealer registration including enquiry about complain to and disciplinary matters. It is also responsible for developing and amending seed acts, rules and regulations and monitors their implementation. It organises seminars and workshops for disseminating information on seed technologies and training courses for capacity development of the seed professionals. This wing plays an important role in monitoring seed production, import, distribution and utilisation.	Agriculture/improved crop production
	Ministry of Agriculture (MoA) – Planning wing	Responsible for identifying the appropriate investment areas in the agricultural sector and planning, monitoring and evaluating agricultural development projects implemented by different agencies under the MoA. This wing also makes comments on the projects of NGOs, other relevant ministries and departments for protecting the interest of the agricultural sector in Bangladesh. Plays a vital role in monitoring physical and financial progress of the development projects and in reporting to the different Ministries and Divisions of the government like, the Ministry of Finance, Planning Commission, External Resources Division, IMED, PM Office, Parliamentary Committee, etc. It is also responsible for reporting on women development in agricultural sector.	Agriculture/improved crop production

[16] Further information is available at: http://www.moa.gov.bd/site/page/b4afc7c3-ebee-431a-914e-be193f9eecf1/About-MoA

Type	Name	Relevant mandate	Relevant subsectors
	Ministry of Environment and Forests (MoEF)	**MoEF** is the focal point for the UNFCCC and will lead on the development of the NAP and the implementation of the NDC, in collaboration with the relevant sectoral ministries and the Planning Commission.	All subsectors
	MoEF - Department of Environment (DoE)[17]	**DoE** ensures the effective implementation of environmental regulations, promotes awareness raising on environmental issues and undertakes sustainable actions to tackle environmental problems while ensuring public support and involvement.	All subsectors
	Ministry of Industries (MoI)	The Ministry of Industries aims to promote growth and development along with an environmental-friendly and safe industrialisation. It explicitly targets small and medium enterprises' (SMEs) development in the country, whose activities are exposed to climate impacts or produce GHG emissions. The 2010 national industrial policy[18] underscores Bangladesh's exposure to climate change and promotes the investment in climate-friendly projects, with an emphasis on public-private sector-partnerships.	All subsectors
	Ministry of Finance (MoF) - Economic relations division (ERD)	ERD is the country's National Designated Authority (NDA) to the. As the NDA screens funding proposals and accreditation applications, it plays a substantial role in channelling climate finance towards the private sector.	All subsectors
	MoF - Finance Division (FD)	The Finance division encompasses a Public-Private Partnership Unit responsible for the Viability Gap Financing (VGF) allocation. It targets projects where financial viability is not ensured but with a high economic and social	All subsectors

[17] (2015) Facts about DoE http://www.doe.gov.bd/site/page/03f09d82-fb8f-4952-b9cc-c46064635e3b/Brief-of-DoE

[18] (2010) Policy and Strategy for Public-Private Partnership (PPP) http://www.pppo.gov.bd/download/ppp_office/Policy-Strategy-for-PPP-Aug2010.pdf

Type	Name	Relevant mandate	Relevant subsectors
		potential	
	Ministry of Power, Energy and Mineral Resources (MoPEMR)	Responsible for power generation, transmission and distribution.	Power/Energy efficiency RE
	Ministry of Power, Energy and Mineral Resources (MoPEMR) – Power Division (PD)	Division responsible for all matters related to the power sector (generation, transmission, distribution). It also promotes RE and EE through formulation of policy/regulations, incentive mechanisms and research and development (R&D).	Power/Energy efficiency RE
	Ministry of Power, Energy and Mineral Resources (MoPEMR) – Power Division - Power Cell (PC)	Think-tank involved in providing expert services to the ministry regarding power sector development from both conventional and non-conventional sources of energy.	Power/Energy efficiency RE
	Ministry of Power, Energy and Mineral Resources (MoPEMR) – Power Division - Sustainable & RE Development Authority (SREDA)	Coordinates and facilitates the development of RE and energy efficiency: • to increase the share of RE in the energy mix for reducing dependency on fossil fuel, • to take appropriate measures for energy saving and to assess continuously for new potential sustainable energy solutions[19]	Power/Energy efficiency RE
	Ministry of Planning - Planning Commission (PCom)	The central planning organisation of the country. It determines objectives, goals and strategies of medium and short-term plans within the framework of long-term perspective and formulates policy measures for the achievement of planned goals and targets.	All subsectors

[19] Further information available at: http://www.sreda.gov.bd/index.php/site/page/f3f1-eb2f-ae16-d014-fc7c-af01-8d1b-f8cb-8e33-2915

Type	Name	Relevant mandate	Relevant subsectors
		Its activities includes the following elements:[20] Policy Planning Sectoral Planning Programme Planning Project Planning Evaluation	
	Public-Private Partnership (PPP) Authority	An autonomous office that sits under the Prime Minister's Office to support the implementation of the 2010 PPP policy. It supports line ministries to identify, develop, tender and finance PPP projects (Prime Minister's Office. 2010).	All subsectors
	Road and Highway Department (RHD)	Responsible for the construction and the maintenance of the major road and bridge network of Bangladesh[21].	Transport
	Road and Highway Division (RHD)	The highest policy making body of the road transport sector. This Division is headed by a full Minister. The Ministry has taken many mega projects around the country for the development of this sector, e.g. Elevated Express Highways project.	Transport
	Road Transport Authority (RTA)	A regulatory body to control manage and ensure discipline in the road transport sector and road safety related areas in Bangladesh[22].	Transport

[20] Further information available at: http://www.plancomm.gov.bd/
[21] Further information available at :http://rhd.portal.gov.bd/site/page/b34dca5c-5352-4fd2-9533-715058f45951/Overview-of-RHD
[22] Further information available at: http://www.brta.gov.bd/newsite/en/brta-at-a-glance/

Type	Name	Relevant mandate	Relevant subsectors
Solutions and technology providers/manufacturers	**Advanced Chemical Industries (ACI)**	A leading conglomerate in Bangladesh, with operations across four main business units: pharmaceuticals, consumer brands and commodity products, retail and agribusiness. Agribusiness is one of the important area of investment of the company. ACI is significantly contributing to national food security through its this division, which is the leading agricultural integrator of the country. ACI Agribusiness is providing complete solution to the farmers need from Seeds, Fertilizer, agro-machineries, Crops Care & Public Health, and Animal Health. They also provide different knowledge-based services on crop production through their field forces.	Agriculture / improved crop production
	Lal Teer (LT)	A R&D focused seed company in Bangladesh which commenced operations in 1995. It focuses on the production of high-yield seeds, sustainable agriculture and food security within Bangladesh and internationally. The company develops high yielding year round nutritious and ecologically sustainable crop varieties for supply to the growers to alleviate the nutritional deficiency of the population of the country. Lal Teer at present is marketing 131 varieties of 33 vegetable crops in the country.	Agriculture / improved crop production
	PRAN Group (PRAN)	Bangladeshi agribusiness firm producing more than 400 food products under 10 different categories (juice, drinks, mineral water, bakery, carbonated beverages, snacks, culinary, confectionery, biscuits and dairy).	Agriculture / improved crop production
	Rahimafrooz RE Limited (RREL)	A Bangladeshi conglomerate operating in eight main business ventures and a non-profit social enterprise for rural development. The main business operations focus upon: storage power, auto-motives and electronics, energy and retail. One of its specific business units that is of interest for this study. RREL specialises in solar energy solutions and has been a key organisation in the success of IDCOL's SHS programme. It has also undertaken numerous innovative ventures leading action on climate change in Bangladesh, including	RE

Type	Name	Relevant mandate	Relevant subsectors
		a joint venture with Australian Firm Carbon Planet to establish Bangladesh Carbon in 2009, enhancing engagement of Bangladeshi organisations with the CDM, and catering for the rural unbanked through their not-for-profit Rural Services Foundation.	
	Grameen Shakti (GS)	A subsidiary of the world leading social enterprise Grameen Bank, focussing on the development of RE systems in rural Bangladesh. Grameen Shakti has significant climate change relevant experience, including in the initial phases of IDCOLs Solar Home Systems (SHSs) programme, as well as biogas, solar irrigation and clean cook-stoves with the Kyoto Protocol's Clean Development Mechanism (CDM). Grameen's extensive network, including agricultural and rural capacity building programmes, provide the ideal opportunity to maximise paradigm shift and sustainable development benefits in energy access technologies.	RE
	Solaric (SL)	A RE-based SME, founded in 2009. It has been particularly influential in the R&D of solar products in Bangladesh including with IDCOL, but also the wider international market, with holdings in Malawi and Tanzania. Solaric also has good experience in international funding, including from the IFC based Small Enterprise Assistance Fund (SEAF).	RE
	Energy Pack- RE (EPRE)	Established in 2005,providing complete electronic solutions. It holds one of the most modern and pioneering electronics industry in Bangladesh. It includes sophisticated manufacturing equipment along with the research and development facilities.They have footprint in the development of solar- based RE projects. They pioneered in efficient LED production locally.	RE

Type	Name	Relevant mandate	Relevant subsectors
	Building Resources Across Communities (BRAC)	Has 16 social enterprises. Some operate in agribusiness and include the seed sector.With 22 production centres and about 7,000 contract farmers around the country BRAC is the country's largest producer of hybrid maize seed and second largest producer of potato seed. It has the largest market share for rice seed (hybrid and high-yielding varieties), maize seed, potato seed and vegetable seed. The seed and agro enterprise has established five seed processing centres with a processing capacity of 12,000 metric tons per year, along with 11 modern storage systems with the capacity of 4,400 metric tons. To ensure high quality seeds, the enterprise uses automatic polymer seed coating treatment (fungicide) and an automatic packaging system. Furthermore, it promotes environment-friendly farming by marketing micronutrients like zinc and boron in order to tackle the rising micronutrient deficiency in soil [23].	Agriculture/Improved crop production
	Pivot Engineering (PE)	Engineering company. Their main areas of work are: water treatment plants, effluent treatment plant, fabrication items, industrial chemicals, rice mill machinery[24].	
	Prokaushali Ali Sangsad Ltd (PSL)	Engineering consulting firm. Their main areas of work are: Off-grid / Mini-Grid PV design & implementation, Energy Auditing/ Energy Efficiency and On-Grid PV system design and implementation. The firm has provided technical assistance in power generation from nation's first solar mini grid of 100 kW in the remote island of Sandwip, Chittagong[25].	RE

[23] Further information available at: http://www.brac.net/brac-enterprises/item/899-brac-seed-and-agro-enterprise
[24] Further information available at:https://bd105432182.fm.alibaba.com/company_profile.html?spm=a2700.8304367.coowfd0405.1.76f1ac9fRVYnwb
[25] Further information available at :
http://www.psldhaka.net/sub_page/archive%20projects/First%20100%20KW%20Solar%20mini%20grid%20of%20Bangladesh/100%20kW%20solar%20mini%20grid%20sandwip.html

Type	Name	Relevant mandate	Relevant subsectors
	Filament Engineering Ltd[26] (FEL)	Filament Engineering Ltd.'s vision is to bring improved solutions for cooking. FEL is committed to improve the rural lives by reducing the health risks and help lower income groups in the society to help fight for financial solvency by reducing the costs of fuel while mitigating the energy demands for cooking in a smart way. FEL believes in lowering the respiratory problems and lung cancer patients among the underprivileged portion of our society and this will be done by aligning FEL's clean cooking stove research and continuous improvement.	Power/Energy efficiency
Commercial banks and other financial institutions	**Bangladesh Infrastructure Finance Fund Limited (BIFFL)**	A government-owned financial intermediary and mandated to finance large infrastructure projects which including power & energy, ports, connectivity, tourism and economic zones. It also wants to ensure a greener Bangladesh by supporting the finance in the sustainable energy development projects with an emphasis on RE, EE and eco-friendly projects. BIFFL is working to supplement government's vision of achieving middle income status of the country by 2021.	All subsectors
	Green Delta Insurance (GDI)	One of the leading private non-life insurance companies in Bangladesh. GDIC was incorporated in December 14, 1985 as a public limited company, under the Companies' Act 1913 and its operation started on 1st January 1986, with a paid up capital of BDT 30.00 million.	
	Pragati Insurance Limited (PIL)[27]	PIL is a leading private non-life insurance company in Bangladesh. It was established in 1986 by a group of young Bangladeshi entrepreneurs who had earlier launched a Commercial Bank in the private sector also. These Sponsors included Shipping Magnates, Engineers, Road Builders and Top Garment Industrialists.The company offers a complete range of general insurance products and services in motor, marine, energy, property and casualty, health,	

[26] Further information available at: http://cleancookstoves.org/partners/item/999/2091
[27] Further information available at: http://pragatiinsurance.com/

Type	Name	Relevant mandate	Relevant subsectors
		accident and liability areas.	
	Bangladesh Bank (BB)	The country's central bank and regulatory body for the country's monetary and financial system.	
	BRAC Bank (BRAC-B)	Established in 2001 is an SME focused bank that offers market loans at competitive rates. The green banking department's goal is to comply with the regulatory guidelines, align with internal green banking activities with the central bank and with internal policies of the bank. It offers products related to energy efficiency and RE. Most recently they have developed a product called - Planet Solution an Energy Efficiency Financing Loan to assist readymade garments and textile industries to invest in energy efficiency technology. These include audit and Energy Efficient equipment for borrowers at the rate of 6%. IFC is involved in this project. This is an unsecured loan (no collateral) offered to manufacturers and exporters in textile.	
	City Bank (CB)	One of the leading commercial banks within Bangladesh under the regulation of the Bangladesh Bank and the Bangladesh Securities and Exchange Commission (BESC). It commenced operations in 1983, and was listed on the Dhaka Stock Exchange in 1987, followed by the Chittagong Stock Exchange in 1995. In addition to its leading corporate finance role, City Bank also has a growing SME financing focus. Moreover, it is the only financial institution being institutionally assessed which has already accessed a specific international climate fund: The Global Climate Partnerships Fund (GCPF), providing low cost financing for EE and RE financing, from international donors including KfW, Deutsche Bank, the IFC, and UK Aid, amongst others. This is in addition to its Green Banking mandate from Bangladesh Bank. City Bank also has an established structured financing division and experience in large scale conventional power plant financing, blending finance from international and domestic institutions.	

Type	Name	Relevant mandate	Relevant subsectors
	Eastern Bank (EB)	Commercial bankthat provides products and services in retail banking, corporate finance, asset management, equity brokerage and security. It has 59 branches in Bangladesh and employ around 3,000 employees.	
	Green Delta Capital (GDC)	GDCL is a subsidiary of the leading non-life insurance company Green Delta Insurance, and is itself one of the leading corporate investment banks in Bangladesh under the regulation of BESC. It is perhaps better considered as a merchant bank given its significant expertise in international financing, especially from DFIs. It specialises in the arrangement and underwriting of financing deals between international financiers and domestic Bangladeshi institutions, bridging the gap between international and domestic capital markets.	
	Industrial Development Leasing Company (IDLC) Finance Limited	IDLC is a Non-Banking Financial Institution (NBFI) established in 1965 by domestic and international financing institutions, which include several DFIs such as IFC and the German Investment Corporation (DEG). It is now one of the largest NBFIs in Bangladesh, with a particular focus on SME financing, including innovative female focused financing products – the "Purnota loan". Additionally, IDCL also as a corporate financing division and experience in the Bangladeshi capital markets and project management. Moreover, IDLC has a particularly proactive stance on climate change, with an active role in the international financing fora with ratification of UNEPs Financial Institutions (FI) "Mobilising 100 FIs for energy efficiency" at COP21. To back this up, it has accessed finance from several DFIs for EE programmes and engaged in CDM financing with IDCOL, in addition to its Green Banking mandate from Bangladesh Bank.	
	Infrastructure Development Company Limited (IDCOL)	IDCOL was established on 14 May 1997 by the Government of Bangladesh. The Company was licensed by the Bangladesh Bank as a non-bank financial institution (NBFI) on 5 January 1998. Since its inception, IDCOL is playing a major role in bridging the financing gap for developing medium to large-scale infrastructure and RE projects in Bangladesh. The company now stands as the	

Type	Name	Relevant mandate	Relevant subsectors
		market leader in private sector energy and infrastructure financing in Bangladesh[28].Act as a fund manager for concessional funding received from JICA to finance EE measures in the cement and textile industries.	
	Mercantile Bank Limited (MBL)	A new commercial bank to provide efficient banking services and to contribute socio-economic development of the country. Commenced its operation on June 2, 1999[29].	
	Mutual Trust Bank Limited (MTBL)	First commercial bank in Bangladesh, introduced integrated irrigation finance scheme based on Solar technology. Also they have many innovative financing scheme to support sustainable technologies and management. Offers a green product called Green Energy Loan which finances customers to set up RE projects such as solar, biogas, wind, hydro, brick kiln financing and any other potential renewable plants finances. The bank lends to microfinance entities who lend to small borrowers for home and commercial uses. Through microfinance institutions they have funded 12 solar irrigation projects in North Bangladesh. Other examples of projects financed include green agro projects such as biogas, recyclable cups.	
	Climate Change Trust Fund (CCTF)	This is a national climate fund. CCTF funds programmes and projects from the national budget to help communities recover and become resilient to climate change impacts. Operational since 2010, the fund is currently managed by the Bangladesh Climate Change Trust and (BCCT) and the government, and has allocated Tk2,900cr during the last six fiscal years until 2014-2015[30]. It mainly focuses on adaptation.	

[28] Further information available at :http://idcol.org/home/about
[29] Further information available athttp://www.mblbd.com/home/about
[30] Further information available at :http://www.icccad.net/introduction-to-the-bangladesh-climate-change-trust-fund-2/

Type	Name	Relevant mandate	Relevant subsectors
	Southeast Bank (SB)	SB is a commercial bank that has, like City Bank,secured funding from the Global Climate Partnerships Fund (GCPF) to fund energy-efficiency projects in the textile industry.	Energy efficiency/textile
Academic institutions, consulting firms and think tanks	**Bangladesh Agricultural Research Council (BARC)**	It has the responsibility to strengthen the national agricultural research capability through planning and integration of resources. It is the umbrella under which the entire Bangladesh agricultural research effort is coordinated. This involved cooperative activities in several ministries of government: Agriculture, Forest and Environment, Fisheries and Livestock, Rural Development, Education, Industries, Commerce, Science and Technology, etc[31].	Agriculture/improved crop production
	Bureau of Research, Testing and Consultation (BTRC)[32]	Undertakes research, testing and consultation works in the field of engineering, architecture and planning as entrusted to them by private parties and by government and autonomous bodies.	Transportation
	Bangladesh University of Engineering and Technology (BUET)	Public university in Bangladesh, which focuses on the study of engineering and architecture	Transportation Power/energy efficiency
	Bangladesh Institute of Development Studies (BIDS)	BIDS is an autonomous public multi-disciplinary organisation which conducts policy oriented research on the development issues facing Bangladesh and other developing countries. The mission is to facilitate learning in development solutions by conducting credible research, fostering policy dialogue, disseminating policy options, and developing coalitions to promote informed policy making.	All subsectors

[31] Further information available at :http://www.barc.gov.bd/site/page/2a3319ef-08d2-4818-baf1-663832d9b582/Introduction
[32] https://www.linkedin.com/company-beta/13274622/

Type	Name	Relevant mandate	Relevant subsectors
	BRAC/EC3R	A consulting wing of BRAC and dedicated in the field of climate change and adaptation related policy and advocacy.	
	BRAC NGO (BRAC-NGO)	Bangladesh-based development organisation addressing poverty issues. It is the largest NGO in the world. It is active in 12 countries using a wide array of tools such as microfinance, education, healthcare, legal rights training and more to create opportunities for people most in need.	All subsectors

Type	Name	Relevant mandate	Relevant subsectors
	BRAC University (BRACU)[33]	BRAC University (BRACU) was established in 2001. Building on BRAC's experience of seeking solutions to challenges posed by extreme poverty, BRACU hopes to instill in its students a commitment to working towards national development and progress.BRACU is accredited by the University Grants Commission (UGC) and approved by the Ministry of Education, Government of Bangladesh.	All subsectors
	International Centre for Climate Change and Development (ICCCAD)	Based at the Independent University, Bangladesh. Its goals are to: • Train future and current leaders on Climate Change and Development • Conduct research to generate peer reviewed publications on Climate Change and Development, with a focus on Climate Change Adaptation • Build capacity, specifically for LDCs • Build and lead a network of partners, mainly consisting of Southern based institutes It focuses especially on the adaptation dimension.	All subsectors
	Centre for Policy Dialogue (CPD)	The Centre for Policy Dialogue (CPD) was established in 1993 as a non-profit civil society initiative with a view to advance the cause of a participatory, inclusive and accountable development process in Bangladesh and contribute to Bangladesh's socio-economic development and strengthened regional and global economic integration.	Agriculture/improved crop production

[33] Further information is available here: http://www.bracu.ac.bd/about

Type	Name	Relevant mandate	Relevant subsectors
		It focuses on: • Macroeconomic Performance Analysis • Poverty, Inequality and Social Protection • Agriculture and Rural Development • Investment Promotion, Infrastructure and Enterprise Development • Trade, Regional and Sub-regional Cooperation and Global Integration • Climate Change and Environment • Development Governance, Policies and Institutions • Post-2015 International Development Agenda	
	Future Carbon (FC)	Consultancy whose work centres on energy, environmental sustainability and to green development.	Power/Energy efficiency RE Transport
	Nature Conservation Management (NACOM)	NACOM is a Bangladesh-based environmental NGO with a broad mandate of activities in the area of natural resources management, climate change and livelihood development. NACOM has extensive experience in the design and implementation of various natural resources and environmental management programs. NACOM contributed to a project aimed to support the Bangladeshi government in translating the country's (I)NDC into concrete plans, to mainstream climate compatible development (CCD) into planning processes with the aim to ultimately strengthen institutions. NACOM has also been involved in preparing the country's Third National Communication (TNC), particularly the GHG inventory.	All subsectors
	United International University (UIU)	A private university approved by the Government of the People's Republic of Bangladesh and University Grants Commission (UGC).	

Type	Name	Relevant mandate	Relevant subsectors
	Bangladesh Centre for Advanced Studies (BCAS)	An independent, non-profit, non-government, policy, research and implementation institute working on Sustainable Development (SD) at local, national, regional and global levels. It was established in 1986 and over 30 years and has grown to become a leading research institute in the non-government sector in Bangladesh and South Asia. Encourages multidisciplinary and interdisciplinary in its approaches of running programs and projects by working under four broad themes, Environment-development integration, Good governance and people's participation, Poverty alleviation and sustainable livelihoods, Economic growth and public-private partnership[34].	Agriculture/improved crop production
	Energy Institute, Dhaka University (EIDU)	The institute has the following mandate[35]: • To do research and development activities in diverse areas of RE technology • To reduce dependence on non-renewable sources of energy and make Bangladesh energy independent • To build new research groups for doing research in the field of low cost, high efficiency Solar Cells, Solar Photovoltaic Power, Solar Thermal Power and other fields of RE • To conduct academic programs like MS, M Phil, PhD in RE Technology (RET) • To develop manpower through short term training courses	Power/energy efficiency RE

[34] https://www.bcas.net/
[35] http://www.du.ac.bd/academic/department_item/RET

Type	Name	Relevant mandate	Relevant subsectors
		• To conduct testing of various locally developed or imported devices of RET • To make collaboration with local and international organizations and universities for education and research in the field of RE • To support in Demonstration, Dissemination, Awareness of sustainable energy technologies, Analysis of country's specific problems etc. effectively • To support energy policies of the country • To educate and inform the general people including stakeholders that include residential, commercial, industrial and governmental organizations who are consumers of power and energy, the many benefit of RE • To seek funding, investments and donations for IRE from concerned citizens, organizations and companies that will fund the IRE's grants, research and development IRE will find (it possible) research and development of all RETs, as well as provide consulting advise to the activities of green energy	
Business and industry associations	**Association of Bankers, Bangladesh Limited (ABBL)**	Focuses on the banking industry, development of trade, commerce and industrial sector of Bangladesh. It aims to build a platform to exchange views with the regulatory bodies and other related associations.	All subsectors
	Bangladesh Merchant Bankers (BMB)	A common platform of the merchant bankers operating in the country.	All subsectors
	Bangladesh Seed Association (BSA)	This business association aims to ensure the availability of quality seeds for farmers at an affordable price. They have the following mandate: • Promote supply of quality seeds when and where needed and at reasonable prices for farmers	Agriculture/improved crop production

Type	Name	Relevant mandate	Relevant subsectors
		• Develop the seed industry in a healthy, stable, and sustainably growing atmosphere inculcating the collaborative spirit among all parties. • Promote appropriate regulation by representing interests of all members through lobbying with the government in the process of reviewing the seed laws, decrees, rules of the Bangladesh seed industry • Increase access and usage of information and new seed technologies, including management, marketing and collective promotion to expand the base of high-quality seed available to farmers in the domestic and foreign markets alike. • Promote development and breeding of new varieties	
	Association Bangladesh Agro-Processors Association (BAPA)	UndertakeS lot of activities including extensive motivational and skill development action plan, quality improvement and innovation with preservation techniques.	Agriculture/improved crop production
	Bangladesh Brick Manufacturing Owners' Association (BBMOA)	Established to support the brick fields owners, to develop the brick sector, to introduce new technology, rules and regulation, implement Government policies and raise awareness.	Power/Energy efficiency
	Bright Green Energy Foundation (BGEF)	ONCE of the leading organizations in the country to provide pollution free RE to the underprivileged rural people of Bangladesh through innovative monthly installment based financing model. BGEF's goal is to improve living environment of rural people, inspire them for better livelihood and to create awareness for climate change and mitigation for a bright green future of rural Bangladesh. Bright Green Energy Foundation (BGEF) has become IDCOL's (Infrastructure Development Company Limited) partner organization since June 2011. Since then it has successfully installed over 145,000 SHS in rural off-grid Bangladesh through its own network of 307 rural branch offices all	Power/Energy efficiency RE

Type	Name	Relevant mandate	Relevant subsectors
		over Bangladesh.	
	Bangladesh Solar and RE Association (BSREA)	Largest association of business houses and NGOs working for clean energy industry[36].	RE
	Dhaka Chamber of Commerce and Industry (DCCI)	Works with SMEs to facilitate business contact for penetration into new markets and a is a platform facilitating opinion sharing and recommendations in the sphere of trade, commerce and the overall economy. DCCI is the largest and most active chamber of the country.	All subsectors
	Federation of Bangladeshi Chamber of Commerce and Industry (FBCCI)	Consultative and advisory body	All subsectors
	Metropolitan Chamber of Commerce and Industry (MCCI)	Founded in 1904, the oldest and the pre-eminent trade organization of Bangladesh. Its membership roll encompasses leading commercial and large industrial organizations of the country, including public sector corporations and local as well as multinational companies. Presently, almost all major enterprises of the manufacturing and service sector are among its members. Provides a wide range of professional services to its members.[37]	All subsectors
	Khulna Chambers of Commerce and Industries (KCCI)	Established in 1959 and supports the business communities of the Khulna region. Khulna is the third largest city in the country, after Dhaka and Chittagong.	All subsectors

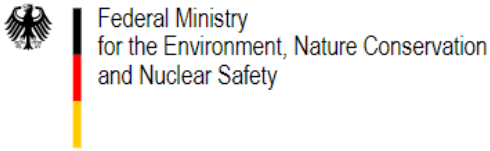
[36] http://cleancookstoves.org/partners/item/999/2343
[37] http://www.mccibd.org/pages/brief-history-of-the-chamber.php

Type	Name	Relevant mandate	Relevant subsectors
	SME Foundation (SMEF)	Established by the Government of Bangladesh under the Ministry of Industries as an apex institution for SME development in the country. Its major activities are implementation of SME Policy Strategies adopted by the Bangladesh Government, policy advocacy and intervention for the growth of SMEs, facilitating financial supports for SMEs, providing skill development and capacity building training, facilitating adaptation with appropriate technologies and access to ICT, providing business support services, etc.	All subsectors
Development partners and international finance institutions	**Asian Development Bank (ADB)**	Pilot Program for Climate Resilience (PPCR) interventions: • Coastal Towns Infrastructure Improvement Project • Strengthening the Resilience of the Urban Water Supply, Drainage, and Sanitation to Climate Change in Coastal Towns • Climate Change Capacity Building and Knowledge Management	All subsectors
	Adaptation Fund (AF)	As Bangladesh is a very vulnerable country to climate change impacts, funding from the AF could contribute to increasing its resilience.	All subsectors
	Climate and Development Knowledge Network (CDKN)	CDKN possesses an in-depth knowledge of the Bangladeshi private sector and its involvement in climate change adaptation thanks to the following programme: "Readiness of private sector investment in climate change (2015 – 2016)".	All subsectors
	Danish International Development Agency (DANIDA)	Inclusive green growth (2016-2021): The programme has a thematic focus on improving climate resilience and income generation among the poor and vulnerable to climate change as well as promoting private sector investments in sustainable and efficient energy solutions.	All subsectors
	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	Climate Finance Readiness. Supporting Strategic Engagement of the Private Sector' project (2015 – 2016)	All subsectors

Type	Name	Relevant mandate	Relevant subsectors
	Food and Agriculture Organization (FAO)	Inclusive green growth (2016-2021)	Agriculture/Improved crop production
	Global Climate Partnership Fund (GCPF) [38]	Works with City Bank and Southeast Bank to which it provides funding to finance energy-efficiency projects in the textile sector.	Energy efficiency
	Green Climate Fund (GCF)	Bangladesh is targeting the GCF for support for mitigation and adaptation actions. The Economic Relations Division in the Ministry of Finance has been designated as the National Designated Authority (the national focal point for the GCF in Bangladesh) and they have submitted a proposal to the GCF for building GCF readiness, for example by strengthening the country's coordination mechanism for GCF-related activities and identifying transformational investment opportunities in accordance with GCF's Investment Framework and Result Management Framework (GCF, 2015). Thus far, Bangladesh has received USD 40 million from the GCF for climate resilient infrastructure mainstreaming in Bangladesh, with a further USD 40 million of co-funding from the German Ministry for Economic Cooperation and the Bangladeshi Ministry of Local Government (GCF, 2015).	All subsectors
	International Finance Corporation (IFC)	Strategic Program for Climate Resilience (SPCR) (2010 - on- going)	All subsectors
	Japan International Cooperation Agency (JICA)	Country assistance policy in Bangladesh aims to accelerate inclusive economic growth and eradicate poverty39. Under the "Accelerate economic growth" area, JICA runs a "Private Sector Development Programme" that focuses on SMEs and PPPs' development.Provides concessional funding to SREDA tofinance EE measures in the cement and textile industries under the the EE	Energy efficiency

[38] Further information available at: http://www.gcpf.lu/energy-efficiency-in-the-textile-industry-bangladesh.html
[39] http://www.bd.emb-japan.go.jp/en/assistance/rollingplan2014.pdf

Type	Name	Relevant mandate	Relevant subsectors
		and Conservation Promotion Financing Project.	
	UK Aid		All subsectors
	United Nations Development Programme (UNDP)	Country work programme (2017-2020) : The programme's priorities are: • Ensuring economic growth is inclusive and supports economic opportunities, particularly for women • Improving social policies and programmes, with a focus on good governance and structural inequalities • Building resilience and improving environmental sustainability. UNDP intends to mobilise resources to secure private sector partnerships opportunities. Partnerships with the private sector will be explored through "Business Initiative Leading Development", the Federation of Bangladesh Chambers of Commerce and Industry, and the Business Call to Action.	All subsectors
	World Bank (WB)	The two following programmes can be of interest to support the investments in this scoping study's identified subsectors. • Bangladesh Insurance Sector Development Project (2017 – 2022): its objective is to strengthen the institutional capacity of the regulator and state owned insurance corporations and increase the coverage of insurance in Bangladesh • Power System Reliability and Efficiency Improvement Project (2017-2021): its objective is to improve the reliability and efficiency of the power system in Bangladesh through optimization of dispatch operation.	Agriculture/crop insurance Power/Energy efficiency



This document is an output from the Mobilising Investment project, an initiative of the Climate and Development Knowledge Network (CDKN) and Low Emission Development Strategies Global Partnership (LEDS GP) contracted through SouthSouthNorth (SSN).

The Mobilising Investment project is funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), on the basis of a decision adopted by the German Bundestag. Delivery partners for the project include the National Renewable Energy Laboratory (NREL), Overseas Development Institute (ODI) and PriceWaterhouseCoopers UK (PwC).