



Country scoping of research priorities on low-carbon transport in Bangladesh

January 2020



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Acronyms

AASGI	Accessible, Affordable, Safe, Green and Inclusive
ADB	Asian Development Bank
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BIWTA	Bangladesh Inland Water Transport Authority
BIWTC	Bangladesh Inland Water Transport Corporation
BRAC	Building Resources Across Communities
BRTA	Bangladesh Road Transport Authority
BRTC	Bangladesh Road Transport Corporation
BSTI	Bangladesh Standards and Testing Institution
BUET	Bangladesh University of Engineering and Technology
CAPS	Centre for Atmospheric pollution study, Stamford University
CBO	Community Based Organisation
CEGIS	Center for Environmental and Geographic Information Services
DFID	Department for International Development
DMTCL	Dhaka Mass Transit Company Limited



DTCA	Dhaka Transport Coordination Authority
EEG	Energy and Economic Growth Applied Research Programme
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GOB	Government of Bangladesh
HVT	High Volume Transport Applied Research Programme
ICCCAD	International Centre for Climate Change and Development
IMC	IMC Worldwide
INDC	Intended NDC (see also NDC)
IWT	Inland Water Transport
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
km	kilometre
LCT	Low-carbon transport
LIC	Low income Country
MIC	Middle Income Country
NDC	Nationally Determined Contributions
OPM	Oxford Policy Management
PCD	Project Closing/Completion Date
PPP	Public Private Partnership
RAJUK	Capital Development Authority
RSTP	Revised Strategic Transport Plan
SDG	Sustainable Development Goals
SASEC	South Asia Sub-Regional Economic Cooperation
TA	Technical Assistance



Reference No.	HVT/022.001
Lead Organisation/ Consultant	Richard Dietrich
Partner Organisation(s)/ Consultant(s)	N/A
Title	Country Scoping of Research Priorities on Low-Carbon Transport in Bangladesh
Type of document	Project Report
Theme	Low carbon transport
Sub-theme	Urban transport
Author(s)	Richard Dietrich
Lead contact	HVT Programme Management Unit
Geographical Location(s)	Bangladesh
Abstract	
<p>The UK Department for International Development initiated under its Energy and Economic Growth and High Volume Transport applied research programmes scoping studies to determine research priorities in low-carbon transport in low- and middle-income countries in Asia and Sub-Saharan Africa, including Bangladesh.</p> <p>The overall objective of these scoping studies was to identify priority research projects that could help advance the transition to a low-carbon transport system in low-and middle-income countries, including Bangladesh. The studies identified key challenges in transport and energy and research gaps in the target countries and determined a prioritised research agenda that can facilitate the transition to low-carbon transport.</p>	
Keywords	High Volume Transport, energy, South Asia, Bangladesh, priority research, electric vehicles, low carbon transport, transport and energy, transport energy nexus, emissions.
Funding	DFID/ UKAID via the Energy and Economic Growth Programme
Acknowledgements	The author would like to acknowledge the contribution of the following individuals and organisations in the creation of this report: IMC Worldwide Bangladesh office, ICCCAD, Rafi Zaman, Toufiq Imam, and Gary Haq.

Issue	Status	Author(s)	Reviewed By	Approved By	Issue Date
1	Draft V1	R. Dietrich	Gary Haq	Bernard Obika	15/01/2020
2	Draft V2	R. Dietrich	Nadeem Ahmed	Bernard Obika	29/01/2020
3	Draft V3	R. Dietrich	Nadeem Ahmed	Bernard Obika	15/02/2020
4	Final V4	R. Dietrich	Nadeem Ahmed	Bernard Obika	15/03/2020



EXECUTIVE SUMMARY

Bangladesh is one of the most densely populated countries in the World. It has made remarkable progress in reducing poverty and experienced steady growth in gross domestic product over the last decade, reaching around 8% in 2019. This has enabled Bangladesh on one hand to reach lower middle-income country status, but on the other hand has also increased urbanisation as well as the demand for transport. Insufficient planning and investment have resulted in severe infrastructure bottlenecks, congestion and air pollution. Transport demand has been increasing significantly, of which much was met by road transport. Urbanisation exceeded 36% in 2018.

Bangladesh's transport system consists of roads, railways, inland waterways, seaports for maritime shipping, and civil aviation facilities that cater to both domestic and international traffic. In 2015, road became the dominant mode of transport, carrying over 70% of passenger and 60% of freight traffic. Motor vehicle registration in Bangladesh is increasing rapidly, causing further congestion and pollution including carbon emissions. Non-motorized transport, such as bicycle rickshaws and walking, remains a very important mode of transport in Bangladesh, but is not generally promoted and largely discriminated in traffic, with any dedicated spaces for NMT – if available at all – being parked on or used otherwise.

Bangladesh is one of the most vulnerable countries in the world to the effects of climate change due to its low elevation, climatic conditions (high rainfall and temperature), high population density, high reliance on farming and inadequate infrastructure. It has included climate change resilience, mitigation and adaptation measures as well as GHG reduction measures in most – if not all – national strategies, policy documents and action plans. In this respect, Bangladesh plans to reduce GHG emissions in the transport sector by 9% below 'business-as-usual' by 2030, or 24% below 'business-as-usual' by 2030, conditional on support from developed countries.

The UK Department for International Development initiated under its Energy and Economic Growth and High Volume Transport applied research programmes scoping studies to determine research priorities in low-carbon transport in low- and middle-income countries in Asia and Sub-Saharan Africa, including Bangladesh.

The overall objective of these scoping studies was to identify priority research projects that could help advance the transition to a low-carbon transport system in low-and middle-income countries, including Bangladesh. The studies identified key challenges in transport and energy and research gaps in the target countries and determined a prioritised research agenda that can facilitate the transition to low-carbon transport.

This report relates to the low-carbon transport scoping carried out in Bangladesh. From the 1st to the 6th of December 2019, a scoping mission was undertaken to Dhaka to identify priority research areas related to low-carbon transport. The scoping exercise included semi-structured interviews, a workshop and literature review. In total, 21 stakeholders were consulted, of which six were from the Government (including government-controlled research centres), five from international development partners (including implementing partners), one from industry, three from NGOs, and six from national research institutes.

Based on the scoping study, this report recommends four research themes, including relevant research questions, as outlined below.

Building a credible transport emission baseline

Bangladesh lacks baseline emission data against which to base decisions, quantify the problem, and measure impacts. This relates to both vehicle types/groups and urban air emission levels. Capturing actual emission data may identify the next “culprit” to be removed from circulation as was the case with two-stroke auto-rickshaws several years ago. Vehicles emissions can only be tested at a single



location in Bangladesh. There are also insufficient air quality measuring stations across the country and especially in Dhaka.

- How do different types of vehicles (including modified ones) operating in Bangladesh contribute to emissions?
- What is the distribution of transport related emission especially in an urban context
- How are emissions levels forecasted to evolve, using comprehensive traffic model?

Non-motorised transport

Non-motorised transport (NMT), which forms a substantial part of transport in Bangladesh, is often neglected and/or discriminated against due to its contribution to traffic congestion. In some cases, attempts have been made to ban NMT from certain roads. In other areas bicycle and rickshaw lanes have been established, but frequently do not meet demand. Sidewalks – where they exist – are largely used for parking. NMT users face considerable road safety risks.

- What role does NMT play in Bangladesh? Who uses NMT and for what purpose?
- Can NMT effectively reduce GHG emissions?
- What incentives and urban planning approaches can incentivise NMT?

Designing a multi-modal, efficient freight system

Bangladesh's freight sector is largely fragmented with poor management of logistics and an absence of multimodal integration and planning. The majority of goods are transported on the road by small private truck operators using high polluting and overloaded trucks and contributing to traffic congestion on highways and air pollution. The so-called "covered van" dominates the sector and is a locally modified truck with poor safety standards, poor fuel efficiency and high emissions. The lack of standardisation in the freight sector, stifles efforts to improve efficiency and modernize. Shipping through inland waterways is under-utilised, despite being a potential form of lower-carbon transport throughout Bangladesh, and into India and Bhutan.

- Measure the impact of the informal "covered van" freight sector on road traffic and emission levels.
- What steps are required to build an integrated multimodal freight transport system?
- What is the potential to increase freight shipping via waterways in Bangladesh? What steps would need to be taken to manage inland waterways and control sedimentation and flooding while maintaining adequate water levels for shipping?

Designing an integrated, multi-modal urban transport system

Bangladesh lacks an integrated multi-modal urban transport system. Different forms of transport coexist and compete for (limited road) space, but are uncoordinated, integrated or complement each other. Transport modes are not integrated with one another, nor are they integrated with economic/business/commercial developments. This leads to inefficient use of transport and high reliance on motorised vehicles resulting in higher levels of polluting emissions.

- What is the current level of integration of urban mass transport? What are potential gaps or shortfalls in urban transport systems (especially in urban areas other than Greater Dhaka, which is well studied)?
- Can integration increase the efficiency & acceptance of public transport systems, leading to a higher share of overall urban transport?
- What is the potential for better coordinated and integrated transport services to reduce GHG emissions



1. Introduction

1.1 Background

The United Kingdom's Department for International Development (DFID)'s High Volume Transport (HVT) and Energy and Economic Growth (EEG) applied research programmes share common elements regarding transport and energy. IMC Worldwide (IMC) leads the HVT programme, while Oxford Policy Management (OPM) leads the EEG programme.

The EEG research programme examines links between energy and economic growth, working closely with policy makers in Sub-Saharan Africa and South Asia to build more sustainable, efficient, reliable and equitable energy systems. EEG research areas cover efficient and productive energy use, reliability, renewable energy and grid access.

In contrast, the HVT research programme aims to make transport safer, greener, more affordable, accessible and inclusive in low-income countries (LIC). The HVT research priority areas include climate mitigation and adaptation, inclusion, gender and road safety, policy and regulation, technology and innovation, fragile and conflict-affected states and research and uptake and capacity building.

The two programmes have joined forces to undertake a scoping exercise to examine low-carbon transport (LCT) and energy research priorities in the low- and middle-income (LIC/MIC) countries of Bangladesh, Nepal, Pakistan Uganda and Zambia. This joint IMC/OPM scoping exercise will maximise commonalities between the HVT and EEG programmes.

1.2 Objectives

The overall objective of the transport scoping exercise is to contribute to the transition to LCT in LIC/MIC in Asia and Sub-Saharan Africa by meeting research needs and enhancing knowledge and capacity in the areas of transport.

The transport scoping exercise will identify key challenges in transport and energy, research gaps in the target country and determine a prioritised research agenda that can facilitate the transition to LCT.

The following key questions will guide the scoping exercise in each country.

1. What are the key challenges to LCT in each country?
2. What type of research activities are being undertaken to assist address these challenges?
3. Which actors/organisations/research institutes are best placed to undertake this research?
4. Who are the main beneficiaries of such knowledge/research?

1.3 Research needs matrix

Sustainable mobility can be defined as one that is **Accessible, Affordable, Safe, Green and Inclusive (AASGI)**. The HVT Programme developed a matrix based on these key elements of sustainable mobility which lists the main actions or 'enablers' that allow these key elements to be achieved in practice.

The AASGI matrix (see Table 1) is used in this scoping exercise to categorise transport knowledge gaps and prioritise transport research needs in the five countries. It identifies which key elements of sustainable mobility require further research and capacity building.



Table 1: AASGI Matrix

Key Enablers	Accessible	Affordable efficient	Safe	Green	Inclusive
Policy, planning and regulations <i>Evidence based policy formulation and promulgation. Proactive, equitable and informed planning, and regulation of transport services.</i>					
Finance and economics <i>Access to infrastructure finance including private finance through Public-Private Partnerships (PPP) and similar structures. Understanding of economics around specific transport challenges</i>					
Governance and Institutions <i>Institutional changes that lead to improved capacity and efficiency, understanding and improving governance structures, and influencing behavioural change e.g. through the anthropology perspective.</i>					
Technology <i>Access to innovation and technology, and their impact on transport.</i>					
Data <i>Application, sources, and importance of big data in providing evidence for improved transport services.</i>					
Operations, service and management <i>Including day to day activities in public transport provision excluding construction of capital infrastructure.</i>					
Infrastructure <i>Including provision of physical assets, construction and engineering.</i>					

1.4 Country Focus

The HVT/EEG collaboration will focus on Bangladesh, Nepal, Pakistan, Uganda and Zambia. In addition, work will be undertaken in China and India that will complement this study.

The current report relates to the scoping carried out in Bangladesh in December 2019.



2. Transport Sector Context

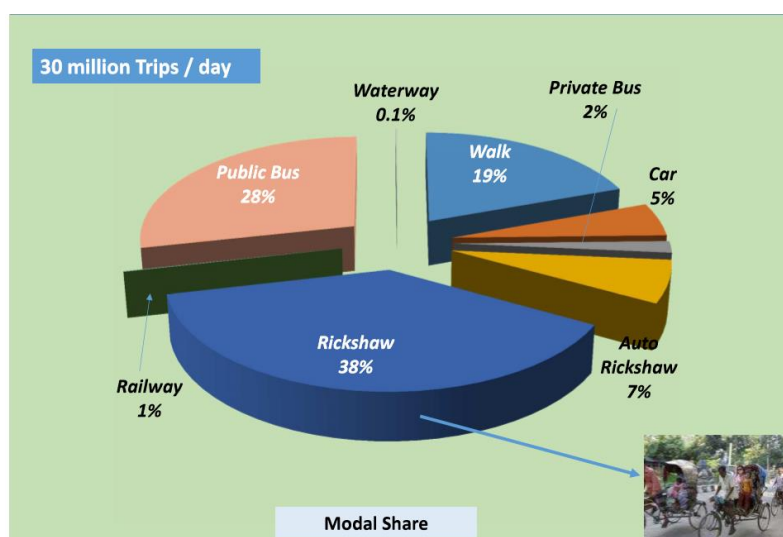
Bangladesh has a population of 164 million and is one of the most densely populated countries in the World (World Population Review, 2020). Over the last decade, Bangladesh has made remarkable progress in reducing poverty. This has been underpinned by steady growth in gross domestic product (GDP), which averaged 6.5% (The World Bank, 2019). Growth is expected to reach 8% in 2020 (ADB, 2019). Rapid economic growth has enabled Bangladesh to reach lower middle-income country status (2015). This has increased the demand for energy, transport and urbanisation. Insufficient planning and investment have resulted in severe infrastructure bottlenecks, congestion and air pollution (The World Bank, 2019).

Dhaka, the capital city of Bangladesh, has a population of about 17 million people and a population density of about 29,069 people/km² (UNESCAP, 2017). It is home to one-tenth of the country's population and generates at least one-fifth of its total economic output providing more than 40% of its formal sector jobs. Dhaka has also been instrumental in reducing Bangladesh's poverty rate. However, despite unrelenting efforts to upgrade the city's infrastructure, congestion is increasing, while the city remains vulnerable to flooding (IBRD, 2018).

Bangladesh's transport system consists of roads, railways, inland waterways, seaports for maritime shipping, and civil aviation facilities that cater to both domestic and international traffic. In 2015, road was the dominant mode of transport, carrying over 70% of passenger and 60% of freight traffic. The drop in market share of the railway as a carrier is the result of the long-term inadequate investment in railway infrastructure, causing inconvenient and unreliable operations and uncomfortable experiences for passengers (ADB, 2015).

While road transport is a main mode for transporting passengers and freight, in urban areas bicycle rickshaws and walking are also important, with a mode share of 38% and 19% respectively (2017), as shown in below **Error! Reference source not found.** (UNESCAP, 2017).

Figure 1: Modal Share in Transport in Dhaka (UNESCAP, 2017)



About 40% of two-wheelers and more than three-quarters of cars are registered in Dhaka, but only about 9% of auto rickshaws (ADB, 2015). This shows that auto-rickshaws are an even more important mode of transport in rural areas.

Bangladesh is vulnerable to the effect of climate change due to its low elevation, climatic conditions (high rainfall and temperature), high population density, high reliance on farming and inadequate infrastructure, which poses a significant risk to the sustainable development of the country. It has therefore adopted a two-fold strategy to tackle climate change. The main focus of Bangladesh's activities is on increasing climate resilience, while working to achieve lower greenhouse gas (GHG)



emissions. Bangladesh is committed to reducing GHG emissions in the power, industry and transport sectors by 5% by 2030, or by 15% if sufficient and appropriate support is received from developed countries. The transport sector would contribute a 9% reduction in GHG emissions by 2030 or 24% if support is received from developed countries (Ministry of Environment, 2018).

2.1 Key Trends

Historically known as a rural-agrarian country, today Bangladesh is experiencing rapid transformation towards an urban society. Urbanisation in Bangladesh has increased from 29% in 2008 to over 36% in 2018 (Statista, Dec 9, 2020). In the decade 2001-2011, the urban population increased more than that in rural areas. By 2047, 50% of Bangladesh's population is estimated to live in urban areas (Daily Sun, Oct 23, 2018).

Since 2009, Bangladesh's economy has grown by 188%. Exports have grown by 10% (2019) and have diversified. In addition, Bangladesh is now the fourth largest rice producer, the second largest jute producer, the fourth largest mango producer, the fifth largest vegetable producer, and the fourth largest inland fish producer in the world (The Diplomat, Nov 2, 2019).

Chittagong is the principal port, handling 85% of imports and 80% of exports. On average, the quantity of containers handled at Chittagong increased each year by 15% (2005- 2015) (ADB, 2015).

Motor vehicle registrations in Bangladesh have increased by 10.5% each year from 0.74 million (2003) to 1.34 million (2009) (ADB, 2015). In 2017, BRTA reported around 2.95 million registered vehicles in Bangladesh (Quora, Mar 5, 2017). The highest increase was for two-wheelers; excluding two-wheelers, the average annual increase was 7.4%. (ADB, 2015).

In the financial year 2013/14, about 65 million passengers were transported by Bangladesh railway compared with 43 million during the financial year 2003/04. Freight traffic in the financial year 2013/14 dropped to 2.52 million tons from 3.473 million tons in the financial year 2003/04 (ADB, 2015). The increase in passenger numbers may be due to the increased travel demand and population, while the decrease of freight appears to be a result of the identified lack of integration of the railways (see Section 5 below).

2.2 Key Sector Entities

The main government ministries and institutions involved in transport or transport-related climate change in Bangladesh are listed below.

While responsibilities in the transport sector and, hence, also in relation to LCT are fragmented, some key actors with respect to climate change in Bangladesh include:

The Ministry of Environment, Forest and Climate Change is the main Government body in charge of climate change policy making.

The Road Transport and Highways Division of the Ministry of Road Transport and Bridges, under which the Bangladesh Road Transport Authority (BRTA) falls. The BRTA is a regulatory body to control, manage and ensure discipline in the road transport sector, and road safety-related areas in Bangladesh. Many of the measures introduced by the BRTA will have a direct impact on transport-related GHG emissions even if the main objectives were otherwise. The BRTA also approves engine changes and use of LCT technology.

The Ministry of Railways is in charge of Bangladesh's railways, and therefore its policies, development plans and strategies are key to the reduction of GHG emissions in Bangladesh. Similarly, the Civil Aviation Authority of Bangladesh of the Ministry of Civil Aviation and Tourism, or the Bangladesh Inland Water Transport Authority of the Ministry of Shipping, regulate the aviation and shipping sectors respectively. Any introduction of technology or measures to reduce transport-related GHG emissions within the aviation and shipping sectors fall under their remit.



Finally, the City Corporations (including Dhaka North & Dhaka South) falling under the Ministry of Local Government, Rural Development and Co-operatives, and the various Development Authorities falling under the Ministry of Housing and Public Works, deal with LCT developments across the country, including non-motorised transport, public transport and related programmes.

There are, however, many other actors that have a role either in implementation or implementation of transport – including LCT – projects. The long-list of stakeholders in LCT in Bangladesh is as follows:

- Ministry of Civil Aviation and Tourism
 - Civil Aviation Authority of Bangladesh
- Ministry of Environment, Forest and Climate Change
 - Bangladesh Climate Change Trust Fund
 - Department of Environment
- Ministry of Finance
 - Economic Relations Division
 - Infrastructure Development Company Limited
- Ministry of Home Affairs
 - Police Department (e.g. including Metropolitan Traffic Police, Highway Police, etc)
- Ministry of Housing and Public Works
 - Development Authorities (various, including Capital Development Authority (RAJUK) previously called the Dhaka Improvement Trust)
 - Public Works Department
 - Urban Development Directorate
- Ministry of Industries
 - Bangladesh Standards and Testing Institution (BSTI)
- Ministry of Land
- Ministry of Local Government, Rural Development and Co-operatives
 - City Corporations (including Dhaka North & Dhaka South)
 - Local Government Engineering Department
- Ministry of Planning
 - Planning Commission
 - Bangladesh Bureau of Statistics
 - Central Procurement Technical Unit
- Ministry of Railways
 - Bangladesh Railway
- Ministry of Road Transport and Bridges (previously: Communication)
 - Road Transport and Highways Division
 - Bangladesh Road Transport Authority (BRTA)
 - Bangladesh Road Transport Corporation (BRTC)
 - Dhaka Mass Transit Company Limited (DMTCL)
 - Dhaka Transport Coordination Authority (DTCA)
 - Roads and Highways Department



- Bridges Division
 - Bangladesh Bridge Authority
- Ministry of Shipping
 - National Maritime Institute
 - Bangladesh Inland Water Transport Authority
 - Bangladesh Inland Water Transport Corporation
 - Bangladesh Marine Academy
 - Bangladesh Shipping Corporation
 - Department of Shipping
 - Port Authorities (various)
- Ministry of Water Resources
 - Centre for Environmental and Geographic Information Services (CEGIS).

2.3 Policy Context

Bangladesh is one of the most vulnerable countries in the world to the effects of climate change. As such, climate change resilience, mitigation and adaptation measures, as well as GHG reduction measures, have been included in national strategies, policy documents and action plans.

The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) is an overarching document on climate change. In addition, the Bangladesh Seventh Five Year Plan mentions three themes: climate change adaptation; implementation strategy on climate change resilience; and climate change mitigation. Bangladesh has also prepared an implementation roadmap for the Nationally Determined Contributions (NDC) to manage growing emissions without compromising the required development. The Roadmap and Action Plan for Implementing Bangladesh NDC: Transport, Power and Industry Sectors (2018), outlines the country's strategies, policies and action. The action plan covers the period 2016 to 2019 and 2020 to 2025, it describes what needs to be done by whom and by when, to deliver the required GHG emissions reductions.

Box 1 provides key extracts from the Roadmap and Action Plan for Implementing Bangladesh NDC: Transport, Power and Industry Sectors (2018). It shows the considerable level of inclusion of climate change resilience, mitigation and adaptation measures as well as GHG reduction measures in national strategies, policy documents and action plans (Ministry of Environment, 2018). Only the 2018 BRTA Act was added thereafter as it postdates the above document.

The longlist of relevant policy documents in Bangladesh is as follows:

- 2nd National Communication (2012)
- Bangladesh Climate Change Strategy and Action Plan (2009)
- Bangladesh Intended Nationally Determined Contribution (2015)
- BRTA Act (2018)
- Dhaka Integrated Transport Study
- Dhaka Metropolitan Development Plan
- Dhaka Structure plan (2016-2035)
- MRT Act (2016)
- National Action Plan on [Climate Change] Adaptation (2005)
- National Integrated Multi-Modal Transport Policy (2013)
- National Road Safety Strategic Action Plan (2007-2020)
- National Sustainable Development Strategy 2010-21 (2013)
- Railway Master Plan (2013)
- Revised Strategic Transport Plan (RSTP) (2016-2035)



- Roadmap and Action Plan for Implementing Bangladesh NDC: Transport, Power and Industry Sectors (2018)
- Road Master Plan (2009)
- Road Transport Act 2017
- Seventh Five Year Plan
- Strategic Transport Plan for Dhaka (2016-2035)
- The Perspective Plan of Bangladesh (2010-2021).

Box 1: Excerpts from the Roadmap and Action Plan for Implementation of Bangladesh NDC: Transport, Power and Industry Sectors (2018)

The Intended Nationally Determined Contribution (INDC) describes Bangladesh's plans for tackling greenhouse gas (GHG) emissions and adapting to unavoidable climate change. 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 transport sector would contribute GHG emissions reductions of 9% below 'business-as-usual' by 2030, or 24% below 'business-as-usual' by 2030, conditional on support from developed countries.

The Perspective Plan of Bangladesh 2010-2021 aims to establish a safe, low cost, modern and technologically dependable, environmentally friendly inter-modal transport system with a view to reducing the financial cost and time for both commercial traffic, cargo and for public transportation. The main strategies include to widen selected highways, expand and improve the railway system with the goal of increasing the market share of freight and passenger transport, establish a modern Mass Rapid Transit System (MRTS) in Dhaka and increase the number of modern high-capacity buses. Other options may include Construction of an overhead monorail system, elevated expressway and Circular waterways around Dhaka city.

While the Seventh Five Year Plan has an aim for the economic development of the country, this needs to be done in a sustainable way. It calls for improved efficiency in the transport network to ensure that Bangladesh remains within environmental limits whilst continuing to grow. This includes limiting GHG emissions from transport but also improving air quality and a range of resulting benefits (such as improved health from better air quality). The government recognizes that many road projects were initiated but completion rates were slow, that investments in railways and inland water have lagged behind, and that the urban transport issues (congestion and traffic management) remain overwhelming in the capital city of Dhaka. Therefore, specific focus is put on the improvement of the multimodal transport network, aiming at a significant increase in the share of traffic in rail and waterways. Also, urban traffic management and the maintenance of (especially) road transport infrastructure are seen to be key focus areas, as already highlighted in earlier policy documents and strategies.

The Integrated Multi-Modal Transport Policy aims to create a transport system that is safe, efficient, clean and fair by favouring greener, cleaner vehicles along with better public transport and measures that assist non-motorised transport and walking. It also aims at reducing the rate of road traffic growth. It suggests innovations in bus transport, encourage CNG vehicles, support solar powered refrigeration units for trucks; and use inland ports to accommodate waste matter from vessels to prevent it being dumped in waterways. One of the specific policy performance targets for the road sector includes the mandatory use of Social and Environmental guidelines for all road and bridge projects. Also, environmental standards for road transport are to be established.

The Road Master Plan (2009) for Bangladesh is intended to be the guiding document for investment in the road sector over the next 20 (twenty) years. It has been compiled following a thorough diagnosis of the existing problems of the Roads and Highways Department (RHD) road network, and the future challenges to be faced. The main objectives of the Master Plan are to set out a comprehensive



investment programme for new road construction, rehabilitation and maintenance of RHD network. Road Master plan emphasis on proper maintenance of existing road network for preserve the asset value and enhance and develop the strategic road network to meet economic and traffic growth.

The Revised Strategic Transport Plan (RSTP), 2016-2035 aims to ensure mobility and accessibility to urban services that are vital for the people and the society, by providing a transport system characterized by safety, amenity, and equity and sustained by an efficient public transport system. This includes several MRT and BRT lines, improved traffic management and traffic safety, selected arterial and ring road development, restructuring of the bus network including bus route franchise & replacement of bus terminals, the implementation of TDM measures and redevelopment of inter-urban roads.

The Bangladesh National Road Safety Strategic Action Plan is the key policy document to reduce accidents from Road. The 8th National Road safety strategic action plan aims to achieve the SDG target to reduce the number of road accident fatalities and injuries by 50% by 2020.

The Railway Master Plan (2013) guides the overall development of Bangladesh Railway (BR) in the foreseeable future and allows BR to go for planned and systematic development as opposed to ad-hoc initiatives. It gives attention on the main corridors where 90% of traffic takes place and focuses on the infrastructure requirement to be implemented during the period 2010 to 2030. The national climate change policies, development strategies and the relevant transport strategies all point to the importance of developing further rail transport. This is thereafter structured within the railway master plan which lays out the required infrastructure needs to implement the policies and strategies.

The Bangladesh Climate Change Strategy and Action Plan (BCCSAP, 2009) includes 'Improving energy consumption pattern in transport sector and options for mitigation'. Specific actions include (1) promotion of low cost public transport modes such as rapid transit; (2) reducing the use of fossil fuels by improving the efficiency of energy usage, (3) review of political, institutional and fiscal planning and (4) substitution of bio-fuels, fossil fuels as appropriate.

The transport priorities listed in the National Sustainable Development Strategy 2010-21 (2013) comprise an expansion and renewal of the railway network, increased focus on upgrading and maintaining the existing road infrastructure (rather than for the build of new road infrastructure), and the development of rural transport infrastructure by integrating road and inland water transport and improving channel and waterway conditions. Concerning urban transport, especially pedestrian traffic is to be prioritised. Also, public transport means are to be developed, especially with regards to the bus system and the rail system.

The 2nd National Communication of 2012 identifies the following potential mitigation measures in the transportation sector: Urban transport planning and traffic management to decrease congestion; Urban MRTS; Vehicle maintenance and eco-driving; Expansion and modernization of railways and a mode shift from road to rail and from road to waterways.

The Bangladesh's NDC implementation Roadmap includes cross-cutting NDC implementation issues to ensure that NDC implementation is taken forward in a holistic and effective manner as well as NDC Sectoral Action Plans for the Power, Industry and Transport sectors. Mitigation measures in the transport sector are grouped according to the 'Avoid-Shift-Improve' framework: Avoid reducing the demand and need for transport; Shift encouraging people to switch to lower-emitting modes of transport; Improve increasing fuel and vehicle efficiency. Measures to avoid the need to travel include: ICT has a key role to play in reducing demand for transport. Measures such as e-ticketing and e-billing are already being deployed. Shift measures include: mass rapid transit systems should be encouraged, in particular in Dhaka. The railways in Bangladesh have the potential to play a major role in the context of national and regional transport and trade as the country has a unique geographical location. Improve measures focus on the improvement of transport infrastructure for more efficient running.



Upgrading of all major highways from 2 lane to 4 lane could be an option for more efficient running of vehicles as major movements of both passenger and freight are on highways.

In addition to the climate change-relevant policies discussed above, is the Road Transport Act (BRTA Act, 2018), which was passed by parliament in September 2018, replacing the Motor Vehicles Ordinance 1983. BRTA is the regulatory body which controls, manages and ensures discipline in the road transport sector and road safety-related areas in Bangladesh. Many measures of the BRTA Act will have a direct and significant impact on transport-related GHG emission reduction in Bangladesh, albeit their main objective may be road safety or public health related.

The BRTA Act was passed in response to countrywide student protests after a reckless bus driver killed two students in Dhaka in July 2018. However, implementation was delayed, and road safety campaigners have alleged that the authorities are trying to secure the interests of transport owners and workers (NewAge Bangladesh, Jan 5, 2019). It was finally enforced from 1st November 2019, leading to protests by transport providers. Calling a wildcat indefinite strike, a section of transport owners and workers across the country started to put pressure on the government to amend the newly enforced Act (DhakaTribune, Nov 20, 2019). The government subsequently decided to soften their stance with respect to enforcement of the Act to avoid further chaos in the transport sector. It had already announced an extension until June 30th, 2020 by which time the drivers and owners of public transport will be able to update their driving licences and fitness certificates. The government also agreed to look into the nine-point demands, including amendments to the Act, the cargo transport leaders and workers had made. The Road Transport Act will be examined for inconsistencies before amendment (DhakaTribune, Nov 22, 2019).



3. Transport Supply and Demand

3.1 Transport supply

Bangladesh's transport system consists of roads, railways, inland waterways, seaports for maritime shipping, and civil aviation facilities that cater to both domestic and international traffic. Historically, the railway enjoyed a monopoly as a carrier and transported most principal commodities. However, the railway began losing market share, declining from 30% market share in 1975 to 4% in 2015 for both passenger and freight transport. As mentioned already above, road transport is now the dominant mode of transport.

The country has approximately 271,000 km of roads, including 21,000 km of major roads; 2,835 route-km of railways; 3,800 km of perennial waterways (which increases to 6,000 km during the monsoon) and the ports of Mongla and Chittagong; as well as three international airports (Dhaka, Chittagong, and Sylhet) and eight domestic airports.

In the past, most major transport infrastructure improvements have targeted roads, followed by ports (especially in Chittagong) and civil aviation. The length of the railway network has been virtually unchanged since being inherited from the British Indian Railway system in 1947; it is a disjointed network separated by the Jamuna River, with two separate and incompatible gauges. Navigable inland waterways have shrunk from about 8,000 km in 1970, partly because of inadequate dredging (ADB, 2015).

An urban road network should consist of primary roads, secondary roads, collector roads and access roads. Since almost all the urban centres in the country are not planned, road networks, intersections and links have not been built on the basis of modern principles of road design. The problems are worse at intersections. The road space not only fails to meet the minimum requirement in most of the large cities, but also does not cater to the needs of the pedestrians, cyclists, disabled or children (Jahan, 2014). Over 70% of the roads have no sidewalks, and for the remaining 30% of roads, having sidewalks, 40% are occupied illegally (Hasan, 2014).

In urban areas bicycle rickshaws and walking remain an important mode of transport.

3.2 Transport demand

The economic expansion and social development witnessed in Bangladesh since independence was accompanied by rapid growth in transport demand, at 9% per year. Much of this growth was met by road transport, which emerged as a dominant mode of transport over the years. A key reason for road transport's dominance is its efficiency relative to other modes. It provides door-to-door services, is more flexible, and completes the service in less time than competing modes. An important element in the dominance of road transport has also been the government's public expenditure policy that has favoured the road sector, at the expense of rail and river transport (Smith, 2009).

There are considerable variations in the projection of traffic on road by various studies. The Bangladesh Road Master Plan (1991) estimated that the average annual growth of both freight and passenger traffic would be 5-6%. The Bangladesh Road Master Plan (2005-2025), however, estimated that the growth of both freight and passenger traffic would be 6.4% per year for the period 2010-2015 and 6% over the Master Plan period (2005-2025) (Jahan, 2014).

Rapid urbanisation in Bangladesh has increased transport demand leading to severe congestion on roads and deterioration in urban environment. Such trends are likely to continue as further urbanisation takes place. The impact of such rapid growth has major consequences on the ability of the transport sector to provide mobility for all people as they seek to take advantage of employment, education, health and social opportunities. Unless properly checked and controlled, the consequent



growth in traffic congestion and air pollution will adversely affect the health and quality of life of the urban residents (Jahan, 2014).

Major problems of urban transportation in Bangladesh can be described in terms of the following: insufficient transport infrastructure and services; institutional deficiency; the varied traffic mix and increasing number of private cars; the absence of a dependable public transport system; and inadequate traffic management practices (Jahan, 2014).



4. Key International Development Programmes

Several international and bilateral funded development programmes are currently underway in Bangladesh affecting the transport sector. A longlist of project has been provided in the Appendix. While in one way or another most transport sector projects have an influence on transport related GHG emissions, the below active or proposed projects are considered to be most relevant to LCT.

The Asian Development Bank

- **Dhaka Mass Rapid Transit Development Project** Readiness Financing (Line 5, Southern Route): The ensuing project of MRT Line 5 (Southern Route) will comprise a total length of about 17.4 km between Gabtoli and Dasherbandi stations. The congested central area of Dhaka requires 12.8 km of underground section with 12 stations, while the remaining section will be elevated with four stations. (PCD June 2024)
- South Asia Sub regional Economic Cooperation **Chittagong-Cox's Bazar Railway Project**: The SASEC Chittagong-Cox's Bazar Railway Project, Phase 1 (the Project) will support the government of Bangladesh in constructing the new, 102 km Dohazari-Cox's Bazar section of the Chittagong-Cox's Bazar railway corridor in south-eastern Bangladesh. The government is upgrading the 47 km section Chittagong-Dohazari with its own funds. The project will also strengthen the capacity of the railway sector in project management and implementation. (PCD Jan 2026)
- **Strengthening Knowledge and Actions for Air Quality Improvement**: The proposed knowledge and support technical assistance (TA) will enhance the knowledge and capacity of participating developing member countries (DMCs) to develop policy actions and technological solutions for air quality management. (PCD Sep 2021)
- **Supporting Innovation and Knowledge Exchange for Transport Projects in South Asia**: Project preparation and implementation support to a number of projects in South Asian developing ADB member countries, as well as implement knowledge exchange and capacity building activities for a number of executing agencies and implementing agencies. Development and implementation of innovative features in at least four projects being implemented in 2018 -2020 or proposed for approval in 2019- 2020. Innovative features such as road and rail safety, engineering design, resettlement and rehabilitation, environmental issues, disaster risk management including climate change risks, gender mainstreaming, communication, asset management, and project finance, will be accomplished through knowledge exchange, collaborative learning, or South-South partnership. (PCD Dec 2022)
- **Railway Rolling Stock Operations Improvement Project**: Improve the operational efficiency of Bangladesh Railway through the procurement of modern rolling stock, preparation of investment projects to enhance its rolling stock maintenance capacity and support for the ongoing railway reform. (PCD Dec 2022)
- **Dhaka Metro Project**: Construction of a metro line in Dhaka as the backbone public transport system in an integrated urban transport system for the city. (PROPOSED)
- **Railway Rolling Stock Project**: Improve services on railways running between Dhaka and Chittagong, and Dhaka and Khulna. The project is financing the purchase of new locomotives, passenger carriages, four cranes, two train washing plants, a locomotive conduct simulator for training, and other rail equipment. (Jun 2021)
- TA: **Promoting Urban Climate Change Resilience in Selected Asian Cities**: foster urban climate change resilience in medium-sized cities and to build capacity to work together to prevent climate change indicated shocks and stresses. (PCD not available)
- **South Asia Sub regional Economic Cooperation Railway Connectivity: Akhaura-Laksam Double Track Project**: upgrading the 72 km Akhaura Laksam section of the Dhaka Chittagong railway corridor to a double track railway line with modern signalling equipment. The section is part of a major sub regional corridor and the Trans-Asia Railway network. (PCD Jun 2023)



- **Coastal Towns Environmental Infrastructure Project:** Develop climate-resilient infrastructure in eight vulnerable coastal pourashavas (secondary towns). The project will include investments in water supply and sanitation facilities, cyclone shelters, emergency access roads and bridges, and other municipal infrastructure. It will also strengthen urban planning and disaster preparedness, and conduct outreach activities. (PCD Dec 2020)
- **Coastal Climate-Resilient Infrastructure Project:** This project is proposed under the Government of Bangladesh's Strategic Program for Climate Resilience (SPCR), prepared under the Pilot Program for Climate Resilience (PPCR). The PPCR is a part of the Strategic Climate Fund (SCF) within the Climate Investment Funds (CIF), to pilot and demonstrate ways to mainstream climate resilience in development planning and management. (CLOSING)
- **Greater Dhaka Sustainable Urban Transport Project:** Develop a sustainable urban transport system in north Greater Dhaka. The project will include the construction of a 20 km bus rapid transit corridor, and depot and terminal facilities in Gazipur City. (PCD Dec 2020)

Japan International Cooperation Agency:

- National Transportation Network Development (PCD not available unless specifically stated)
 - Dhaka Integrated Traffic Management Project;
 - Revision and Updating of Strategic Transport Plan for Dhaka;
 - Dhaka Mass Rapid Transit Development Project (PCD Sep 2021);
 - Dhaka-Chittagong Railway Development Project.

The World Bank

- **Bangladesh Regional Waterway Transport Project:** improve Inland Water Transport (IWT) efficiency and safety for passengers and cargo along the Chittagong-Dhaka-Ashuganj Regional Corridor and to enhance sector sustainability. The Project consists of three components as follows: 1) Improved inland waterway navigation include work to guarantee advertised depths and widths of navigation channels on select river routes. 2) Improved services at priority inland waterway terminals and landing stations supports the development of two cargo terminals, four passenger terminals and 14 landing stations (or ghats). 3) Institutional capacity development and sector sustainability will support Bangladesh Inland Water Transport Authority's (BIWTA) overall enhancement of its management systems and human resources capacity for modern, efficient, and high quality management of the IWT sector in line with international standards, and to help BIWTA achieve long-term operational and financial sustainability, and enhance the climate resilience of the IWT sector. (PCD Dec 2025).

Other:

- **Improved protection of urban infrastructure from the consequences of climate change** (KfW / Green Climate Fund in Bangladesh) aims to strengthen the climate resilience of infrastructure in Bangladesh on a long-term and sustainable basis. (PCD not available).
- **Adaptation to climate change in urban areas** (GIZ) aims to contribute to increasing the resilience of extremely vulnerable population groups in urban areas in Bangladesh towards the impacts of climate change by 2020 by supporting the systematic consideration of the impacts of climate change on development and investment planning, as well as improving the access to and use of geospatial information. (PCD 2022).
- **Rehabilitation of Kulaura-Shahbazpur section of the Bangladesh Railway:** Part of the Trans-Asian Railway Network. (Governments of India & Bangladesh) (PCD not available).
- **Construction of Akhaura-Agartala rail link:** connect north-eastern Indian states with Bangladesh, creating a more-durable line for cargo transport. (Governments of India and Bangladesh) (PCD not available).



5. Challenges and Opportunities

During a scoping exercise undertaken in December 2019 to identify transport research priorities, the following challenges and opportunities were identified with respect to the transport sector in general and the possibility of reducing the transport-related carbon emissions in particular:

Lack of baseline emission data to make decisions on, to quantify the problem, and to measure any impact. This relates to both vehicle types/groups and urban air emission levels.

BRTA advised that while they capture basic data on the vehicle and owner, they did not in the past capture data on type of motor and fuel or any changes or adaptations made. It is noted that many vehicles imported to Bangladesh have been modified. Also, for annual inspections of vehicles they can only test vehicle emissions at a single location in Bangladesh. Capturing actual emission data may identify the next “culprit” to be removed from circulation as was the case with two-stroke autorickshaws several years ago.

There are also insufficient air quality measuring stations across the country and especially in Dhaka. It is understood that, of the limited number of stations in the capital, one is actually inside the US embassy where any measurements may not be representative for the rest of the city.

Fragmented institutional arrangements related to transport with multiple agencies and institutions with overlapping responsibilities operating in silos, making it difficult to plan and implement measures related to GHG reduction.

Participants stated that high-level coordination between ministries and agencies related to what projects will be pursued is lacking. At the initiation of a project there is a lack of clarity on who actually takes the lead. Such lead agencies often do not have the means and power to ensure integration, coordination and compliance by all actors with the required processes and reporting mechanisms.

Lack of understanding of the importance and potential of non-motorised transport (NMT), which forms a substantial part of transport in Bangladesh, and being low carbon, is often neglected and/or discriminated against due to its contribution to traffic congestion. Any dedicated spaces for NMT – if available at all – are often parked on or used otherwise.

NMT is neither understood nor appreciated, and not sufficiently promoted. It is often blamed for traffic congestion in urban areas and, in some cases, attempts have been made to ban it from certain roads. However, in other areas bicycle and rickshaw lanes have been established but do not meet demand and do not follow a holistic approach to transport planning and traffic management. Sidewalks – where they exist – are largely used for parking. NMT users face considerable road safety risks.

Poor fuel quality due to low grade fuel being produced in-country and/or the contamination during transport or storage (accidental and/or deliberate). This makes it difficult to upgrade to lower emission motors and/or comply with emission levels. Bus and truck owners objected to stricter enforcement of emission standards as long as the Government cannot guarantee fuel quality. It is understood that research is being carried out by Stamford University related to this issue.

Fragmented and unregulated ordinary bus transport sector dominated by the private sector, with complicated owner and operator arrangements and being highly politicised, with powerful lobby and owner/driver associations. Private owners (one or several individuals) own old buses with poor fuel efficiency and high tail-pipe emissions and no roadworthiness certificates. These are leased to one or more drivers to operate transport services at their own risk competing with other drivers. There is no bus-route franchise. High competition leads to low prices and reckless driving to reach customers. Many drivers do not have the required licenses. This issue was the cause for the strike of part of the transport sector which has forced a delay in enforcement of the 2018 BRTA Act. It is understood that the World Bank is assisting the Government to address this issue.



Lack of a comprehensive traffic and transport model for Dhaka informing traffic management, transport and urban planning to improve transport and reduce traffic congestion and hence polluting air emissions without increasing the number of vehicles in the city.

Lack of application of existing research. Significant (academic) research has been carried out in Bangladesh with respect to transport and/or climate change. Policy makers are often not aware of relevant research, or it is not accessible, or it is not understood, or there is a lack of will to act upon it.

Lack of or insufficient implementation and/or enforcement of existing policies, strategies or action plans for various reasons, including capacity, political, technical or organisational issues. Participants were of the opinion that if all existing policies were implemented, this would have a large impact on transport-related GHG emissions in Bangladesh.

Fragmented freight transport sector with poor management of logistics and an absence of multimodal integration and planning. This results in the majority of goods being transported on the road by small private truck operators using high-polluting and overloaded trucks and contributing to traffic congestion on highways and air pollution. The so-called “covered van” dominates the sector and is a locally modified truck with poor safety standards, poor fuel efficiency and high emissions. The covered van is more attractive to freight service providers and customers as container transport, because containers need to be returned and have a cost of storage. A service using containers requires better advance planning, while the covered van provides more flexibility at a lower cost.

Poor understanding of the potential of rail with respect to freight. A lack of awareness and capacity is blocking the provision of integrated door-to-door freight services using railways. Instead, Bangladesh Railways focuses on passengers and rehabilitation of mainline/rail corridors.

Poorly trained licensed drivers (private and public transport). Drivers within the transport sector often do not have the required licenses. They are poorly trained and do not comply with laws and regulations. This leads not only to accidents but also inefficient driving, congestion and hence higher emission levels. The passing of the 2018 BRTA Act as well as its delay in enforcement relate to these issues with different lobby groups pushing for strict enforcement (students) or amendment (drivers).

General lack of awareness and/or sensitivity on low-carbon transport and its benefits and opportunities by the general public, policy/law makers, law enforcement, private sector and industry, leading to missed opportunities and lack of pressure or motivation to change. While most people are aware that polluting vehicle emissions are bad for their health, they lack specific knowledge about the risks. Many have no choice as transport demand exceeds transport supply.

Lack of urban multi-modal transport integration and integration of urban transport with economic/business/commercial developments. This leads to inefficient use of transport and high reliance on motorised vehicles resulting in higher levels of polluting emissions. Different forms of transport coexist and compete for (limited) road space, but are uncoordinated, integrated and do not complement each other. The issue of bus services has been highlighted separately, but stakeholders are concerned about how ordinary bus services will be integrated with MRT and BRT. Parking space and uncontrolled parking is also a concern.

Poor utilization of inland water transport for freight as this mode of transport is considered to be slow, inefficient or often inhibited due to sedimentation. There has been a lack of investment and poor institutional arrangements and multimodal integration, and integration with industrial or economic development zones is poor. Sedimentation is a major issue for IWT, along with blockages of waterways by developments or waste (urban areas). Conflicting priorities in the management of rivers and waterways by different agencies (for example, flood prevention versus shipping) is unhelpful in this respect. Other problems include unstable embankments, lack of flood control mechanisms to ensure water levels for shipping, and poor sediment control (expensive dredging).



Insufficient means and/or capacity of traffic/transport police and other law enforcement agencies to enforce regulations and laws related to traffic and transport which would lead to GHG reduction.

Insufficient understanding of alternative (low-carbon) vehicle technology and lack of related policies. This leads to prejudices, misinformation and lost opportunities. This affects diesel, petrol, CNG, LPG, hybrid and electric cars and commercial vehicles. Perceptions relate to cost of purchase, operation and maintenance (cost), vehicle emission levels, carbon footprint, availability of maintenance capacity and knowledge in-country. Lack of policy on introduction of electric vehicles (albeit under development) and lack of general policy on introduction and/or phasing out of technology.



6. Methodological Approach

6.1 Overview

This LCT scoping study consisted of three key steps:

1. Stakeholder interviews with 8-12 key stakeholders to collate contextual information on low-carbon transport and to identify key research areas of importance.
2. A stakeholder workshop where participants discussed, developed, categorised and prioritised key research areas/knowledge needed to facilitate the transition to low-carbon transport.
3. Survey of current literature relevant to the target country.

6.2 Stakeholder Interviews

The objective of the stakeholder interviews was to identify key barriers to low-carbon transport in Bangladesh, and to determine a provisional list of research needs that will support the transition to low-carbon transport.

Interviews were undertaken with senior individuals from five stakeholder groups: (i) government; (ii) international organisations, (iii) industry and industry association; (iv) NGOs; and (v) research institutes. The output of the interviews provided a list of research themes with examples of research questions that were discussed at the stakeholder workshop. The interviews took approximately 60-75 minutes and were, where possible, recorded. The interviews also provided an opportunity to obtain local knowledge and obtain key publications relevant to the target country (for example, policies, national level studies, etc.).

Interview questions were as follows:

1. *What are the key challenges that are making the implementation of LCT difficult to achieve, and what research is needed to overcome these challenges?*
2. *What priority is given to reducing GHG emissions in national/local decisions that affect transport?*
3. *How desirable is it to promote LCT over the coming years? Why is it important (or not) to promote this?*
4. *What knowledge is needed to overcome these challenges (e.g. developing capacity, and sharing knowledge/good practice/tools)?*
5. *How can research and knowledge play a role in removing barriers? If so, what knowledge?*

6.3 Stakeholder Workshop

The objective of the stakeholder workshop was to elaborate the list of research projects that could facilitate the transition to an LCT system in Bangladesh and to gain input for a capacity research strategy.

The workshop was divided into the following sessions:

- Introduction to the HVT/EEG study its objectives and structure.
- An exercise to discuss the identified (during the interviews) challenges and research needs to validate them and identify additional LCT challenges. Also, participants were asked to state if they were aware of someone already addressing any issue.
- A second exercise to categorise the selected questions according to the ASSGI matrix and to prioritise them, followed by the identification of actors which could undertake the research.



7. Overview of Process

From 1st to 6th December 2019 a scoping mission to Bangladesh was undertaken to identify priority research areas related to LCT. In general, the methodology outlined in Section 6 above was followed including semi-structured interviews, followed by a workshop and literature review.

During the scoping in Bangladesh, 21 stakeholders were consulted (interviews and workshop) of which six were from the Government (including government controlled research centres), five from international development partners (including implementing partners), one from industry, three from NGOs, and six from research institutes.

The semi-structured interviews identified the key challenges that make the implementation of LCT difficult to achieve in Bangladesh and as well as the research needed to overcome these challenges

The workshop identified additional research needs, categorized them into the AASGI Matrix (see **Error! Reference source not found.**3 below) and then prioritized them. In the AASGI Matrix participants have attempted to allocate the identified research topics to key enablers (rows) and general requirements transport must comply with (columns). The result provides a snapshot of priority areas to look into. The participants also prioritized the specific research topics identified. Those topics that received high-priority points from the participants have been grouped into High and Medium-High Priority Research Areas.

Following the workshop, the interim findings were summarised, and a brief review of relevant literature and policies undertaken before writing this final report. The team converted the themes identified in the workshop into more specifically researchable questions. Duplicates were removed, as were topics that did not fit with the priorities of EEG, CCG or HVT. Questions covering similar thematic areas amalgamated where possible. The main objective of this exercise was to finalise the thematic areas and sub-questions, striking a balance between researchable topics and adequately reflecting the questions identified by the main stakeholders. This resulted in four proposed research topics to take forward, outlined in Section 9.

A valuation exercise was carried out at the end of the workshop. Nine forms were submitted which are shown in Appendix D. The feedback is summed up in **Error! Reference source not found.**2 below.

Table 2: Summary of Workshop Feedback

Usefulness	4.6	Poor: 1; 5: Excellent
Relevance	4.6	Poor: 1; 5: Excellent
Methods	4.7	Poor: 1; 5: Excellent
Value of Learning	3.8	Much less than expected: 1; As expected:3; Much more than expected: 5
Likely to submit a research proposal	4.1	Never: 1; 5: Guaranteed
Likelihood to continue relationship with HVT	4.3	Never: 1; 5: Guaranteed

During the workshop available research capacity in Bangladesh was identified. This capacity includes universities, including the ones that participated (such as BUET, Stamford and Jahangirnagar), as well as Government agencies (such as BRTA & CEGIS and ICCCAD) and NGOs (such as BRAC).



Figure 2: Pictures of Scoping Workshop in Bangladesh



Table 3: AASGI Matrix completed during scoping in Bangladesh

AASGI Matrix	Accessible	Affordable & efficient	Safe	Green	Inclusive
Policy, planning and regulations		●●	●	●●●	●●●●
Finance and economics	●			●	●
Governance and Institutions		●	●	●●	●●
Technology		●			
Data	●●●●	●			●
Operations, service and management	●	●●●			●
Infrastructure	●●	●	●	●●	●●●●

Table 4: Details of Participating Stakeholders

Sector	No	Organisation	Name	Position	E-mail	Inter-viewed	Work-shop
Government (both transport and non-transport, such as energy and environment)	1	Bangladesh Road Transport Authority	Md. Lokman Hossen Mollah	Director (Engineering) Engineering Wing	de@brta.gov.bd	√	√
	2	Dhaka North City Corporation	Dr Engr. Tariq Bin Yousuf	Project Director	tariqbinyousuf@gmail.com	√	X
	3	Dhaka Transport Coordination Authority (DTCA)	Md Anisur Rahaman	Traffic Engineer, Project Director	anis89buet96@gmail.com	√	X
	4	Center for Environmental and Geographic Information Services (CEGIS)	Malik Fida A Khan	Executive Director (In Charge)	mkhan@cegisbd.com	√	X
	5		Soumitro Das Shuvro	Research Consultant		X	√
	6	Roads & Highways Department Bangladesh	Jalaluddin Al-Quaderi	Former Secretary	jalal.quaderi@gmail.com	√	X
International development organisation	7	ICCCAD	Sherpard Zvigadza	Visiting Researcher	szvigadza@gmail.com	√	√
	8		Sharder Shafiqul Alam	Coordinator	atan.badla1@gmail.com	X	√



Sector	No	Organisation	Name	Position	E-mail	Inter-viewed	Work-shop
	9		Sumaya Rahman	Internship	sumrahman44@gmail.com	X	√
	10	DFID Bangladesh (Extreme Poverty, Resilience & Climate Change Team)	Anna Balance	Climate & Environment Advisor	a-balance@dfid.gov.uk	√	X
	11	Asian Development Bank	Md Humayun Kabir	Associate Project Officer (Transport)	mkabir@adb.org	√	X
Industry & industry association	12	Toyota (Navana Bangladesh)	Safqat Ahamed	Senior Manager	shafqat@amartoyota.com	√	X
NGOs, CBOs & Civil Society Organisations	13	Climate Change, BRAC and BRAC	Ms Nazria Islam	Senior Manager	nazria.islam@brac.net	√	X
	14	International Urban Development, BRAC	Abu Sadat Moniruzzaman Khan	Programme Head	abu.khan@brac.net	√	X
	15	BRAC	Md Bodrud-doza	Deputy Manager	bodrud.d@brac.net	x	√
Research institutes or universities	16	BUET	Dr Ashraf Ali	Professor	ashraf@ce.buet.ac.bd ; mashrafali88@gmail.com	√	X
	17		Dr Tanvir Ahamed	Professor	tanvir96@gmail.com	x	√
	18		Prof. Md Shamsul Hoque	Professor	shoque@ce.buet.ac.bd ; shoque@gmail.com	√	X
	19	Centre for Atmospheric pollution study, Stamford University	Dr. Ahamed Kamruzzaman Mojumder	Director	kamrul_sub@hotmail.com	√	√
	20	Stamford University	Abdullah Al Nayeem	Lecturer	nayeem.env58@gmail.com	x	√
	21	jahangirnagar university	Dr. Shafiq-Ur Rahman	Professor	shafiq_urp@yahoo.com	x	√



8. Long-list of Research Topics

The below list of research themes were highlighted by the participants during the scoping exercise for further investigation. The highest priority interventions – as per the prioritisation exercise carried out during the workshop – are also indicated:

8.1 Higher Priority Research Topics

What is the specific contribution of transport-related (GHG) emissions of different types of (modified) vehicle operating in Bangladesh, and what is the actual distribution of transport-related emissions over the country, but especially within Greater Dhaka?

The research aims to identify those vehicle groups and technologies operating in Bangladesh that contribute most to transport-related GHG emissions. The research also aims to identify the emission hot-spots across the country, but specifically in Dhaka. Further, measures that could be taken to achieve significant improvement at affordable cost will be identified. The answers to both will guide decision takers to take appropriate measures to help achieving Bangladesh's NDCs.

The research will provide the baseline for determining the impact of interventions and – in combination with a comprehensive traffic model – allow forecasting of emission development. Especially in an urban context such as Greater Dhaka participants felt that an air quality management system was needed, which requires significant investment.

In relation to the above, BRTA, which controls vehicle licencing, registration and inspections, may require support in updating their database of licensed vehicles with data on engine type and fuel information, as well as adaptations performed on the vehicle. Such efforts will require a significant increase in capacity and investment, especially into mobile emission testing equipment and the related training.

What is the role (positive and negative) and importance of NMT in Bangladesh and what is its potential to contribute to the reduction of transport-related GHG emissions?

As mentioned in the report, NMT plays an important role in the transportation sector in Bangladesh but is often neglected by decision makers and discriminated by other road users who use NMT spaces for parking, commerce, driving, etc. The research will identify and better quantify the importance of NMT in Bangladesh and its contribution to GHG reduction. The research should also examine what would happen in terms of GHG emissions if NMT users switch to other means of transport. The research should identify the factors that limit the growth of NMT and what could be done to remove such obstacles, as well as the potential measures to be taken to make NMT more attractive and efficient, and to capture a larger share of the transport sector.

Different city councils follow different strategies with respect to NMT, from trying to simply ban it off the road to promoting it with special lanes and infrastructure. However, NMT plays an important role in Bangladesh, including in urban areas such as Greater Dhaka. Research should provide clarity on the benefit of a combination of measures not only with respect to GHG reduction, but also for air quality and road safety. In addition, it should be determined how NMT can best be integrated with the other forms of transport without causing traffic congestion (as is currently the case).

What are the limiting factors within the current institutional arrangements related to (low-carbon) transport planning and implementation, and how can these be removed?

The research will identify the issues within the institutional arrangements that currently affect the efficient planning and implementation of transportation projects, in particular those with the objective or scope to reduce transport-related carbon emissions. It is expected to identify measures that could be implemented to achieve improvements and streamline processes.



There are many government stakeholders involved in – especially urban – transport planning, management and implementation of projects. There is an overlap of responsibilities and possibly gaps, and different stakeholders pursue different agendas. Recommendations are needed for simplification, improvement and restructuring, informed by well-functioning arrangements in countries of similar structure and development. Capacity assessments of relevant actors and related recommendations on capacity building and enhancements would be beneficial.

8.2 Medium Priority Research Topics

What are the current and expected future traffic flows in Greater Dhaka considering current and future developments, and how does this affect transport related emission levels, in particular carbon emissions?

Combined with the above research on the contribution of transport-related (GHG) emissions, this research will allow the improved forecasting of GHG emissions and provide tools and approaches to decision makers to steer the transport sector and related development programmes towards an LCT sector in Greater Dhaka.

While there are many different studies related to different projects, a comprehensive traffic model, especially for Greater Dhaka, is lacking, and there is generally no link to transport-related emissions. The research is expected to consider different transport modes and vehicle types to facilitate traffic planning and management, as well as transport and urban planning, and to determine the effect of proposed interventions on traffic and emissions.

The model should be linked to emission data to allow the modelling of emissions and the effects of related policies and action plans. This should also lead to the recommendation of "quick win" improvements such as parallel one-way arrangements, introduction of separate cycle and bus lanes, grade separated crossings for pedestrians, parking areas, park and ride arrangements. They should aim to improve transport and reduce traffic congestion (without attracting more vehicles) and polluting vehicle emissions, including GHG.

What research exists in Bangladesh, or elsewhere, on transport or transport-related emissions that relates to LCT and could be used to inform decision makers, and how do the different research findings compare? How, if at all, have relevant research findings been interpreted by decision makers and incorporated into current regulations, laws, acts, policies, strategies and action plans?

Bangladesh has some of the leading climate change researchers in the world and a lot of research and information is available. However, these are not always known to relevant stakeholders, accessible or understood. This is especially prevalent with government actors. The provision of a central database would allow stakeholders to access such information.

8.3 Lower Priority Research Topics

How is the freight and trade transport sector currently organised and structured, and how does this affect transport-related GHG emissions or initiatives to reduce these? What is the scope for improvements leading to GHG reductions, including the better integration of rail-freight with other transport modes and economic developments?

This research will cover the impact of the informal "covered van", which is a locally modified vehicle that dominates the road-based freight sector and has a significant effect on road traffic and emission levels. It will also identify how the railway system can be better used for freight, and how the different modes of freight transport can be better integrated. Recommendations are required on the improvement of integrated multimodal freight transport and transport and infrastructure planning, as well as the development of integrated action plans and delineation of clear responsibilities. Ideally, there should be the development of a trade transport policy.



What are the typical behaviours, motivations and awareness of emissions of drivers in Bangladesh? What approaches can be developed that would lead to behavioural change and hence low-emission driving?

Many drivers of busses and trucks, but also personal cars, engage in inefficient, inconsiderate or unsafe driving. Reasons appear to be simple: the bus fees and cost of freight are too low and competition too high to justify better qualifications (and more modern vehicles) and – especially in Greater Dhaka – unless you are a bully you don't get anywhere and certainly no customers. But the answer may actually be more complex, and addressing this issue may not only improve driving behaviour and hence contribute to the reduction of road accidents and also (GHG) emissions, but also allow the – currently suspended – implementation of the 2018 BRTA Act which will lead to a whole range of improvements.

What are the limiting factors and obstacles for increased freight transport on inland waterways, and what approaches or tools can be used to increase the share of freight related IWT? What carbon emission reductions could be achieved and at what cost and what would be the general economic impact of increasing IWT?

Bangladesh has a large network of inland waterways, which was even larger in the 1960s. Inland shipping has the potential to extend to India and Bhutan. Constraints include the management of inland waterways by different actors with different agendas (for example, shipping versus dewatering and flood control) and especially the issue of sedimentation. Research is required not only into ways to better control sedimentation and flooding on the one hand, but to also ensure adequate water levels and depth within shipping channels, and the stability of embankments, at reasonable cost. All environmental, social and land issues must be considered, including retention areas, loss or gain of usable land, stability of embankments, loss or gain of livelihoods, etc. Also, the integration with other means of transport needs to be considered.

What vehicle technologies that have a lower carbon footprint than those predominately used in Bangladesh, are currently available in Bangladesh or similar economies and environments? What are the misconceptions and limiting factors that prevent roll-out of these technologies?

There are a whole range of misconceptions on cost (purchase, operation and maintenance), availability of technical capacity within Bangladesh, fuel availability, efficiency, appropriateness within the climate, etc. of different vehicle technologies, which often result in uninformed decisions and policies. As a result, opportunities to lower carbon emissions within the transport sector may be lost. There is a need for improved awareness for stakeholders. The finalisation of policies relating to electric vehicles and other technologies is required. However, without understanding the misconceptions and other limiting factors its roll-out may be hampered, as happened with previous policies.

How can urban mass transport be better integrated with other modes of transport, and what are the current factors affecting the efficiency and acceptance of urban mass transport? Are there accepted approaches or measures that could be adopted, especially in urban areas, that would lead to improvements and higher market share, and hence lower carbon emissions?

Potential gaps or shortfalls in urban transport are to be identified (especially in urban areas other than Greater Dhaka which is well studied), as well as the potential for GHG reduction if transport services were better coordinated and integrated.

What are the limiting factors affecting traffic police and transport-related law enforcement agencies that prevent them from more efficiently managing traffic and enforcing applicable laws that would leave to GHG reductions?

It was stated by stakeholders that if all current laws and regulations were fully implemented and enforced, GHG emissions would be significantly reduced. Research is required to identify approaches which can improve the situation, including those that have been tested elsewhere. The status of



implementation and enforcement should be examined, and related challenges and obstacles identified. Recommendations should be given, especially on quick wins which could support higher adoption and implementation of certain aspects of policies and regulations.

8.4 Research areas that that appear to be addressed already by others

Some research issues that were highlighted are already being addressed by others. These include **research on fuel quality and the obstacles that impede the implementation of the higher standards required to effectively operate modern and lower-emissions vehicle technology**, amended testing and enforcement procedures, mobile testing technology, and revision of policy on fuel quality, standards, strategy and action plans for the transport sector (diesel, petrol, CNG and LPG). It is understood that a fuel policy has been formulated including a Diesel Road Map. BUET advised that much is already happening in this area and improvements can be expected.

Significant issues relate to the **fragmented, private sector-dominated and largely unregulated ordinary bus services, which use largely old vehicle technology with high emissions, and result in inefficient and often unsafe bus transport, especially in urban areas**. It is understood that this matter is a high priority in Dhaka and is being addressed by the World Bank.



9. Final Priority Research Themes

9.1 Building a credible transport emission baseline

Bangladesh lacks baseline emission data against which to base decisions, quantify the problem, and measure impacts. This relates to both vehicle types/groups and urban air emission levels. Capturing actual emission data may identify the next “culprit” to be removed from circulation as was the case with two-stroke auto-rickshaws several years ago. Vehicles emissions can only be tested at a single location in Bangladesh. There are also insufficient air quality measuring stations across the country, and especially in Dhaka.

- How do different types of vehicles (including modified ones) operating in Bangladesh contribute to emissions?
- What is the distribution of transport related emission especially in an urban context
- How are emissions levels forecasted to evolve, using comprehensive traffic model?

9.2 Non-motorised transport

Non-motorised transport (NMT), which forms a substantial part of transport in Bangladesh, is often neglected and/or discriminated against due to its contribution to traffic congestion. In some cases, attempts have been made to ban NMT from certain roads. In other areas bicycle and rickshaw lanes have been established, but frequently do not meet demand. Sidewalks – where they exist – are largely used for parking. NMT users face considerable road safety risks.

- What role does NMT play in Bangladesh? Who uses NMT and for what purpose?
- Can NMT effectively reduce GHG emissions?
- What incentives and urban planning approaches can incentivise NMT?

9.3 Designing a multi-modal, efficient freight system

Bangladesh’s freight sector is largely fragmented with poor management of logistics and an absence of multimodal integration and planning. The majority of goods are transported on the road by small private truck operators using high polluting and overloaded trucks and contributing to traffic congestion on highways and air pollution. The so-called “covered van” dominates the sector and is a locally modified truck with poor safety standards, poor fuel efficiency and high emissions. The lack of standardisation in the freight sector, stifles efforts to improve efficiency and modernize. Shipping through inland waterways is under-utilised, despite being a potential form of lower-carbon transport throughout Bangladesh, and into India and Bhutan.

- Measure the impact of the informal “covered van” freight sector on road traffic and emission levels.
- What steps are required to build an integrated multimodal freight transport system?
- What is the potential to increase freight shipping via waterways in Bangladesh? What steps would need to be taken to manage inland waterways and control sedimentation and flooding while maintaining adequate water levels for shipping?

9.4 Designing an integrated, multi-modal urban transportation system

Bangladesh lacks an integrated multi-modal urban transport system. Different forms of transport coexist and compete for (limited road) space, but are uncoordinated, integrated or complement each other. Transport modes are not integrated with one another, nor are they integrated with economic/business/commercial developments. This leads to inefficient use of transport and high reliance on motorised vehicles resulting in higher levels of polluting emissions.



- What is the current level of integration of urban mass transport? What are potential gaps or shortfalls in urban transport systems (especially in urban areas other than Greater Dhaka, which is well studied)?
- Can integration increase the efficiency & acceptance of public transport systems, leading to a higher share of overall urban transport?
- What is the potential for better coordinated and integrated transport services to reduce GHG emissions?



10. Summary of Key Findings

The UK Department for International Development initiated this study to determine research priorities in low-carbon transport in low- and middle-income countries, including Bangladesh. The overall objective of the study was to identify key challenges in the transport sector in Bangladesh and research gaps related to the transition to low-carbon transport.

A scoping mission to Bangladesh consulted 21 stakeholders across various sectors. Numerous key challenges were identified, including (but not limited to) a lack of baseline emission data, fragmented institutional arrangements, the lack of understanding of importance and potential of non-motorised transport, poor fuel quality and fragmented and unregulated ordinary bus transport sector.

The study identified four priority research themes, where DFID research funding could help facilitate the transition to low-carbon transport:

1. Building a credible transport emission baseline
2. Non-motorised transport
3. Designing a multi-modal, efficient freight system
4. Designing an integrated, multi-modal urban transport system

During the workshop available research capacity in Bangladesh was identified, including universities such as BUET, Stamford and Jahangirnagar, also government (for example, BRTA and CEGIS), research institutions such as ICCCAD and NGOs such as BRAC.

Once research funding is secured, it is proposed that a second visit is undertaken ahead of a procurement process and the implementation of research projects. The purpose of the second visit will be to finalise these themes and questions and raise further awareness within the Bangladesh research community and stakeholders.



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Appendix A: List of stakeholders consulted



Sector	No	Organisation	Name	Position	E-mail	Inter-viewed	Work-shop
Government (both transport and non-transport, such as energy and environment)	1	Bangladesh Road Transport Authority	Md. Lokman Hossen Mollah	Director (Engineering) Engineering Wing	de@brta.gov.bd	√	√
	2	Dhaka North City Corporation	Dr Engr. Tariq Bin Yousuf	Project Director	tariqbinyousuf@gmail.com	√	X
	3	Dhaka Transport Coordination Authority (DTCA)	Md Anisur Rahaman	Traffic Engineer, Project Director	anis89buet96@gmail.com	√	X
	4	Center for Environmental and Geographic Information Services (CEGIS)	Malik Fida A Khan	Executive Director (In Charge)	mkhan@cegisbd.com	√	X
	5		Soumitro Das Shuvro	Research Consultant		X	√
	6	Roads & Highways Department Bangladesh	Jalaluddin Al-Quaderi	Former Secretary	jalal.quaderi@gmail.com	√	X
International development organisation	7	ICCCAD	Sherpard Zvigadza	Visiting Researcher	szvigadza@gmail.com	√	√
	8		Sharder Shafiqul Alam	Coordinator	ratana.badla1@gmail.com	X	√
	9		Sumaya Rahman	Internship	sumrahman44@gmail.com	X	√
	10	DFID Bangladesh (Extreme Poverty, Resilience & Climate Change Team)	Anna Balance	Climate & Environment Advisor	a-balance@dfid.gov.uk	√	X
	11	Asian Development Bank	Md Humayun Kabir	Associate Project Officer (Transport)	mkabir@adb.org	√	X
Industry & industry association	12	Toyota (Navana Bangladesh)	Safqat Ahamed	Senior Manager	shafqat@amartoyota.com	√	X
NGOs, CBOs & Civil Society Organisations	13	Climate Change, BRAC and BRAC International Urban Development, BRAC	Ms Nazria Islam	Senior Manager	nazria.islam@brac.net	√	X
	14		Abu Sadat Moniruzzaman Khan	Programme Head	abu.khan@brac.net	√	X
	15		Md Bodrud-doza	Deputy Manager	bodrud.d@brac.net	x	√
Research institutes or universities	16	BUET	Dr Ashraf Ali	Professor	ashraf@ce.buet.ac.bd ; mashrafali88@gmail.com	√	X
	17		Dr Tanvir Ahamed	Professor	tanvir96@gmail.com	x	√
	18		Prof. Md Shamsul Hoque	Professor	shoque@ce.buet.ac.bd ; shoque@gmail.com	√	X
	19	Centre for Atmospheric pollution study, Stamford University	Dr. Ahamed Kamruzzaman Mojumder	Director	kamrul_sub@hotmail.com	√	√
	20		Abdullah Al Nayeem	Lecturer	nayeem.env58@gmail.com	x	√
	21		jahangirnagar university	Dr. Shafiq-Ur Rahman	Professor	shafiq_urp@yahoo.com	x



Appendix B: Workshop invitation & agenda



Invitation to Low Carbon Transport Workshop

Date: Thursday 5th December 9am to 2pm

Location: Asia Pacific Hotel
House No. 02, Road No. 02, Block – K, Baridhara, Dhaka – 1212

IMC Worldwide (IMC) are pleased to invite you to attend the Low Carbon Transport Workshop on Thursday 5th December at Asia Pacific Hotel. Kindly confirm attendance per e-mail: rafi.zaman@imcw-bangladesh.com.

Background

The UK Department for International Development (DfID) is assessing the need for a research programme on low-carbon transport in Bangladesh and other countries. Under its High-Volume Transport (HVT) and Energy & Economic Growth (EEG) Programmes it intends to undertake a scoping exercise to determine research priorities in such countries to inform its funding for low carbon transport research in the selected countries.

IMC is undertaking stakeholder consultations in Dhaka during the first week of December to identify challenges to implementing low carbon transport, determine research needs to overcome these, and to identify the potential beneficiaries of such research. A workshop on low-carbon transport will be held with key stakeholders from government, public & private sector, donor agencies, industry, NGO & research institutes.

Your Opportunity

The workshop provides stakeholders with the opportunity, to:

- learn more about DfID's HVT Programme, its focus on Low Carbon Transport, and potential future funding opportunities on Low Carbon Transport;
- influence DFID research priorities on Low Carbon Transport and learn at an early stage about possible DfID funded future research opportunities in Low Carbon Transport in Bangladesh;
- to assist in identifying information requirements and challenges to implementing Low Carbon Transport in Bangladesh and hence be at the forefront of potential future shift in the transportation sector in Bangladesh towards Low Carbon Transport.

Agenda

09.00:	Registration
10.00:	First Session (briefing & validation of identified research scope)
11.30:	Tea break
12.00:	Second Session (prioritisation of identified research scope)
13.30:	Lunch and Close

IMC Worldwide Ltd
<http://www.imcworldwide.com/project/hvt>

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Redhill
RH1 1LG
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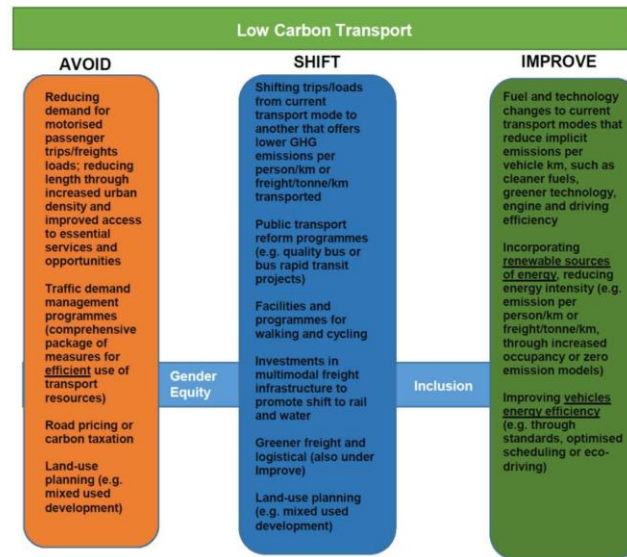
Tel: +44 (0) 01737 231400
Email: imc@imcworldwide.com



Consultation to Determine Research Requirements

Low Carbon Transport

Low carbon transport will emit less carbon than in the business-as-usual (BAU) scenario. Measures to promote low carbon transport include: reducing the need and demand to travel; providing alternatives to the motorised vehicle; improving efficiency of transport, fuel and technologies (including electric cars); providing alternatives to the private car such as high volume public transport (i.e. buses, trolleybuses, trams/light rail, trains, rapid transit [BRT/metro/subway/underground, etc.], ferries and cable-based systems); and improving driver behaviour; etc.



The figure to the right provides an overview of the range of measures that may be applied to **AVOID** polluting emissions, **SHIFT** to alternative transport modes and **IMPROVE** the existing vehicle fleet.

Identifying Research Needs to Promote Low Carbon Transport

IMC Worldwide is undertaking stakeholder consultations in your country to identify challenges to implementing low carbon transport, determine research needs to overcome these challenges, and to identify the potential beneficiaries of such research.

In preparation for the consultation process, we would like you to think about the following questions. The information gathered in the scoping study will be used to inform a proposal for a potential research programme on low carbon transport in your country funded by the UK Department of International Development.

1. What are the key challenges to low carbon transport in your country?
2. What type of knowledge/research (e.g. developing capacity, and sharing knowledge/good practice/tools) could be undertaken to assist in overcoming these challenges?
3. Which actors/organisations/research institutes are best placed to undertake this research?
4. Who could be the main beneficiaries of such knowledge/research?



Appendix C: Workshop documents





Appendix D: Workshop evaluation forms



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input checked="" type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka		Date: 05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	✓ 5	Excellent
1.2. Relevance:	Poor	1	2	3	4	✓ 5	Excellent
1.3. Methods:	Poor	1	2	3	4	✓ 5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected ✓
-------------------------	--------------------	-------------	--------------------	---------------------------

Do the outputs from the workshop address low carbon transport needs and priorities in your country?
 If yes briefly explain: *YES. Lack of data on actual carbon footprint at airport related emissions could be achieved.*

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4 ✓	5	Guaranteed
-------	---	---	---	-----	---	------------

If yes, please provide any information on particular area of interest (optional)

YES. data collection on emission of vehicles

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5 ✓	Guaranteed
-------	---	---	---	---	-----	------------

4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

Thank you for taking the time to provide this valuable feedback!



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input checked="" type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka		Date: 05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5 <input checked="" type="checkbox"/>	Excellent
1.2. Relevance:	Poor	1	2	3	4	5 <input checked="" type="checkbox"/>	Excellent
1.3. Methods:	Poor	1	2	3	4	5 <input checked="" type="checkbox"/>	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected <input checked="" type="checkbox"/>	Much more than expected
-------------------------	--------------------	-------------	--	-------------------------

Do the outputs from the workshop address low carbon transport needs and priorities in your country?

If yes briefly explain:

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2 <input checked="" type="checkbox"/>	3	4	5	Guaranteed
-------	---	---------------------------------------	---	---	---	------------

If yes, please provide any information on particular area of interest (optional)

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2 <input checked="" type="checkbox"/>	3	4	5	Guaranteed
-------	---	---------------------------------------	---	---	---	------------

4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

Thank you for taking the time to provide this valuable feedback!



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input checked="" type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka	Date:	05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5	Excellent
1.2. Relevance:	Poor	1	2	3	4	5	Excellent
1.3. Methods:	Poor	1	2	3	4	5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected
-------------------------	--------------------	-------------	--------------------	-------------------------

Do the outputs from the workshop address low carbon transport needs and priorities in your country?
 If yes briefly explain: Overall goal ^{motivation} and concepts need to be explained first.

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4	5	Guaranteed
-------	---	---	---	---	---	------------

If yes, please provide any information on particular area of interest (optional)
 GHG emission, pollution prevention, carbon footprint

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5	Guaranteed
-------	---	---	---	---	---	------------

4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

Thank you for taking the time to provide this valuable feedback!



**HIGH VOLUME
TRANSPORT**
APPLIED RESEARCH



**HVT Low Carbon Transport Scoping Study
Workshop Evaluation Form**

Male:	<input checked="" type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka		Date: 05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5	Excellent
1.2. Relevance:	Poor	1	2	3	4	5	Excellent
1.3. Methods:	Poor	1	2	3	4	5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected
-------------------------	--------------------	-------------	--------------------	-------------------------

Do the outputs from the workshop address low carbon transport needs and priorities in your country?

If yes briefly explain:

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4	5	Guaranteed
-------	---	---	---	---	---	------------

If yes, please provide any information on particular area of interest (optional)

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5	Guaranteed
-------	---	---	---	---	---	------------

4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

Thank you for taking the time to provide this valuable feedback!



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input checked="" type="checkbox"/>				
Female:	<input type="checkbox"/>				
Workshop location	Asia Pacific Hotel - Dhaka			Date:	05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH				

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5	Excellent
1.2. Relevance:	Poor	1	2	3	4	5	Excellent
1.3. Methods:	Poor	1	2	3	4	5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected
-------------------------	--------------------	-------------	--------------------	-------------------------

Do the outputs from the workshop address low carbon transport needs and priorities in your country? Yes
 If yes briefly explain: *We can prioritize our need.*

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4	5	Guaranteed
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If yes, please provide any information on particular area of interest (optional)

Emission / Air pollution

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5	Guaranteed
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4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

Its Nice .

Thank you for taking the time to provide this valuable feedback!



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka	Date:	05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5	Excellent
1.2. Relevance:	Poor	1	2	3	4	5	Excellent
1.3. Methods:	Poor	1	2	3	4	5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected
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Do the outputs from the workshop address low carbon transport needs and priorities in your country?

If yes briefly explain:

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4	5	Guaranteed
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If yes, please provide any information on particular area of interest (optional)

#15 (NMT)

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5	Guaranteed
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4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

on etc.

Thank you for taking the time to provide this valuable feedback!



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input checked="" type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka	Date:	05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5	Excellent
1.2. Relevance:	Poor	1	2	3	4	5	Excellent
1.3. Methods:	Poor	1	2	3	4	5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected
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Do the outputs from the workshop address low carbon transport needs and priorities in your country?

If yes briefly explain: *Yes, but the main obstacles in high dense population.*

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4	5	Guaranteed
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If yes, please provide any information on particular area of interest (optional)

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5	Guaranteed
-------	---	---	---	---	---	------------

4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

Day long/ Phase workshop with gov. body/ Non gov.

Thank you for taking the time to provide this valuable feedback!



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input checked="" type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka	Date:	05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

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1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5	Excellent
1.2. Relevance:	Poor	1	2	3	4	5	Excellent
1.3. Methods:	Poor	1	2	3	4	5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected
-------------------------	--------------------	-------------	--------------------	-------------------------

Do the outputs from the workshop address low carbon transport needs and priorities in your country?

If yes briefly explain:

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4	5	Guaranteed
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If yes, please provide any information on particular area of interest (optional)

Multimodal mode, NMT, behaviour

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5	Guaranteed
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4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

better time management

Thank you for taking the time to provide this valuable feedback!



HVT Low Carbon Transport Scoping Study Workshop Evaluation Form

Male:	<input checked="" type="checkbox"/>		
Female:	<input type="checkbox"/>		
Workshop location	Asia Pacific Hotel - Dhaka	Date:	05/12/2019
Name of workshop:	LOW CARBON TRANSPORT SCOPING STUDY - BANGLADESH		

This form is intended for internal use within the HVT programme. The data provided in this form will be treated with strict confidentiality and will be analysed purely towards improving the programme's provision of validation workshops activities.

1. Reaction

How would you rate the overall content of the workshop in the following areas?

1.1. Usefulness:	Poor	1	2	3	4	5	Excellent
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1.3. Methods:	Poor	1	2	3	4	5	Excellent

2. Learning

Thinking about the overall topic of the workshop how much have you learned about understanding the research gaps in low carbon transport in your country?

Much less than expected	Less than expected	As expected	More than expected	Much more than expected
-------------------------	--------------------	-------------	--------------------	-------------------------

Do the outputs from the workshop address low carbon transport needs and priorities in your country?
If yes briefly explain:

3. Behaviour

How likely are you to submit a research proposal for any of the suggested topics

Never	1	2	3	4	5	Guaranteed
-------	---	---	---	---	---	------------

If yes, please provide any information on particular area of interest (optional)

How likely are you to continue your relationship with the HVT programme in your research proposal/work (optional)

Never	1	2	3	4	5	Guaranteed
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4. Reflection

What can we improve to make this process better in the future research scoping? (optional)

Thank you for taking the time to provide this valuable feedback!

Appendix E: Longlist of International Development Programmes

The below projects are all ACTIVE unless specifically stated that they are PROPOSED or COMPLETED. Project Closing/Completion Dates (PCD) are given for each project where available.

The Asian Development Bank

- South Asia Subregional Economic Cooperation **Dhaka-Northwest Corridor Road Project**: The project will improve the road connectivity of the Dhaka-Northwest international trade corridor. (PCD Aug 2027).
- **Dhaka Mass Rapid Transit Development Project** Readiness Financing (Line 5, Southern Route): The ensuing project of MRT Line 5 (Southern Route) will comprise a total length of about 17.4 km between Gabtoli and Dasherbandi stations. The congested central area of Dhaka requires 12.8 km of underground section with 12 stations, while the remaining section will be elevated with four stations. (PCD June 2024).
- South Asia Subregional Economic Cooperation **Chittagong-Cox's Bazar Railway Project**: The SASEC Chittagong-Cox's Bazar Railway Project, Phase 1 (the Project) will support the government of Bangladesh in constructing the new, 102 km Dohazari-Cox's Bazar section of the Chittagong-Cox's Bazar railway corridor in south-eastern Bangladesh. The government is upgrading the 47 km section Chittagong-Dohazari with its own funds. The project will also strengthen the capacity of the railway sector in project management and implementation. (PCD Jan 2026).
- **Strengthening Knowledge and Actions for Air Quality Improvement**: The proposed knowledge and support technical assistance (TA) will enhance the knowledge and capacity of participating developing member countries (DMCs) to develop policy actions and technological solutions for air quality management. (PCD Sep 2021).
- **Supporting Innovation and Knowledge Exchange for Transport Projects in South Asia**: Project preparation and implementation support to a number of projects in South Asian developing ADB member countries, as well as implement knowledge exchange and capacity building activities for a number of executing agencies and implementing agencies. Development and implementation of innovative features in at least four projects being implemented in 2018 -2020 or proposed for approval in 2019- 2020. Innovative features such as road and rail safety, engineering design, resettlement and rehabilitation, environmental issues, disaster risk management including climate change risks, gender mainstreaming, communication, asset management, and project finance, will be accomplished through knowledge exchange, collaborative learning, or South-South partnership. (PCD Dec 2022).
- **Railway Rolling Stock Operations Improvement Project**: Improve the operational efficiency of Bangladesh Railway through the procurement of modern rolling stock, preparation of investment projects to enhance its rolling stock maintenance capacity and support for the ongoing railway reform. (PCD Dec 2022)..
- **Dhaka Metro Project**: Construction of a metro line in Dhaka as the backbone public transport system in an integrated urban transport system for the city. (PROPOSED).
- **Railway Rolling Stock Project**: Improve services on railways running between Dhaka and Chittagong, and Dhaka and Khulna. The project is financing the purchase of new locomotives, passenger carriages, four cranes, two train washing plants, a locomotive conduct simulator for training, and other rail equipment. (Jun 2021).
- TA: **Promoting Urban Climate Change Resilience in Selected Asian Cities**: foster urban climate change resilience in medium-sized cities and to build capacity to work together to prevent climate change indicated shocks and stresses. (PCD not available).
- **South Asia Subregional Economic Cooperation Railway Connectivity: Akhaura-Laksam Double Track Project**: upgrading the 72 km Akhaura Laksam section of the Dhaka Chittagong railway corridor to a double track railway line with modern signalling equipment. The section is part of a major subregional corridor and the Trans-Asia Railway network. (PCD Jun 2023).
- Third **Urban Governance and Infrastructure Improvement (Sector) Project**: Improve municipal services under an urban governance action program. The project will provide assistance to 30

municipalities with a total population of 2.2 million, including 20 towns. The loan funds will be used to upgrade infrastructure and services, including roads and water and sanitation, and strengthen governance. (PCD Dec 2020).

- **Coastal Towns Environmental Infrastructure Project:** Develop climate-resilient infrastructure in eight vulnerable coastal pourashavas (secondary towns). The project will include investments in water supply and sanitation facilities, cyclone shelters, emergency access roads and bridges, and other municipal infrastructure. It will also strengthen urban planning and disaster preparedness, and conduct outreach activities. (PCD Dec 2020).
- **South Asia Subregional Economic Cooperation Road Connectivity Project:** (i) upgrade about 110 km of Dhaka-Northwest corridor by four-lanes of the Joydebpur-Chandra-Tangail-Hatikamrul Road and (ii) improve two land ports at Benapole and Burimari. This trunk road section forms part of a major international road corridor. The project will also strengthen the capacity of the road sector. (PCD Dec 2020).
- **Coastal Climate-Resilient Infrastructure Project:** This project is proposed under the Government of Bangladesh's Strategic Program for Climate Resilience (SPCR), prepared under the Pilot Program for Climate Resilience (PPCR). The PPCR is a part of the Strategic Climate Fund (SCF) within the Climate Investment Funds (CIF), to pilot and demonstrate ways to mainstream climate resilience in development planning and management. (CLOSING).
- **Greater Dhaka Sustainable Urban Transport Project:** Develop a sustainable urban transport system in north Greater Dhaka. The project will include the construction of a 20 km bus rapid transit corridor, and depot and terminal facilities in Gazipur City. (PCD Dec 2020).

Japan International Cooperation Agency:

- National Transportation Network Development (PCD not available unless specifically stated below)
 - Dhaka Integrated Traffic Management Project
 - Establishment of Clearing House for Integrating Transport Ticketing System in Dhaka
 - Revision and Updating of Strategic Transport Plan for Dhaka
 - Strengthen the Capacity on Advanced Mapping of SOB for Building Digital Bangladesh
 - Kanchpur, Meghna and Gumti Bridges Project (PCD Jan 2022)
 - Dhaka Mass Rapid Transit Development Project (PCD Sep 2021)
 - Improving Fare System of Mass-transportation in Dhaka City Area through ICT
 - Chittagong City Outer Ring Road Project
 - Bangladesh Digital Mapping Assistance Project
 - Eastern Bangladesh Bridge Improvement Project
 - Dhaka-Chittagong Railway Development Project
 - Provision of Portable Steel Bridges on Upazila and Union Roads
 - Paksey Bridge Construction Project
 - The Project for Improvement of Steel Bridges for Roads in Rural Areas
 - Pupsha Bridge Construction Project
 - Reconstruction of Small and Medium Bridges on Dhaka- Chittagong Highway
 - Jamuna Bridge Access Roads Project
 - Chittagong Airport Development project
 - Jamuna Multipurpose Bridge Project
 - Dhaka Port Development Project
 - Construction of Meghna Gumti Bridge
 - Construction of the Meghna Bridge.

The World Bank

- **Second Rural Transport Improvement Project:** improve rural accessibility in project areas (covering 26 districts) and strengthen institutional capacity for sustainable rural road maintenance. (PCD Jun 2021) Outputs include:
 - 782 km roads upgraded to paved standard
 - 4,383 km roads rehabilitated and maintained
 - 30 Growth Centre Markets, 9 rural jetties constructed
 - 47 km of rural waterways dredging piloted
 - Performance-based maintenance contract introduced for 428 km of roads
 - 10 river jetties being constructed,
 - 33 growth centre markets being developed.
- **Operation for Supporting Rural Bridges:** improve and preserve rural bridges to support connectivity and climate resiliency and strengthen institutional management. (PCD Dec 2023).
- **Clean Air and Sustainable Environment Project:** improve air quality and safe mobility in Dhaka through the implementation of demonstration initiatives in urban transport and brick making. (COMPLETED Mar 2019).
- **Bangladesh Regional Waterway Transport Project:** improve Inland Water Transport (IWT) efficiency and safety for passengers and cargo along the Chittagong-Dhaka-Ashuganj Regional Corridor and to enhance sector sustainability. The Project consists of three components as follows: 1) Improved inland waterway navigation include work to guarantee advertised depths and widths of navigation channels on select river routes. 2) Improved services at priority inland waterway terminals and landing stations supports the development of two cargo terminals, four passenger terminals and 14 landing stations (or ghats). 3) Institutional capacity development and sector sustainability will support Bangladesh Inland Water Transport Authority's (BIWTA) overall enhancement of its management systems and human resources capacity for modern, efficient, and high quality management of the IWT sector in line with international standards, and to help BIWTA achieve long-term operational and financial sustainability, and enhance the climate resilience of the IWT sector. (PCD Dec 2025).

Other:

- **Dhaka Bypass Project (PPP):** A consortium of companies from the People's Republic of China have signed a concession contract with the Government of Bangladesh to upgrade the Dhaka Bypass under a public-private partnership (PPP) arrangement. (PCD estimate 2022).
- **Improved protection of urban infrastructure from the consequences of climate change** (KfW / Green Climate Fund in Bangladesh) aims to strengthen the climate resilience of infrastructure in Bangladesh on a long-term and sustainable basis. (PCD not available).
- **Adaptation to climate change in urban areas** (GIZ) aims to contribute to increasing the resilience of extremely vulnerable population groups in urban areas in Bangladesh towards the impacts of climate change by 2020 by supporting the systematic consideration of the impacts of climate change on development and investment planning, as well as improving the access to and use of geospatial information. (PCD 2022).
- **Rehabilitation of Kulaura-Shahbazpur section of the Bangladesh Railway:** Part of the Trans-Asian Railway Network. (Governments of India & Bangladesh) (PCD not available).
- **Construction of Akhaura-Agartala rail link:** connect northeastern Indian states with Bangladesh, creating a more-durable line for cargo transport. (Governments of India and Bangladesh) (PCD not available).



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