Background Studies for the Second Perspective Plan of Bangladesh (2021-2041)

Volume-3

Editor:
Dr. Shamsul Alam

General Economics Division (GED)
Bangladesh Planning Commission
Ministry of Planning
Government of the People's Republic of Bangladesh
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M.A. Mannan, MP
Minister
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Government of the People's Republic of Bangladesh

Message

It gives me immense pleasure to learn that the General Economics Division (GED) of Bangladesh Planning Commission is going to publish 16 background papers in six volumes which have been used as the inputs for preparing the country's Second Perspective Plan (2021-2041). The background papers of the Second Perspective Plan is the culmination of macroeconomic and sectoral issues of Bangladesh for future intervention that GED has pursued with various eminent economists, social scientists, researchers, and academicians at the national level.

My thanks are done to the Member (Senior Secretary) and the officials in the General Economics Division (GED) for their perseverance in shaping this document. I believe background papers will be helpful for policy-planners, development practitioners, researchers, academicians and students as well. I believe that officials working in government ministries and agencies will be immensely benefited from these background papers for upgrading and updating their knowledge and professional competences. Finally, I appriciate GED leadership for undertaking this endeavour for printing background papers of the Second Perspective Plan in book volumes for much wider use. I earnestly wish their success.

(M. A. Mannan, MP)

Dr. Shamsul Alam
Member (Senior Secretary)
General Economics Division (GED)
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Foreword

Following the 2009 National Election that reinstated democracy in Bangladesh, two major changes ensued in the planning landscape of the country. First, Bangladesh returned to its five-year planning system discontinuing the PRSPs. The country, then, decided to synergize its short- and medium-term planning intervention introducing a long-term perspective plan. The efforts culminated into the preparation of first ever Perspective Plan of Bangladesh (2010-2021). The Plan, in fact, was an elaboration of the Vision 2021 announced by the Hon'ble Prime Minister Sheikh Hasina. It provided a roadmap for accelerated growth and laid down broad approaches for the eradication of poverty, inequality, and human deprivation. Most importantly, it provided the broader context in which the Sixth and the Seventh Five Year Plan would be implemented.

Embracing the Perspective Plan's creed, the 6th Five Year Plan (2011-2015) has completed its tenure and the 7th Five Year Plan (2016-2020) has crossed the halfway of its intended period of implementation approaching the end. The preparatory activities of the 8th Five Year Plan are expected to begin in 2019. However, like the two preceding plans, it needs a longer-term perspective plan to set the context and create the policy pathway. Moreover, in the meantime, Bangladesh has gone through some major socioeconomic transformation—it crossed the lower-middle income threshold of World Bank country classification in 2015 and qualified for the first time to graduate into a developing country in 2018. Based on her presentiment that such changes are imminent, the Hon'ble Prime Minister directed GED to initiate Second Perspective Plan (2021-2041) formulation process in the National Economic Council (NEC) meeting held on 20 October 2015.

And following that instruction the process of preparing the Second Perspective Plan has been initiated by General Economics Division at the end of 2016. The process formally started with preparation of a 'Concept Paper'. In addition, Planning Commission constituted a high level "Panel of Experts" for guiding the process of formulating the Plan within a participatory framework. For developing the Plan strategies and indicating the desirable development path that would lead to fulfilling its objectives, sixteen different

background studies covering different socio-economic sectors and sub-sectors, and a technical framework for macroeconomic projection for 2021-2041 were prepared. These background papers were undertaken for generating quantitative/qualitative benchmark values and targets for relevant indicators of the Plan and fill in critical knowledge gaps. Renowned economists, academicians, researchers and development practitioners in the relevant fields with a long-standing flair were assigned to conduct the studies within the stipulated timeframe. Later, the final drafts of the background papers were reviewed by relevant experts in the government as well as from professional and academic community. Based on such elaborate feedback, the drafts were modified and finalised by the author(s) under the overall supervision and guidance of General Economics Division (GED).

These background studies provided valuable information/inputs which significantly contributed towards drafting the Second Perspective Plan. These studies are rich in contents and, if made available, will enrich the knowledge base relating to development challenges and development options facing Bangladesh. In view of the importance of these studies, it has been decided that GED will publish these studies for making these available to interested readers, researchers and academia.

The background papers have been published in six separate volumes. It is expected that these volumes will help the readers to understand the rational for the choice of the specific domain underlying the Plan and the design of the policy package adapted for the Plan for reconciling the goals of efficiency with those of equity. The studies attempted to spell out a reform strategy and agenda for agriculture, food security, industrialisation, poverty reduction, social inclusion, transportation, quality infrastructure, sustainable management of natural resources, and other development issues like governance, gender, urban development, service sector development, health and population management, human development, ICT and information highway, employment and labour market in the light of current conditions as well as past experience trends.

Now, I would like to take the opportunity to convey my gratitude to the people behind this splendid task. First and foremost, I will recall the diligent contribution from the relevant officials of GED for their untiring support and cooperation in managing all the studies. Finally, the publication will be a success only when it served the purpose of the readers that intended to.

I believe, this book of background papers prepared to help formulate the Second Perspective Plan of Bangladesh would be considered as one of the valuable knowledge products of GED.

(Professor Shamsul Alam, M.A. Econs., PhD)

Acknowledgements

First and foremost, GED likes to express its humble gratefulness to the Hon'ble Prime Minister Sheikh Hasina for her visionary leadership. Perceiving in advance the changing socioeconomic landscape of the country, she first felt the need of a second perspective plan to be formulated. In the National Economic Council (NEC) meeting of the 20th October 2015, she provided a clear guidance in this regard.

GED acknowledges the guidance and timely direction provided by the Hon'ble Minister for Planning Mr. Abdul Mannan, MP, gave valuable time and precious guidance. GED is indebted to him.

GED, gratefully recalls the valuable contribution of the Panel of Experts headed by Dr. Wahiduddin Mahmud for his suggestions and advices all through. The reviewers' (members of technical committee) contribution to the background papers are also acknowledged herewith.

GED is indebted to the outstanding leadership of Dr. Shamsul Alam for this endeavor and efforts. In his eleven years tenure, he has raised GED, the policy-planning hub of the country, into the highest level of excellence. He is the person who reviewed and edited the background papers and transformed them into one interlinked document that ultimately culminated into the Second Perspective Plan (2021-2041).

Mr. Md. Mofidul Islam, not only as the Chief, GED but also as the Project Director of Mid-Term Review of the Perspective Plan and Formulation of Bangladesh Vision 2041 coordinated all the administrative and financial procedures. Mr. Md. Forhad Siddique, Deputy Chief and Deputy Project Director seconded him with his ubiquitous involvement in all the activities. Ms. Josefa Yesmin, Senior Assistant Chief, as the Assistant Project Director exerted her best to make the initiative a success story. Preparing the project proposal, concept paper and other relevant documents as well as providing data support, Mr. Sheikh Moinul Islam Moin, Senior Assistant Chief, played his role in the process.

Last but not the least, many officials from the General Economics Division (GED), Bangladesh Planning Commission, Ministry of Planning and other Ministries of the government graced with their presence to project-related meetings and discussions.

We gratefully acknowledge the efforts by all concerned in the Bangladesh Planning Commission.

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Part-1

Reducing Cost of Doing Business to Spur Domestic and Foreign investment

Dr. G.M. Khurshid Alam*

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Reducing Cost of Doing Business to Spur Domestic and Foreign investment

I. Introduction

1.1 Background. Bangladesh has been on a transformation path with the manufacturing sector driving exports and job growth resulting in sustained robust average growth in both GDP and in per capita GDP, facilitated by some conducive policy reforms. From here on, the prospects of rapid growth with extensive job creation requires a high-performing and diversified manufacturing sector which will remain, for some time to come, the main driver of growth in Bangladesh.

Bangladesh has continued pursuing that strategic path, and the inclusive growth strategy in the Seventh Five Year Plan, which reflects continuation of the major policy that had been articulated in the Sixth Plan. The cornerstone of this inclusive growth strategy has been a strategy of job creation through employment-intensive and export-oriented manufacturing growth which will be able to absorb the army of additional workers that will continue to enter the labor force consistent with Bangladesh's demographic transformation. As already factored in the 7th Five Year Plan and the Perspective Plan, private sector will be the driving force in this endeavor for which higher levels of private investments is an absolute necessity. Bangladesh had already attained sustained average growth of 4.8% in the nineties, 5.8% in the period 2001-2010, and 6.3% during 2011-2015 in the current decade. Driven by a rising rate of national savings, the rate of gross domestic investment as a percent of GDP has been on the rise – expanding from a low of 10% of GDP in the 1970s to 28.9% with private investments at 22.1% in FY2015.

Within its medium term macroeconomic framework, the Seventh Plan expects gross investments to reach 34.4% of GDP by FY20 of which private investments are expected to reach 26.6%. While gross investments have been growing, but that has been mainly from higher public sector investments. So there is the challenge of getting higher levels of private investments (both domestic and FDI) so as to attain the levels envisaged under the seventh five-year plan. The slow pace in generating higher levels of private investments indicates that private sector has been facing challenges in policy, regulatory needs, infrastructural and other investment climate related challenges, which need to be redressed.

The Seventh Plan has targeted to attain an average real GDP growth rate of 7.4% and creating good jobs for the pool of unemployed and the new entrants to the job market by increasing the share of employment in the manufacturing sector from 15% to 20%. This increased share of employment is hinging on achieving an average of 10.9% growth in industry over the plan period with manufacturing reaching a growth level of 12.6% in FY 20.

1.2 Goals and Strategic Vision

The broad objective of the study is to highlight the main regulatory constraints to private investment, both domestic and foreign, based on available evidence from available data on Bangladesh investment climate and cross-country experiences. The study focuses on strategies for increasing levels of private investment, both domestic and foreign, in light of

the projected structural transformation that is envisaged for a rapidly growing economy in the context of globalization. The thrust is on identifying the challenges and opportunities for investments based on analysis of the prevailing investment climate in Bangladesh, and also looks for options and strategies for making improvements. The diagnosis is done on the basis of local and global experiences using the survey data, the Global Competitiveness Index (GCI), the Global Logistic Index (GLI), and Doing Business (DB) index, compiled by the World Economic Forum (WEF), the World Bank, and the International Finance Corporation (IFC) respectively. In this context the "Doing Business" environment and key institutional, regulatory bottlenecks and market structure that impedes private investments in Bangladesh will be looked into, with the objective of drawing out strategies for attracting higher levels of domestic and foreign investments. Based on that diagnosis the paper provides suggestions for policy reforms.

1.3 The strategic scenarios and targets for moving Bangladesh to trajectory to become a High Income Country (HIC) – the 2041 vision.

The GED of the Planning Commission has postulated a scenario whereby Bangladesh could traverse to the HIC status around 2041 hinges on the need for Bangladesh to be able achieve its GDP growth target of 8% by FY2020, and then maintain an average growth rate of 8% beyond FY2041. Table 1 below provides a summary of that GED policy scenario. As a result, a key outcome of this plan policy scenario is that Bangladesh could become an UMIC by FY2031; and be on a path to be a HIC around FY 2041. This scenario envisages that Bangladesh's per capita income would be around USD 5,480 in FY31 and climb to USD 23,302 in FY41, while maintaining 8.3 percent growth rate on an average from FY2016 to FY2046.

These per capita income figures exceed the corresponding thresholds for HIC as defined under the WB guidelines. Indeed, projections by the General Economics Division (GED) of the Bangladesh Planning Commission shows that Bangladesh could cross the UMIC threshold by the target year FY31 and be high income country around FY41. As will be shown later, this income expansion path for UMIC will be quite steep and challenging, and will require not only many policy reforms but also, especially, a massive investment effort (See Figure 8 below).

Table -1: Summary of Policy Scenario

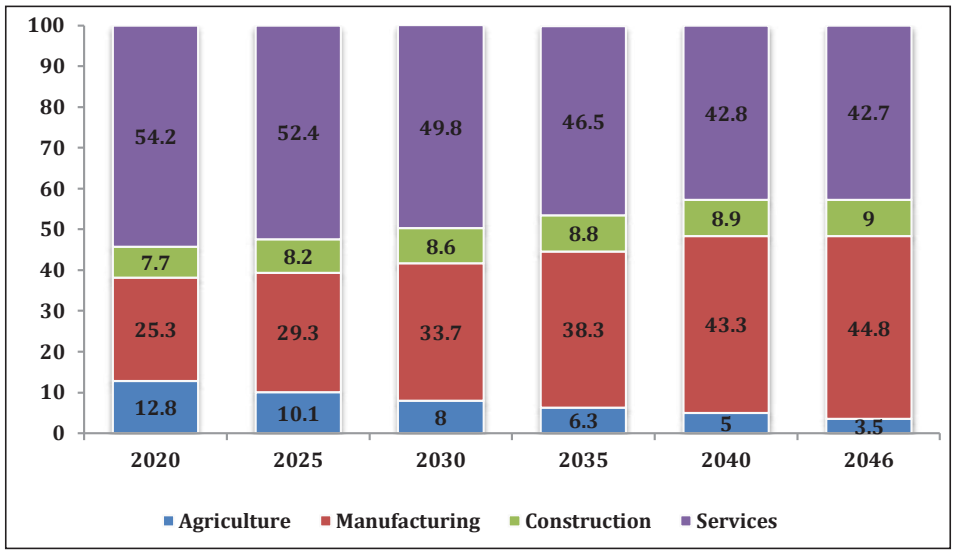
Key Outcome	2030	2041	2046
Extreme poverty	0.4	0.0	0
Moderate Poverty	8.3	4.1	2.2
Upper Middle Income Country	√		
High Income Country			√
Key Drivers:			
I/Y ratio	36.5	38.2	38.5
Public Investment to GDP	8.6	9.0	9.0
Private Investment to GDP	27.8	29.2	29.5
Labour force participation	63.5	68.0	70.0
Male	82.0	82.2	82.2

Key Outcome	2030	2041	2046
Female	44.9	53.7	57.7
Employed People, In million	86.2	101.2	107.5
TFP	3.4	4.3	4.4
Capital	5.3	4.6	4.8
Labour	4.1	3.6	3.4
Export/GDP ratio	24.4	32.5	38.2
Remittance/GDP ratio	6.7	5.3	5.0
FDI to GDP ratio	3.8	4.2	4.4
Public Debt to GDP	37.1	40.2	41.5
External	10.8	14.5	16.1
Domestic	16.3	25.7	25.4
Memorandum Items:			
Growth rate (%)	8.2	8.4	8.5
ICOR	4.4	4.6	4.6

Source: GED Projections

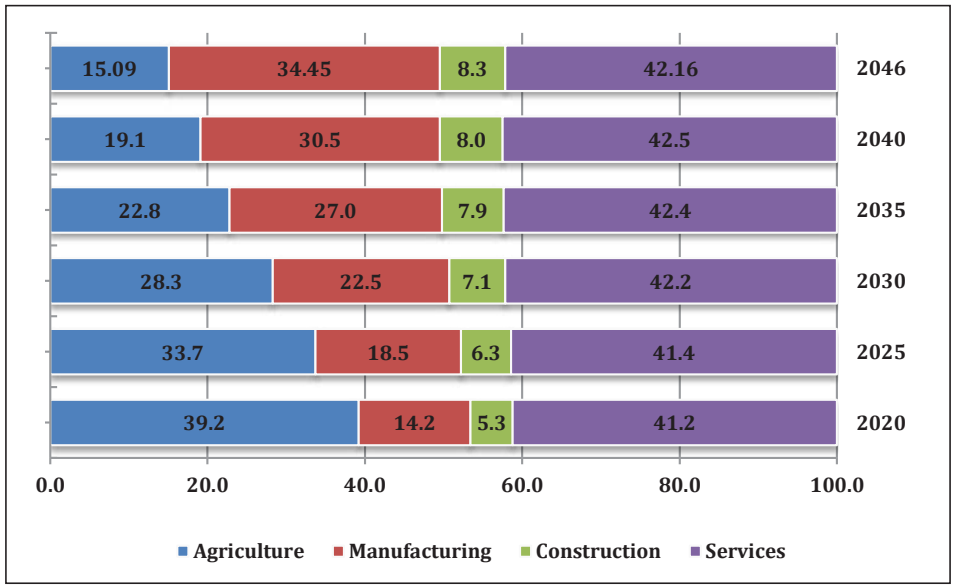
Under this forward looking scenario, Bangladesh economy has also been projected to experience major shifts in its economic structure and the sources of employment generation (Figure 1 and 2 below), with manufacturing having the highest share of GDP (projected to be around 43% in 2041) with services coming down to second position (projected to be around 43% in 2041). During the period most of the employment growth is also projected to be in manufacturing (about 31% of total employment), with employment in service hovering around 43%. The biggest decline, both in terms of GDP hare and employment share is projected to be in the agriculture sector.

Fig;1 Projected economic structure (%)



Source: GED projections

Fig 2: Projected employment share (%)



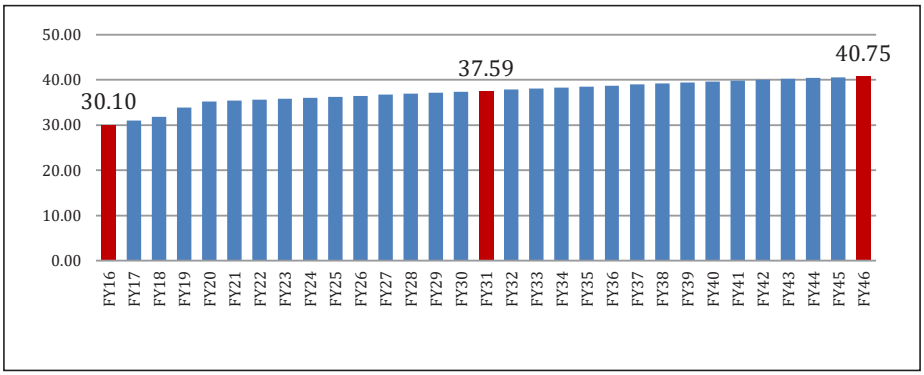
Source: GED projections

Desired Path to and beyond 2041 – Higher levels of Investments: As already indicated above, the two key drivers of this growth will be growth of share of investments (both private and public) and that of exports in the GDP of Bangladesh. The challenge for exports will be the need for its diversification and so there will be necessity of reforms in trade related policy; but it will also require higher levels of private investments particularly FDI in export oriented manufacturing to be able to diversify the exports, bring in technology, and in getting access to markets. Cross-country experience has been showing that there is a positive relationship between investment and GDP growth rate. The positive relationship explains that for economies around the world higher investment leads to higher growth of GDP.

According to the scenario analysis done by GED, Bangladesh's desired goal of reaching HIC status around 2041 would require it to increase its investment to a minimum of 39 percent of GDP in 2041[1] from nearly 31 percent of GDP in 2017 (Figure 3). The lion's share of investment would be generated from the private sector (which have been projected to reach 29.2% by 2041). but it would only be possible if planned public investment can create an environment favorable for private investment and foreign direct investment.

1 ESCAP (2017), estimated Bangladesh would need to investment $ 10 billion only to cover the huge infrastructure gap between 2015 and 2030. This investment would however increase GDP by about 3.94 percentage points implying annual addition to GDP growth of 0.26 percent only from this source. This scenario also includes USD 33 billion investments for Delta projects.

Figure 3: Bangladesh Gross Investment Projection (FY16-FY46)

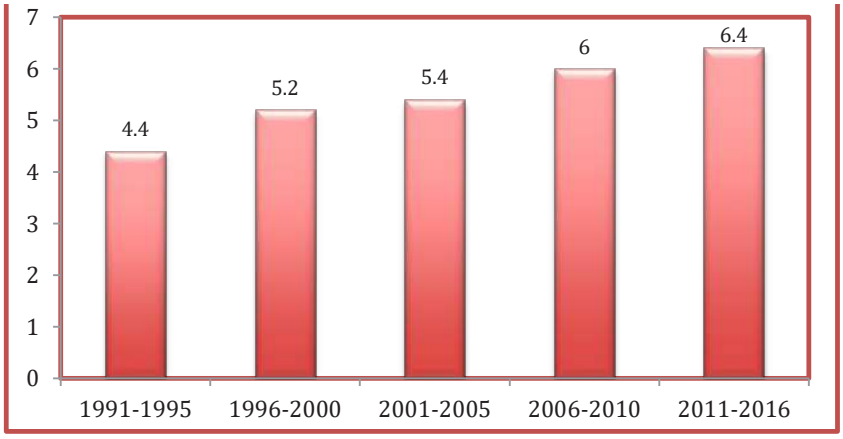


Source: GED Estimate

1.4 Lessons from Bangladesh Experience

Bangladesh economy has been experiencing steady acceleration in economic growth over the last several decades; this pattern continued through out the Sixth Plan and also into the 7th Plan period. Following two decades of low growth during the 1970s and the 1980s, GDP growth in Bangladesh accelerated since the early 1990s, climbing from an average of 4.4% during 1991-95 to 6.4 % in 2011-16 (Figure 4). The growth rate crossed over to 7% in FY2016.

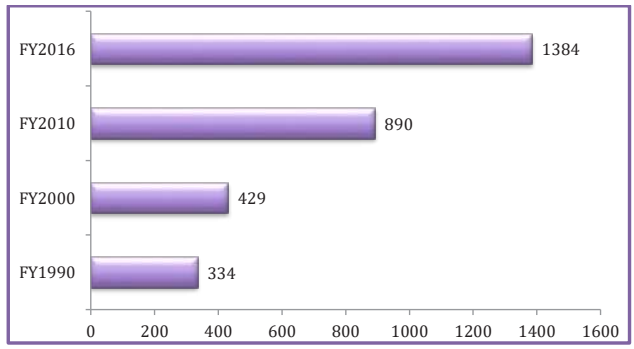
Figure 4: 5-Year Average GDP Growth Rates



Source: Bangladesh Bureau of Statistics

In per capita terms, growth rate surged from 2.2 % per year to 5.2% over the same periods. The acceleration of per capita GDP during 2010-2016 is truly remarkable and it enabled Bangladesh to cross the threshold of lower middle-income country (LMIC) as defined by the World Bank (Figure 5).

Figure 5: Per Capita Income (USD)

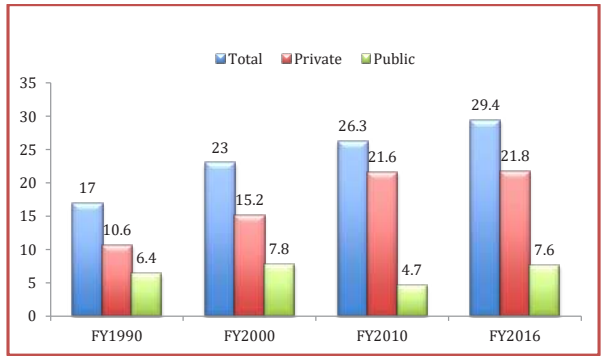


Source: Bangladesh Bureau of Statistics

The Rate of Investment – the growth driver. Investments and exports have been the key drivers of Bangladesh growth success story. Bangladesh's development success so far has been accumulation of capital (capital deepening) resulting from rising investments, which has resulted in a structural change of the economy with manufacturing sector becoming increasingly important that has so far positively impacted development of Bangladesh. This is consistent with the growth experiences of East Asia when they started their journey from their low-income stage. The investment rate expanded from a low of 10% of GDP in 1970 grew to 28.9% in 2015. Private investment climbed from a low of 10.6% of GDP in FY1990 to 15.2% in 2000 to 21.6% of GDP in FY2010. In many ways these 20 years transformed Bangladesh from a regulated economy to a private investment-led economy. This is an important milestone and lesson-learnt as it demonstrates that private investments respond well to steps that improves ease of doing business, reduces its costs, and brings certainty from any deep policy and institutional reforms.

On the public investment front, however, the rate declined from 7.8 % to 4.7% between FY2000 and FY2010 owing to weak tax revenue mobilization and growing current expenditures. There was then a reversal of this trend over FY2010-FY2016. Public investment recovered well, growing to 7.6% of GDP in FY2016. The historical growth of investments between FY1990 and FY 2016 is presented below in Fig 6.

Figure 6: Growth of Investment (% of GDP)



Source: Bangladesh Bureau of Statistics

2. Some Policy Challenges:

The rapid growth in private investment rate from 10% of GDP in FY1990 to 22% in FY2010 did not happen by accident. A number of good policies including sound macroeconomic management, trade and investment deregulation, the expansion of infrastructure services and expansion of labor and quality improvements contributed to that effort. A detailed review of these determinants is available in Ahmed (2005; 2006). Sound macroeconomic management has been a hallmark of economic policy making in Bangladesh. Occasional hiccups and deviation from this path were quickly corrected and on average the long-term trend of various macroeconomic management indicators show a facilitating environment for the expansion of private investment. The stability of the macroeconomic environment has been a major enabler of the rapid expansion of private investment (Ahmed 2015).

Investment deregulation: In the 1970s and 1980s Bangladesh manufacturing and organized services were characterized by a domination of state-owned enterprises and state controls over prices, investment and external trade. The deregulation process started in the 1980s but gained momentum after 1990. Since then, there has been a major and progressive investment deregulation to boost domestic and foreign investment. The deregulation effort has involved privatization, removal of quantitative restrictions, simplifying business registration process and encouraging foreign investment through relaxation of ownership restrictions.

Trade liberalization: Much of the trade liberalization happened during 1990-2005. Although Bangladesh was a late starter compared with other developing countries including in South Asia, the magnitude of liberalization is impressive when measured against the starting point. This involved virtual dismantling of almost all quantitative restrictions on trade, sharp reduction of average trade tariffs and the establishment of the free trade zones (Export Promotion Zones (EPZs)). The hugely positive response of the readymade garments (RMG) sector to trade liberalization and related other policies (such as back-to-back LCs, fiscal incentives and access to concession trade finance) is illustrative of the role trade liberalization in promoting investments, exports, GDP growth and employment.

Fiscal incentives: To attract foreign investment and promote domestic investment the Government offers a fairly liberal set of fiscal incentives involving tax holidays, lower income tax rate, accelerated depreciation and low import duties on capital and intermediate goods imports. Exports also enjoy duty drawback benefits. In many ways, the fiscal incentives in regards to exemption of profits or low rates offered to selected sectors (RMG) might be too liberal and an overkill and as such needs to be re-examined to avoid an unnecessary erosion of the tax revenue base.

Supply of labor and employment policies: The abundant supply of labor is a major positive contributor to private investment and expansion of manufacturing production and exports, especially in RMG. Low wage cost remains a substantial advantage for Bangladesh that contributes to cost competitiveness in labor-intensive manufacturing such as RMG. Government policy in regards to education and labor markets has played an important facilitating role. Bangladesh labor markets relating to all three major sectors (agriculture, manufacturing and services) work flexibly and the transaction costs of employment in terms of hiring, termination and wage setting are among the lowest in developing countries

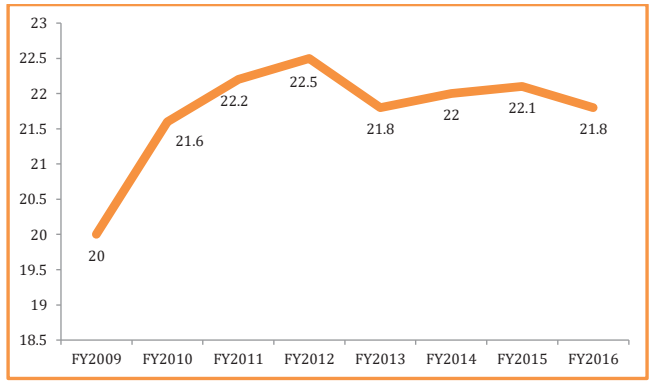
and certainly within South Asia (Ahmed, 2015). While this flexibility is a big plus, recent developments in the RMG sector suggest that the absence of prudential regulatory norms regarding worker safety and social insurance including coverage of accidents is a serious problem that needs to be corrected.

The above analysis suggests that the returns to good policies can be substantial. But it also raises two questions: first, why the FDI response in Bangladesh has been sluggish in comparison with the dynamic Asian economies; and second what explains the stagnation of the private investment rate over the past few years? The answers to these two questions are inter-related and can be obtained by reviewing the emerging constraints to investment.

3. Bangladesh Investment trend – the Issues and Challenges:

Getting desired higher levels of private investments has been a key challenge. While the Bangladesh economy has done well in terms of GDP growth and exports, one negative development is the near stagnation of the private investment effort in recent years. The government to support achieving its overall growth targets had also set private and public investment targets over both 6th FYP and 7th FYP. The 6th FYP had targeted an increase in the investment rate growing from 24% of GDP in FY10 to 32% by FY15. The worrisome factor is that since FY2012, the private investment as a share of GDP has remained virtually flat at around 22% (Figure 7). This is worrisome because the 6th FYP had identified private investment as a major engine of growth and exports, especially in the manufacturing sector.

Figure 7: The Private Investment Challenge (% of GDP)



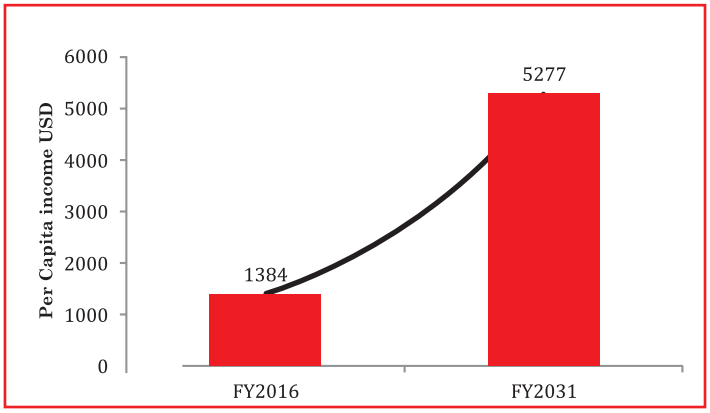
Source: Bangladesh Bureau of Statistics

It should be noted that, while the current total investment rate of 29% of GDP has been adequate to sustain the investment needs of the average GDP growth rate of 6-7% overall and 5-6% per capita of the past 6 years; this may not be adequate to take the economy to the next stages of the development path involving sustained 8% overall GDP growth and 7% growth of per capita GDP that will be required to achieve the vision of Higher Income Country (HIC) around 2041. The path will be quite challenging.

As a PRI projection had shown (Figure 8 below), the income expansion path even for Upper Middle-Income Country (UMIC) is steep and requires many policies but especially

a massive investment effort. In fact, both public and private investment rate must expand to enable Bangladesh move to the 8% GDP growth path and achieve the target of upper middle income (UMIC) by FY2031. The investment rate needs to go up from the present 29% of GDP to 34% of GDP to achieve 8% growth rate by FY2020 and 35% of GDP by FY2022 to sustain that effort. This substantial expansion in the investment rate is needed partly to accommodate the growing capital intensity of production in Bangladesh and partly to finance the additional 1-2% growth in GDP. As in the past, the momentum has to come from private investment.

Figure 8: Transition Path to UMIC (USD)



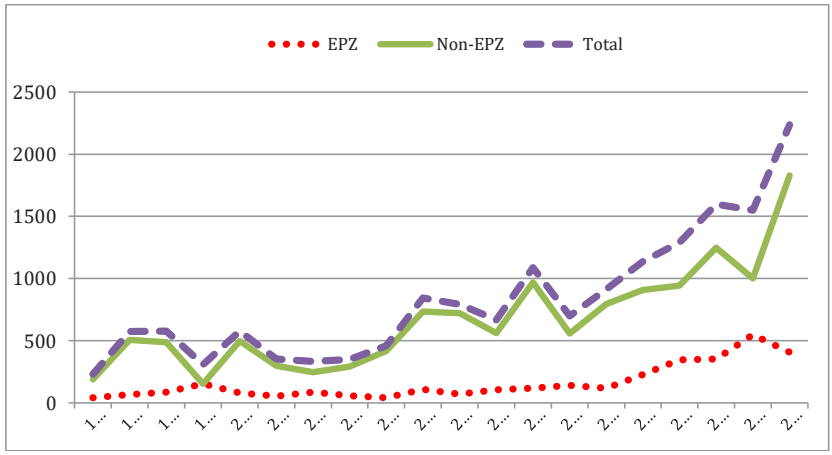
Source: Sadiq Ahmed - PRI Projections

As evident from Fig. 8, the projected transition path will be quite steep and challenging based on what has been achieved so far in investments, particularly private investments. Achieving a 4-5-percentage point of GDP increase in the private investment rate in the next 5 years is not an easy task, especially in view of the stagnation in the investment rate over the previous 5 years. There needs to be substantial changes in the policy and regulatory framework for private investment, with particular emphasis on attracting higher FDI inflows.

Poor FDI flows have been a stumbling block to raising investment rates. A very concerning factor is that the response from foreign direct investment (FDI) has been lack luster (Figure 9). Although FDI flows have picked up recently, reaching $2.3 billion in 2015, this is still much below potential. Total FDI flows in Bangladesh are relatively insignificant in relation to total supply to developing countries (Ahmed and Sattar 2012). For example, as compared with $1.6 billion FDI inflow in Bangladesh in 2013, FDI inflows amounted to $124 billion in China, $29 billion for India, $18 billion for Indonesia and $9 billion for Vietnam.

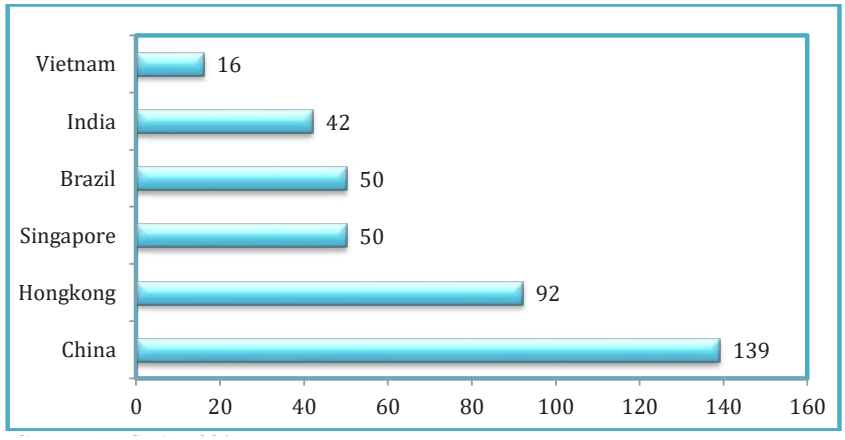
More recently, as illustrated in Figure 10, FDI flows in 2016 amounted to $139 billion in China, $92 billion for Hong Kong, $50 billion each for Singapore and Brazil, and $42 billion for India (UNCTAD, 2017). These numbers easily dwarf the $ 2 billion or so inflow in Bangladesh. They also indicate the large FDI flows that are still available for developing countries despite prevailing global financial difficulties.

Figure 9: Flow of FDI ($ millions)



Source: Bangladesh Bank

Figure 10: Inflow of FDI 2016 (USD Billion)



Source: UNCTAD, 2017

Bangladesh had also adopted several strategies as expressed through the 6th FYP and the 7th FYP to help achieve that goal. Two such initiatives were adaption of the PPP policy and the setting up of Special Economic Zones (SEZs) under the Special Economic Zones Act 2010. Both of these initiatives were expected to help to catalyze higher levels of new private sector investments (including higher levels of FDI) both in manufacturing and exports, and also helping fill up the resource gap needed to build new infrastructure.

Public investments for facilitating private investments: One of the main challenges relating to investment climate and doing business environment in Bangladesh is the huge deficiency in all aspects of quality and also quantity of infrastructure, for which public investments along with PPP investments are absolutely essential. Public investments are critical for facilitating private investments. While it is true for all aspects of public investments it is particularly true for investments in strategic infrastructure like power, energy supply, roads,

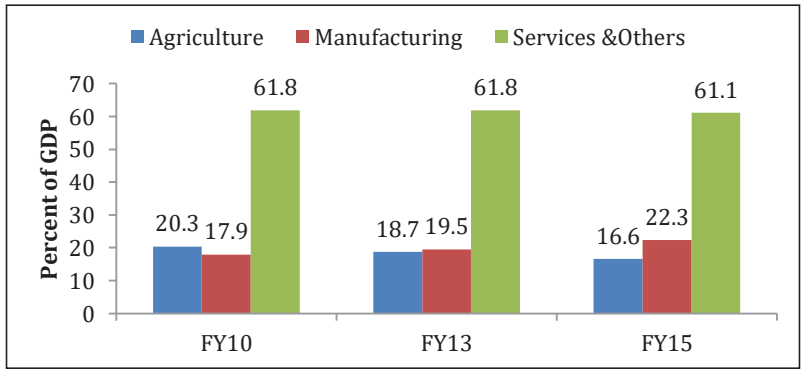
railway, waterway, ports, and IT related infrastructure. As it will be shown later Bangladesh performs very poorly in terms of infrastructure quality, which negatively impacts its Global Competitive Index (GCI) rankings. All these are extremely important in reducing cost of doing business and that way facilitates higher levels of private investments. There needs to be efficient implementation of public investment through the Annual Development Plan (ADP) along with PPP investments to help Bangladesh reduce cost of doing business and thus improve its rankings in Global Competitive Index (GCI), Global Logistic Index (GLI), the Doing Business (DB) indicators (to be discussed later) so as to spur domestic and foreign investments.

While there has been improvement in allocation for public investments through the ADPs, an even bigger challenge is the constant is the lag in providing resources for operation and maintenance (O&M) of the infrastructure that had already been built. However, a very big disappointment has in the inability to mobilize requisite resources through PPP for infrastructure projects. Despite ambitious plans, the PPP strategy has not taken off in any significant shape for a host of reasons including institutional challenges, and the doing business environment itself stymies increased flow of private investments. The net result is a substantial shortfall in public investment rate in comparison with the 6th FYP targets, and is likely to happen during 7th FYP period, if remedial measures are not immediately taken. Unless there is marked improvement in all these indicators and come in line with countries like Korea, China, Vietnam etc. it will be challenging to attain the 2041 goal of transforming into a HIC.

Higher levels of private investments in manufacturing sector, particularly ready-made garments (RMG), facilitated it in leading the robust GDP growth. The underlying growth strategy in the 6th FYP and 7th FYP had aimed at facilitating a faster transformation of the Bangladesh economy away from a primarily agrarian one towards a modern manufacturing and services oriented economy. This has yielded good results for the manufacturing sector in terms of growth in the arena of exports, domestic production, and job creation and its continuous increase in share of the GDP (Fig. 11 and 12 below). The main contributor to this robust growth performance of the manufacturing sector has been investments in the export oriented RMG sector.

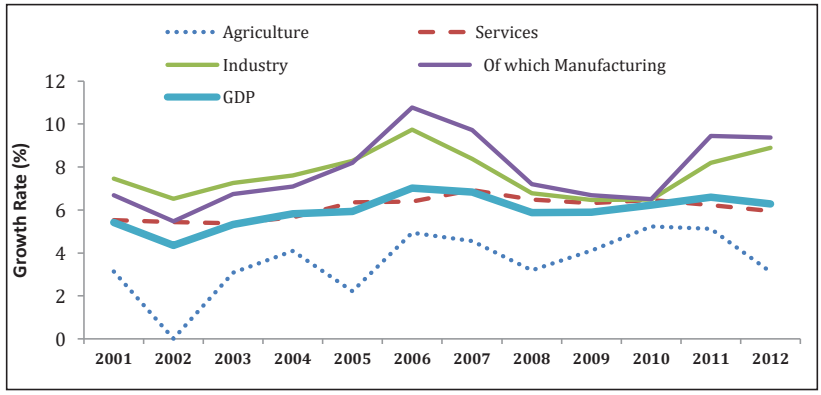
The robust manufacturing growth of past decades Bangladesh has also helped in structurally transforming of the economy with share of industry in GDP rising, compensating the decline in the size of agriculture (Fig 11 and 12). Manufacturing, which accounts for 70% of industry and has been driving the structural transformation, will have to continue to lead growth acceleration for many more years to come. At the same time it has to remain globally competitive and ahead of the curve, where a high performing manufacturing sector will have to reach a high level of industrial sophistication meeting internationally recognized standards of product quality within a compliant production environment.

Figure 11: Progress with Structural Change



Source: BBS

Figure 12: Sectoral Growth Trends



Source: National Accounts, BBS

In order to measure up to the needs, our manufacturing industry has to shape a course based on the global needs and national realities; but definitely will require higher levels of capital accumulation. The presence of Global Value Chains (GVCs) could provide a mechanism for firms and farms in Bangladesh to access the world market and advanced technologies to reach that higher level of industrial sophistication and meeting internationally recognized standards of product quality within a compliant production environment. These could happen, provided the right policy and institutional support is there and if the investment climate remains conducive for private sector to increase investments (both domestic and FDI). Particularly for accessing world markets and advanced technologies and to cash on the GVC opportunity it will also be critical to have increased levels of manufacturing FDI. The government has been trying to provide support for this through setting up of SEZs.

3.1 Improving Doing Business Environment – Bangladesh needs to do much better for attracting higher levels of investment

The two most important determinants for private sector investment are the cost of doing business and the incentive structure. In order to spur private investments (both domestic and FDI), it will be necessary to reduce cost of doing business relative to competing countries,

which in turn will provide the necessary returns to entrepreneurs in incentivizing them in taking the long-term risks of investments. This entails not only having in place investor friendly supportive policies, along with strengthened legal, regulatory and other supporting institutions, but also taking specific measures to sort out the challenges that faces investors including infrastructure, logistics, facilitating services, land and skills related challenges. This is what is usually referred to as the prevailing investment climate of country.

Investment climate reflects the overall business environment in the country, which not only reduces the cost of doing business but also allows private sector to operate their businesses in a more transparent and hassle free institutional setting. It is important for good investment climate to have in place policy certainty and a non-discriminatory regulatory environment, which in turn gives investors the comfort level to invest. So policy and institutions are at the core of investment climate as much as that of facilitating infrastructure.

Investor surveys like Investment Climate Assessments (ICA) or Doing Business (DB) show that what matters more for investors is the general investment climate and competitiveness of the economy. Long delays in contract enforcement, limited access to serviced land, power and gas shortages and red tape have all become major constraints to investment in Bangladesh. These are what raise cost of doing business in Bangladesh where it features very poorly and very low in almost all the indices. As indicated above primary reason for the lower-than-expected increase in private investment during the SFYP and first two years of 7th FYP has been the continued weakness in the investment climate. While some domestic private investments are coming there has been very little FDI flowing in, particularly in the manufacturing sector. The inability to attract adequate foreign private investment can only be attributed to a poor investment climate, and the better performance of FDI in neighboring countries is a reflection of this.

Capital deepening supported by higher rates of private investments (includes PPP investments in infrastructure) and robust and efficient implementation of public investments will be key driver for Bangladesh to attain its version of attainment of HIC around 2041. As manufacturing and exports will be the key vehicles achieving this visionary goal, all effort should be in ensuring a very robust response to investment needs, both from the private and public sectors. The Government needs to address this challenge much more comprehensively in order to further spur the growth of manufacturing to reach double-digit rate, and critical for this to happen is to bring about substantive improvement in Bangladesh's "Investment Climate".

3.2 Improving Investment Climate and Reducing Cost of Doing Business is need for spurring private sector investments:

An efficient and supportive regulatory environment a must for improved investment climate: The regulatory environment for business can have a determining influence on private investment (World Bank 2004). Laws, regulations and rules are integral part of a country's governance structure. These are implemented and enforced through a web of institutions. Complex regulations and bureaucratic hurdles tend to increase the transaction costs of doing business and thereby hurt the growth of investment. On the other hand enabling regulations that protect investor interests and simplify business transactions encourage private investment. A report by IFC's Foreign Investment Advisory Service

(FIAS) finds that the biggest problem with regulation in Bangladesh is that existing laws are not applied or enforced properly. Part of the reason for lax enforcement is regulatory capture. The FIAS study points out that very often, the chief ailment is over regulation, and, occasionally, under regulation or poor regulation. Regulations tend to be made without proper social cost and benefit analysis of regulations, and there is no practice of undertaking any Regulatory Impact Assessment (RIA) that takes into account enforcement cost, compliance cost, or the negative externalities arising from new regulation.

In today's globalized world where capital is fairly mobile, weak domestic investment climate riddled with too many regulations and bureaucratic hurdles will not only adversely affect the inflow of foreign investment but can also cause domestic capital flight to more hospitable investment environment. These impact the Doing Business environment and the related indices where Bangladesh continues to perform poorly, and raises risks for good investors. Making the regulatory environment more business-friendly by improving governance and strengthening institutions will be a pre-requisite for sustained high growth performance of the manufacturing sector necessary for attaining UMIC status, and then moving towards the much desired HIC.

For attaining higher levels of investments - the markets needs to function efficiently. An important outcome of good investment climate is a better functioning market. Effective functioning of markets, governance, and institutions are prerequisite for a vibrant private sector ready to invest at higher levels. Markets depend on a complex array of public institutions that shape the quality and effectiveness of governance, which plays a pivotal role in getting markets to work efficiently. It is critical that governments complement markets, encourage rather than penalize entrepreneurship and competition, uphold the rule of law, and limit bureaucratic harassment and corruption. In short, they should provide the foundation of good governance for harnessing higher levels of investments, which will particularly be needed for the desired manufacturing growth to take place.

Bangladesh lags behind in different globally accepted indices relating to business environment. The prevailing regulatory regime of Bangladesh is to be severely challenging as has been reflected in different global indices including the Global Competitiveness Index (GCI) and the World Bank-IFC published Doing Business (DB) indicators. Review of both the GCI and the DB indicators also point out the deficiency in supportive infrastructure and Logistic facilities when compared to other countries. While inadequate regulations and inadequately functioning institutions raise cost of doing business, so also is inadequacy of supporting infrastructure and logistics. It is important to note that it is a competitive world and it is not just enough to make improvements in all of the above-mentioned constraints, but it is equally important to be ahead of competitors as those countries are also making efforts to improve.

3.3 Bangladesh Investment Climate in Comparison to some competing Countries.

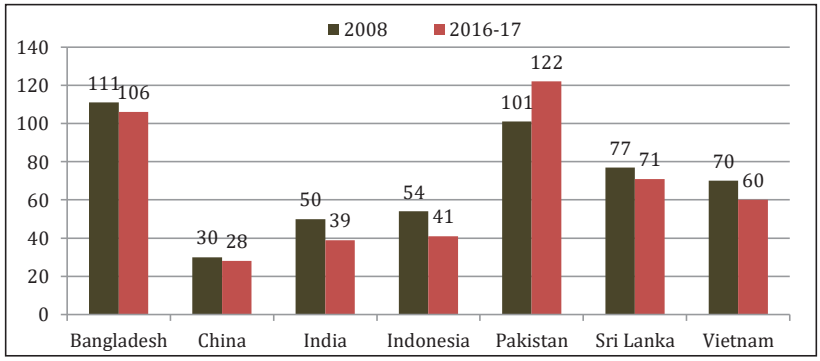
In recent years a range of cross- country indicators of investment climate are regularly prepared on an annual cycle by specialized international agencies based on investor surveys. These indicators provide very useful data on the emerging constraints to private investment. While the implications of each constraint will likely vary by countries, the wealth of knowledge available from these global surveys can be productively used to

inform policies. These cross-country comparisons are especially useful to understand why some countries are able to attract more FDI inflows than others.

The Global Competitiveness Index (GCI) prepared by the World Economic Forum has now become a fairly standard reference point for assessing the competitiveness of an economy in relation to other countries in the list. The GCI measure is available as a composite index as well as by individual components that comprise the index. The individual components (12) provide fairly in-depth views about the regulatory environment faced by investors in any country as well other factors affecting competiveness including macroeconomic environment, financial services, skills, infrastructure, institutions and technology.

The trend in overall competitiveness of Bangladesh as measured by the GCI in relation to its competitors is illustrated in Figure 13. Although the number of countries covered in the surveys between 2008 and 2017 has changed slightly from 134 to 138, the relative cross-country rankings within a year are not affected. Also, the inter-temporal trend showing relative progress across countries provides useful insights.

Figure 13: Global Competitiveness Index (ranking)



Source: GCI, World Economic Forum (2016-17 and 2008-09)

The two main messages conveyed by Figure 13 are that: first, the competiveness of the Bangladesh economy relative to competitors remains a serious challenge. China, Indonesia, India, Vietnam and Sri Lanka are much more competitive than Bangladesh. And second, between 2008 and 2017 Bangladesh has made some progress with improving its competitiveness, but China, Indonesia, Vietnam and Sri Lanka have improved faster. As a result, the competitiveness gap with these countries has widened. The one exception in competitiveness performance is Pakistan. In 2008 Pakistan was well ahead of Bangladesh but its performance deteriorated sharply over the past 9 years and had fallen behind Bangladesh in 2016.

An important thing to note is that the better performing countries like Singapore, Malaysia, South Korea, and China have scores 5 and above (Table 2 below). Other catching up countries like India, Vietnam and Thailand had scores above 4. Only Bangladesh and Pakistan in the list below have 3.8 and 3.5 respectively. Bangladesh will have to aim at raising its score to above 5 in the coming years, in order to improve its rankings and make it as competitive as Singapore, South Korea, Malaysia, and China. It should be noted that

these are relative rankings and other competitor countries are also striving to increase their scores and rankings. So Bangladesh will have to increase its efforts manifolds to not only catch up but also go over competitors' scores to be able to attract desired levels of FDI.

Table 2. Global Competitiveness Index (GCI) 2016

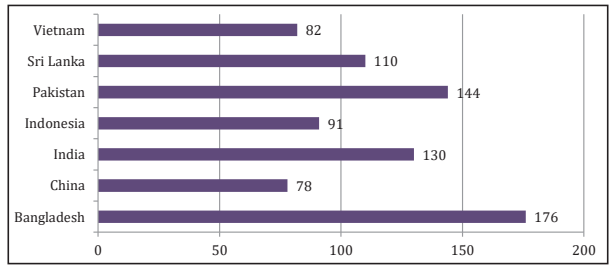
	Rank	Score
Bangladesh	106	3.8
Singapore	2	5.8
Malaysia	25	5.2
South Korea	26	5.0
China	28	5.0
Thailand	34	4.6
India	39	4.5
Vietnam	60	4.3
Pakistan	122	3.5

Source: Global Competitiveness Report 2016-2017, World Economic Forum

Doing Business (DB). A big component of the GCI is the regulatory environment as measured by the International Finance Corporation's (IFC) cost or ease of Doing Business (DB) indicators. The DB indicators are very helpful to measure the progress with deregulation in terms of results on the ground, and not just regulations in the books, and as such they reflect both the regulatory gaps and associated implementation challenges.

The DB indicators provide an overall ease of doing business index ranking as well as rankings for each of the 10 regulatory areas that affect business decisions. The overall DB index for 2017 for Bangladesh and comparators based on 190 countries is indicated in Figure 14. Some interesting results emerge from this comparison. First, despite past progress, the regulatory environment in Bangladesh is substantially less favorable than competitors; it is ranked at a low score of 176 as compared with the worst performing country ranking of 190 for Somalia. Second, all other countries in the comparator list have a relatively better regulatory environment than Bangladesh.

Figure 14: Doing Business Rankings 2017 (out of 190)



Source: IFC Doing Business Database

The Doing Business challenges becomes more apparent from Table 3 below which gives a breakdown of the different components of the composite overall index. Bangladesh ranks relatively poorly in all the components of the index. Bangladesh will have to address each of the components and needs to better than the competing countries to move ahead in its rankings.

Table 3. Ease of Doing Business Rankings, 2016

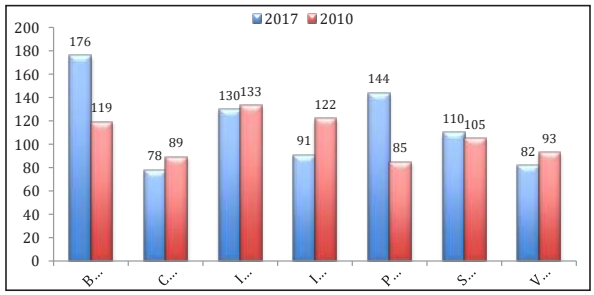
	Overall Ranking	Starting a business	Dealing with construction permits	Getting electricity	Registering Property	Getting Credit	Paying taxes	Trading across borders	Enforcing contracts
Bangladesh	176	122	138	187	185	157	151	173	189
Singapore	2	6	10	10	19	20	8	41	2
Hong Kong	4	3	5	3	61	20	3	42	21
South Korea	5	11	31	1	39	44	23	32	1
China	78	127	177	97	42	62	131	96	5
Malaysia	23	112	13	8	40	20	61	60	42
India	130	155	185	26	138	44	172	143	172
Thailand	46	78	42	37	68	82	109	56	51
Indonesia	91	151	116	49	118	62	104	108	166
Vietnam	82	121	24	96	59	32	167	93	69
Pakistan	144	141	150	170	169	82	156	172	157

Source: Doing Business Report 2017, World Bank

A comparison of the results illustrated in Figure 13 and Figure 14 shows that while the regulatory environment is an important determinant of the investment climate and competitiveness of an economy, it is only one determinant. It is also important to pay attention to such other factors included in the measurement of GCI as the macroeconomic environment, labor skills, labor market, financial sector, infrastructure, technology, institutions and innovation. Progress in these other areas can compensate for the higher transaction costs of negotiating the regulatory environment while weaknesses in these other areas can strongly offset the regulatory ease of doing business (e.g. Bangladesh versus Pakistan).

Bangladesh's DB Rankings worsened between 2010 and 2017. An interesting question is how have the DB rankings changed over time? While there are some methodological challenges in such inter-temporal comparisons owing to changes in the number of countries and interpretation of the survey questionnaires, nevertheless the trend in performance is indicative of the relative policy efforts made to address the investment climate issues. Figure 15 shows the changes in relative rankings. It tells a very worrisome story. The rankings suggest a sharp deterioration in the investment climate for the private sector in Bangladesh relative to comparators. In 2010, Bangladesh was ranked at the 119th place out of 183 countries. This ranking worsened sharply over time and fell to 176th place out of 190 countries. All other comparator countries except Pakistan show improvement.

Figure 15: Doing Business Rankings, 2010-2017



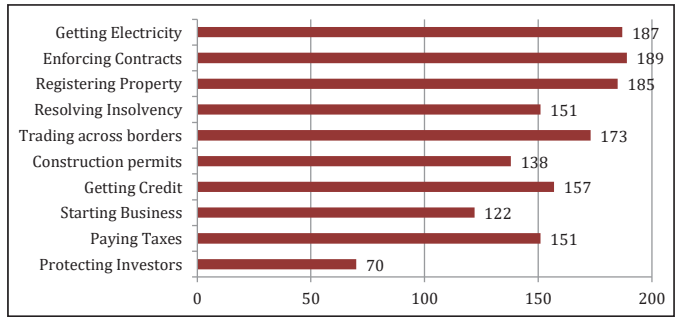
Source: IFC (2009); IFC (2016)

The inescapable conclusion from all of the above is that the overall investment climate for private sector is weak in Bangladesh by both measures (GCI and DB) and has deteriorated, and requires focused attention of the Government, particularly having in place right policies, regulations, and institutions. The Government recognizes the issues and has set up three new institutions – the Bangladesh Investment Development Authority (BIDA), Bangladesh Economic Zones Authority (BEZA), and the PPP Office, all under administrative control of the Prime Ministers Office. However, policy challenges should be handled upfront and the best approach to reforming policies for improving the investment climate is to focus attention on both the regulatory environment as well as the other enablers.

3.4 Regulatory Challenge to improving DB rankings of Bangladesh.

Drilling down the composite DB index by its 10 individual components provides substantial insights of where the main regulatory constraints bite most. The Bangladesh 2017 rankings by components are shown in Figure 16. The four top constraints identified by DB survey responders in Bangladesh are enforcing contracts, getting electricity, registering property, and trading across borders respectively. These are followed by getting credit, paying taxes, resolving insolvency, getting construction permits, and starting a business. The ranking in these areas, especially in regard to getting electricity, registering property, and enforcing contracts, puts Bangladesh at the near bottom of the global list of countries. Getting credit, resolving insolvency and paying taxes are also problematic and involve substantial transaction costs. Some additional insights for policy challenges can be gained by looking at how ranking of components have behaved over time.

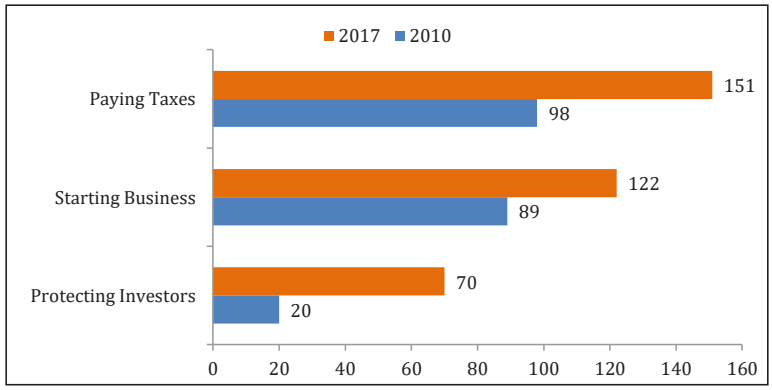
Figure 16: Bangladesh Key Regulatory Constraints to Private Investment 2017
(Ranking, 190 Countries)



Source: IFC (2010; 2017)

Data suggest that the performance worsened for all the 10 indicators, including the three areas where Bangladesh was performing relatively well in 2010 (Figure 17). The most concerning deterioration is in paying taxes; the tax regime has become a serious bottleneck to the investment climate in recent years. There needs to be special focus in instituting major reforms in the overall tax administration with focus not just on revenue collection but also taking into consideration the need of business. In this context not only should there be clarity and certainty of tax policy but also reduce discretionary intervention that makes cost of doing business high.

Figure 17: Relative Regulatory Weakening Over Time



Source: IFC (2010; 2017)

In some areas like starting business and protecting investors, where Bangladesh had made improvements in 2010, again slid down substantially in 2017. Both these areas also need special attention, particularly to help attract higher levels of FDI. All these also reveal the difficulty in overcoming regulatory challenges and will require continuous monitoring and implementation of necessary regulatory changes.

Relative Transactions Costs – where Bangladesh could improve? The implications of DB 2017 rankings in terms of transaction costs are illustrated in Table 4. The costs are given in terms of the number of procedural requirements, the amount of time involved in meeting the regulatory requirements, and some measure of financial cost of complying with the regulation. In some sense the latter two are more fundamental because what matters to a business enterprise are the transaction costs of complying with regulations in terms of time and money. Ceteris paribus, the lower the compliance cost in terms of procedures and time and money spent, the simpler and more efficient is the underlying regulatory regime.

Table 4: Efficiency of the Bangladesh Regulatory Regime 2017

Regulation/Country Performance	Bangladesh	China	India	Indo-nesia	Pakis-tan	Sri Lanka	Viet-nam	Best Performer
1.Starting a business								
---No. of procedures	9	9	12.9	11.2	12	7	9	1
--Time (days)	19.5	28.9	26	24.9	18	9	24	0.5
--Cost (% of income per capita)	13.8	0.7	13.8	19.4	12.4	12.2	4.6	0
2.Dealing with construction permits								
--No. of procedures	14.2	22	35.1	17	15	13	10	7
--Time (no of days)	269	244	190	200	264	115	166	28
--Cost (% of warehouse value)	2.7	7	25.9	5.1	7	0.4	0.8	0.1
3. Getting electricity								
--No. of Procedures	9	5.5	5	4.8	5.3	5	5	3
--Time (no. of days)	429	143	46	58	181	100	46	18
--Cost (% of income per capita)	2861	390	133.2	357	1772	732	1261	0
4. Registering property								
--No. of procedures	8	4	7	5	7.7	9	5	1
--Time (no. of days)	244	19.5	46.8	27.4	154.8	51	57.5	1
--Cost (% of property value)	7	3.4	7.7	10.8	4.6	5.1	0.6	0

Regulation/Country Performance	Bangladesh	China	India	Indonesia	Pakistan	Sri Lanka	Vietnam	Best Performer
5. Getting credit								
--Strength of legal rights index (0-12)	5	4	6	6	3	2	7	12
--Depth of credit info index (0-8)	0	8	7	6	7	6	7	8
--Credit registry coverage (% of adults)	0.9	91.1	0	51.8	9.4	0	41.8	100
--Credit bureau coverage (% of adults)	0	21.3	21.4	0	5.8	57.2	14.8	100
6. Protecting minority investors								
--Extent of conflict of interest regulation index (0-10)	6.3	5	6.7	5.7	6	6.7	4.3	9.3
--Extent of shareholder governance index (0-10)	5	4	8	5.7	7.3	6	6.3	8.3
--Strength of minority investor protection(0-10)	5.7	4.5	7.3	5.7	6.7	6.3	5.3	8.3
7. Paying taxes								
--No. of payments per year	33	9	25	43	47	47	31	3
--Time (no. of hours)	435	259	241	221	311.5	179	540	55
8.Trading across borders								
--Time to export: Border compliance (hours)	100	26	106	53	75	43	58	0
--Cost to export: Border compliance (USD)	408	522	413	254	426	366	309	0
--Time to export: Documentary compliance (hours)	147	21	38	61	59	76	50	1
--Cost to export: Documentary compliance (USD)	225	85	92	139	307	58	139	0
--Time to import: Border compliance (hours)	183	92	283	99	129	72	62	0
--Cost to import: Border compliance (USD)	1294	777	574	383	957	300	392	0
--Time to import: Documentary compliance (hours)	144	66	61	133	147	58	76	1
--Cost to import: Documentary compliance (USD)	370	171	135	164	786	283	183	0
9. Enforcing contracts								
--Time (days)	1442	453	1420	471	1071	1318	400	164
--Cost (% of claim)	66.8	16.2	39.6	115.7	20.5	22.8	29	9
10. Resolving insolvency								
--Time (years)	4	1.7	4.3	1.9	2.6	1.7	5	0.4
--Cost (% of estate)	8	22	9	21.6	4	10	14.5	1
--Recovery rate ((%)	27	36.9	26	31.2	43	46.2	21.6	92.9
--Strength of insolvency framework index (0-16)	4	11.5	6	9.5	7	7	7.5	15

Source: Doing Business 2017, International Finance Corporation

As noted, the high transaction costs of compliance with the regulatory regime in the four areas concerning contract enforcement, getting electricity, registering property and trading across borders are major contributors to the high cost of doing business ranking and the low inflow of FDI in Bangladesh. In some sense, these four issues are a binding constraint to FDI because while local investors would likely have a way to get through with their local knowledge and connections, the foreign investors will be heavily disadvantaged.

For example, on average it takes 1442 days to enforce a contract and the financial cost of enforcement is as high as 67% of the claim. As compared with this, it takes only 400

days in Vietnam and 453 days in China to enforce a contract; the financial cost is 29% and 16% respectively. The performance gap between Bangladesh and the best performer is commensurately much larger: 164 days to resolve a conflict involving only 9% of the cost of claim. The difficulty of getting access to electricity is equally telling.

It takes 429 days to get access to electricity in Bangladesh as compared with 58 days in Indonesia, 100 days in Sri Lanka, 46 days in India and Vietnam. Additionally the relative cost of getting electricity, measured as percentage of per capita GDP, is much higher in Bangladesh relative to comparators. The performance gap with best practice is huge. Regarding, property registration, Bangladesh takes 244 days while it is only 20 days in China, 27 days in Indonesia and 47 days in India. The transaction costs of resolving insolvency and trading across nations are similarly high in relation to the comparators. Concerning trading across borders, the time it takes complete international trade transactions and the financial cost of complying with the documentary and border clearance requirements are exorbitantly high relative to comparators and especially in relation to the best performer. This is a particularly worrisome result for export diversification.

Finally getting credit is another index where Bangladesh features very poorly. Bangladesh ranked 157 in this category (Figure 16). Bangladesh's poor performance is a result of having very low scores (Table 4 above) in Depth of Credit information index (score of 0 compared to 8 for China,), Credit Registry Coverage (0.9% of adults versus 91.9% for China), Credit Bureau Coverage (0 % of adults versus 21.3% China). This is particularly challenging for MSME's to access credit. Higher levels of investments in MSME's will be important ingredient in Bangladesh's transformation to HIC and it is here that most jobs can get created.

3.5 Infrastructure Challenges to Reducing Cost of Doing business:

The World Economic Forum regularly updates countries position on competitiveness based on several pillars, and infrastructure (transport and energy infrastructure) is determined as a key pillar for factor driven economies like Bangladesh. Comparison of infrastructure among different Asian countries shows that Bangladesh is quite deficient in quality of infrastructure as depicted in Table 5 below.

Table 5: Infrastructure of GCI 2016-17

	Bangladesh	Singapore	Malaysia	South Korea	China	Thailand	India	Vietnam	Pakistan
Infrastructure	114	2	24	10	42	49	68	79	116
Quality of overall infrastructure	120	2	19	14	43	72	51	85	93
Quality of roads	113	2	20	14	39	60	51	89	77
Quality of railroad infrastructure	72	5	15	9	14	77	23	52	53
Quality of port infrastructure	89	2	17	27	43	65	48	77	84
Quality of air transport infrastructure	115	1	20	21	49	42	63	86	91
Quality of electricity supply	110	2	39	29	58	61	88	85	121

Source: Global Competitiveness Report 2016-2017, World Economic Forum

As evident from Table 5 above, Bangladesh is also way behind all the competitor countries in quality of infrastructure, quality of roads, quality of railroad, quality of port infrastructure, and quality of electricity. Bangladesh is only ahead of Pakistan in quality of electricity. However, that may also be changing with Pakistan making large investments in low cost power generation supported by higher level of investments in transmission and distribution. It is important to note that it is way behind its competing countries like India and Vietnam. This sort of poor quality of infrastructure raises business uncertainty and risks and raises cost of doing business, and as presented above it takes 429 days to get access to electricity in Bangladesh as compared with 58 days in Indonesia, 100 days in Sri Lanka, 46 days in India and Vietnam, and the cost is 2861% of the per capita income (see Table 4 above), which is much higher than all competing countries.

What is also worrisome is that while Bangladesh made some improvement in infrastructure quality in 2013-14, going up to 110 from 130 in 2010-11; it, however, reversed in 2016-17 (Table 6). Bangladesh has slightly come down in its ranking to 114. It is interesting to note that Pakistan, which had been way below Bangladesh in country competitiveness rankings (133 compared to 110 for Bangladesh), has almost caught up with Bangladesh improving it's ranking to 116 in 2016-17.

Table 6: GCI Infrastructure Ranking Comparison between the 2010-11 and 2016-17 for Bangladesh

Year	Global Country Ranking - Infrastructure
2016	114
2013	110
2010	130

Source: World Economic Forum, the Global Competitiveness Reports

As Bangladesh embarks its goal to be a HIC around 2041, it must ensure adequate supply of good quality infrastructure, including supply lower cost quality electricity. This will require higher levels of private investments. Bangladesh Investment Development Authority (BIDA) needs to work with the concerned infrastructure related Ministries, Regulators, and Agencies to facilitate necessary investments and also bring in regulatory and procedural changes to reduce costs, particularly getting access to quality electricity. Targets should be set by BIDA just as in the case of DB indices so that Bangladesh can be within the top 30 countries by 2041. So Bangladesh needs to bring more focus in efficient implementation of infrastructure investments, both public and PPP, along with necessary institutional changes relating to implementation, regulation, and policy formulation.

3.6 The Logistic Challenges – Customs, Ports related processes and infrastructure – Improvement will definitely improve Doing Business and GCI indicators.

The export led manufacturing growth will require seamless trade facilitation, for which there has quality trade logistics and adequate investments and procedural and regulatory changes to make necessary improvements in this critical area. It is evident from Table 7 below that Bangladesh has a overall low ranking (87) as per 2016-17 LPI published by World bank. It is to be noted that the worrisome factor even among the mixed group of countries presented below, Bangladesh is way behind particularly from competing countries like Vietnam, India, and Indonesia. Bangladesh needs to target reaching levels

of India and Malaysia in the next 05 years and attain levels of that of South Korea or China in 10 years from now. Since Bangladesh will pursue an export led growth strategy with manufacturing being the dominant sector, it will be most important overcome all the trade logistics related hurdles early on.

Table 7: Logistics Performance Index (LPI) 2016-17

Country	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking and Tracing	Timeliness
Bangladesh	87	2.66	2.57	2.48	2.73	2.67	2.59	2.9
Singapore	5	4.14	4.18	4.2	3.96	4.09	4.05	4.4
South Korea	24	3.72	3.45	3.79	3.58	3.69	3.78	4.03
China	27	3.66	3.32	3.75	3.7	3.62	3.68	3.9
Malaysia	32	3.43	3.17	3.45	3.48	3.34	3.46	3.65
India	35	3.42	3.17	3.34	3.36	3.39	3.52	3.74
Thailand	45	3.26	3.11	3.12	3.37	3.14	3.2	3.56
Indonesia	63	2.98	2.69	2.65	2.9	3	3.19	3.46
Vietnam	64	2.98	2.75	2.7	3.12	2.88	2.84	3.5
Pakistan	68	2.92	2.66	2.7	2.93	2.82	2.91	3.48

Source: Logistics Performance Index (LPI) 2016, World Bank

If we look at the breakdown of scores as presented in Table 7 above, we find Bangladesh behind all countries listed in the table in each of the categories. It is also apparent that for Bangladesh to improve the situation in each of the above categories there has to marked improvements in Customs and Port related efficiency. This, of course includes regulatory, procedural, and related infrastructure related efficiency.

Improving Customs and port efficiency could also positively impact Bangladesh's Doing Business rankings as this will help in improving on Trade Across Border Index. Research (Djankov, Freund and Pham 2010. Doing Business 2014) has found that for each additional day that a product is delayed before being shipped, trade volume falls by more than 1%. As reported in Doing Business report, globally the most common feature of trade facilitation reforms in all regions has been the introduction or improvement of electronic submission and processing of customs declarations. Improving customs administration and enhancing port procedures were the second and third most common features. The introduction or improvement of risk-based inspection systems has also facilitated trade. As reported in Doing Business 2014, Economies are virtually linking traders and agencies involved in trade and transport through electronic single windows, and successfully implemented in many countries.

To shed light on the bureaucratic and logistical hindrances facing traders, Doing Business measures the time and cost (excluding tariffs) of exporting and importing a standard containerized cargo by sea transport and the number of documents needed to complete the transaction. The indicators cover documentation requirements and procedures at customs and other regulatory agencies as well as at ports. They also cover logistical aspects, including the time and cost of inland transport between the largest business city and the main port used by traders. Of the 4 components of trade covered by Doing Business— document preparation, port and terminal handling, customs clearance and inland transport—the 2 biggest obstacles for traders in low-ranking economies are document preparation and inland transport because of administrative hurdles and poor infrastructure. It is easier, less

time-consuming and cheaper to trade in economies following good practices. The logistic challenge that Bangladesh faces as reflected by its LGI ranking also gets reflected through the Enabling Trade Index presented in the Global Enabling Trade Report 2016 of the World Economic Forum

It is apparent from Table 8 below that Bangladesh is also low-level performer in the Enabling Trade Index. The only segment it does well is "Foreign market Access' where it has a high rank of 12 and a score above 5. It also shows that the Enabling Trade Index is low for Bangladesh because its Customs' and Port related services is of poorer quality relative to other countries of the world. This conclusion is supported by all the other data that has been presented in this paper.

Table 8: Enabling Trade Index of Bangladesh, 2016

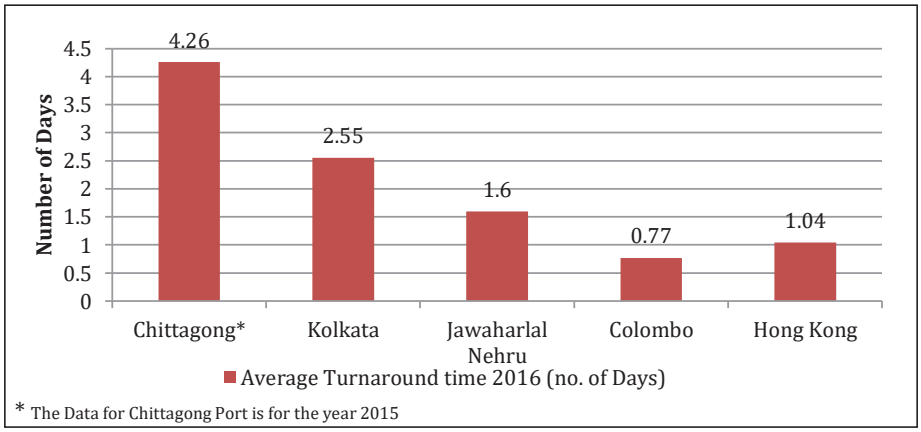
	Rank	Score
Domestic market access	127	3.4
Foreign market access	12	5.3
Efficiency and transparency of border administration	130	3
Availability and quality of transport infrastructure	109	2.7
Availability and quality of transport services	100	3.5
Availability and use of ICTs	112	3.1
Operating Environment	128	3.5

Source: Global Enabling Trade Report 2016, World Economic Forum

Bangladesh has, of course, undertaken lots of reform measures in improving Customs Administration including regulatory, infrastructure, procedural reforms and using of digital technology and automation. While this has helped Bangladesh, evidenced by the growth in its volume of global trade, further trade facilitation related reforms improvement would be required given that its competitors are reforming. Among other things, these trade facilitation reforms should include further improvement of electronic submission and processing of customs declarations, and the improvement of risk-based inspection systems. Besides, there will also have to be improvement of customs administration.

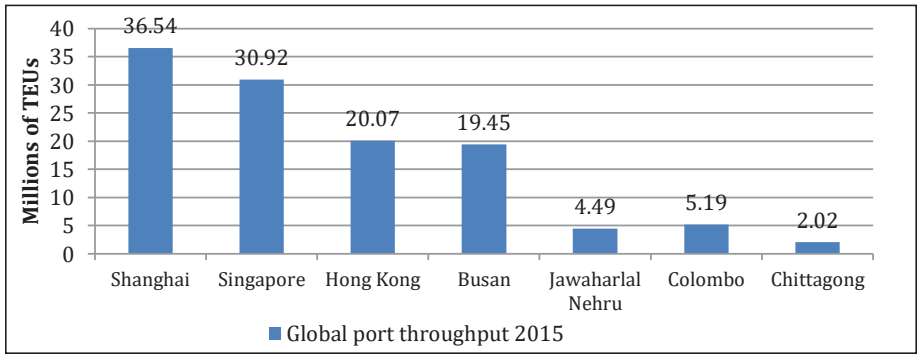
Chittagong port performance raises cost of doing business. Bangladesh has not been able to get full benefits of the Customs Administration reforms that had already taken place because of port related infrastructural bottlenecks. Bangladesh lags behind in both the indices. As shown in Figure 18, Chittagong port has very high turnaround time (4.26 days). It takes almost 1.70 more days than even neighboring Kolkata port. This automatically raises port related costs. This has to change and effort needs to be made to bring it at least to Colombo port level. At the same Chittagong port Throughput in 2015 was only 2.02 million of TEU compared to 36.54 million TEUs for Shanghai. Bangladesh's Throughput needs to reach Shanghai level by 2041 (Figure 19)

Figure 18: Turnaround Times for Selected Ports, 2016



Source: Ministry of Shipping, Government of India; Chittagong Port Authority; Sri Lanka Ports Authority; Marine Department, Hong Kong

Figure 19: Global Port Throughput 2015 (in millions of TEUs)



Source: Lloyd's List Maritime Intelligence

Bangladesh will have to urgently address the Port related infrastructure constraints including road access issues. In addition, enhancing port procedures capacity will also have undertaken, and moving towards automation with proper interface with Customs and other logistic areas will have to be ensured. With the rising volume of trade that will continue to accompany the rising incomes that Bangladesh traverses on its desired path to HIC, there will be need for additional port facilities. The Government is in the process of setting up a deep-sea port. This agenda needs to move ahead most urgently.

BIDA will have to work with both Customs and Port Authorities and their controlling Ministries in identifying procedural and regulatory steps/measures for urgent reforms and also facilitate private investments in related infrastructure through PPPs, particularly in improving capacity of Chittagong port in the short to medium term, and the new deep sea port in the longer run.

3.7 Modernizing Land Administration and setting up of Economic Zones can lead to reduction of Cost of Doing Business – its impact through reducing time in registering properties, getting building permit, and reducing land related case loads allowing courts more time for contract enforcement.

Bangladesh is a land-constrained country and has to cater to the different competing demands on land for housing, food, communication, and business needs. Land is also the most valuable asset and a leading constraint to investments as has been reflected in different surveys. With efficient land management we could see improvements in three of the DB indicators – enforcing contracts, registering property, and dealing construction permits – where Bangladesh performs very poorly as had already been shown above.

The courts are overloaded with cases that originate form disputes relating to title and registration. Land ownership/title related cases burdens the court system with the impact that on average it takes 1442 days to enforce a contract and the financial cost of enforcement is as high as 67% of the claim, compared to only 400 days in Vietnam and 453 days in China to enforce a contract; the financial cost being 29% and 16% respectively. If this burden could be reduced then the courts could focus more in quick dispensation of commercial disputes and enforcing contracts, as would be expected when country moves to higher levels of development.

The land titling related issue also makes property registration a long drawn process. Bangladesh takes 244 days to register property while it is only 20 days in China, 27 days in Indonesia and 47 days in India. Access to industrial land for manufacturing is made difficult by complexity in the process and time taken to register properties – this also has implications on getting building permits in shorter time.

Because of the challenges relating to land title it becomes very difficult for entrepreneurs to purchase land. This is even more challenging for foreign investors. So proper policies and regulatory measures needs to be in place that puts in place an efficient land market that is able to cater to the alternate needs, including the growing demand for land to set up manufacturing and logistics related industry. Since land touches every aspect of development and the lives of its people it needs to be handled with special emphasis so that objectives of Bangladesh's development goal of reaching HIC status around 2041.

Complex land related regulatory system that requires streamlining to reduce cost of doing business: The land related problems are institutional, procedural, and regulatory; which results in an inefficient land market and the resultant doing business index related challenges. There are three institutions – Land Survey office, Land Revenue office and Sub-Registrar office -, administered by two separate Ministries, that are involved in the, settlement, titling, revenue collection, transfer and registration process.

Land related complications arise because the Land records may be updated: (i) as a result of land surveys (via the Settlement Officer); (ii) (via the sub- registrar's office) registering of deeds of sale; and (iii) through inheritance (through AC land office). Each of these units has their own time frame of completing their individual tasks, which can be a cause for inadequate transparency when dealing with the citizen. Efficiency and transparency of land market will depend on how well coordinated are the functioning among each of the three

institutions in dealing with the processes involved in land transfer and those in updating the land titles and land survey, which are all linked to each other; and the outcomes are dependent on efficiency of all. The diversity of ways in which land records may be updated, and the problems associated with each give rise to numerous disputes and also proliferation of land related civil and criminal cases, and thus raises the cost of doing business.

The regulatory system pertaining to land administration is, therefore, complex that calls for simplification and streamlining for land markets to operate efficiently and transparently. While there needs to be full review followed by reforms of the institutional structures, it will be important to use all aspects of digital technology to ensure that record of rights is established in digital form. This can then be used immediately for registration with waiting for long time prevalent at the moment. The Registration process should also be linked digitally so that interaction with officials declines. This has been done in other South Asian countries, including and India and Pakistan, which has similar land administration system and so should be taken up urgently.

These alone will not be enough as the cadastral survey process and the appeal process are themselves also lengthy as stated earlier. Digitization of survey should be come simplar and less time consuming as satellite based mapping technology is available. Similarly the scope for reducing Appeal time and steps needs to be looked into and reduced. There is process for review and rectification but the appeal process could take a long time and also costly. Where a decision relating to the recording of land title is disputed, the appeals process starts at the lowest rung of the ladder and then moves progressively upwards until the appellants and other interested parties either accept the judgment given or lack the resources to proceed further. There is definitely scope for improvement here if necessary regulatory steps and institutional changes are brought in backed up by use of technology.

Land Zoning could overcome the land constraint challenge, and also support sustainable development goals. As a step towards having a more efficient land will be the need for land zoning. Zoning is an essential tool in successful urban planning. Maps divide communities into different zones based on the types of uses allowed—such as residential, commercial, industrial, public buildings, parks and green areas. Land zoning regulations can provide a useful framework for investors and developers by specifying the most appropriate location for their projects, given that the infrastructure, connectivity, energy, and environmental concerns get regulated upfront. This can therefore facilitate in easing up the decision of the investor to invest and move forward with the process of applying and getting building construction permit and start construction of factory building or warehouse in the shortest possible time, leading to more efficient and less costly construction permitting systems. Any improvement in this will also improve rankings in DB and GCI indicators.

3.8 Economic Zones in Bangladesh as an immediate measure to reduce Cost of Doing Business in a limited demarcated territory – The proposed One Stop Service (OSS) can quickly be implemented.

Many countries, to address the investment climate and better business environment issues, have successfully used Economic Zones as a catalyst for investment; but the rationale for their development differs between developing and developed countries. For developing countries, the Zones have traditionally had both a policy/regulatory and an infrastructure rationale.[2] On the policy/regulatory side, it includes measures meant to boost investment

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competitiveness and reduce business entry and operating costs, which can be a useful tool as part of an overall economic growth strategy to enhance industry competitiveness and attract investments, particularly foreign direct investment (FDI).[3] On the infrastructure side it can plan providing right type of infrastructure within a limited area maximizing on economies of scale.

Given the time and challenges to quick implementation of not only regulatory and procedural reforms, but also overcoming quickly the challenges related to land administration, the government has rightly embarked in setting up economic zones with increased involvement of the private sector in setting up zones, and with government facilitating that process through regulatory support, access to land and infrastructure where needed.

The Special Economic Zones (SEZs) can not only help pilot regulatory/institutional reforms that improves business environment and reduces cost of doing business and reduces infrastructure bottlenecks, but also give unhindered access to serviceable land. Providing single window service like One Stop service (OSS) is a way to reducing policy/ regulatory hassles to investors, as it can conveniently be rolled out and implemented in the limited territory of economic zones. It can thus act as a catalyst for domestic and foreign investments to invest in a more business friendly environment. The investments, including FDI, could reach the desired levels (e.g. what is being stipulated in the 7th FYP) with efficient implementation of the SEZ including having in place policies, regulations, and the necessary infrastructure fully in place for investors feel comfortable to invest.

This will provide much needed time and space to undertake all the reforms discussed above relating to reducing cost of doing business across the country. Over long term the focus should be to learn from SEZ experience and improve the investment climate and regulatory oversight throughout the country.

Land Acquisition Related Policies may be a challenge to setting up of SEZs: Government's declared policy of setting up of economic zones is likely to require land acquisition. A very difficult issue is that related to land acquisition, which become necessary for development purpose and which also increases use of land for non-agriculture needs. Laws in Bangladesh do not distinguish between processes governing the acquisition of farmland and urban lands. While the Industrial Policy of Bangladesh addresses the potential conflicts emerging from uses of fertile farmland for industrial purposes, there are no effective mechanisms to ensure the application of the principles put forth in the policy. It creates a challenge when large footprint projects are to be implemented in green-field areas, industrial estates, special economic zones or export processing zones. The legal instrument for expropriating lands for public purposes is the "Land Acquisition and Requisition of Immovable Property Ordinance, 1982". Besides, the resettlement policy of Bangladesh is not adequate. Therefore, policy that facilitates a comprehensive and modern technique of resettlement needs to be adopted in order to smoothen the process of acquiring land. However, critical to even having a better land acquisition process will depend on having in place a well functioning transparent land market.

3 Jin Wang, London School of Economics Job market Paper Version of November 2009 – The Economic Impact of Special Economic Zones: Evidence from Chinese Municipalities. His research concluded that, the SEZ related policy package, including private property rights protection, tax breaks and land use policy, increases per capita municipal FDI by 58% in the form of foreign-invested and export oriented industrial enterprises. The report also found out it increased municipal foreign owned capital stock and did not crowd out domestic capital (and investment), and showed that it helped bring in more advanced technology and increased municipality TFP growth by 0.6 percentage points.

3.9 Improving Access to Credit could raise investments in MSMEs.

International experience suggests that a part of the solution to the diversification of manufacturing production and exports, and to higher-income job creation outside agriculture and unorganized services lies in revamping and spurring the growth of micro and small and medium enterprises (MSME) in manufacturing and services. In the World Bank's Ease of Doing Business 2017's ranking for 'Getting Credit', Bangladesh is ranked at 157, way behind Malaysia (20), Vietnam (32), and India (44).

Bangladesh MSME sector has not been growing as expected and the financial market is failing to cater fully to the needs of the MSMEs including among others access to finance. While there are definitional problems, there is no doubt that however defined MSMEs are a substantial source of economic activity in Bangladesh. Yet, available evidence suggests they lack dynamism. While there are many factors that constrain its performance, access to organized finance is a critical constraint. The main challenges faced by banks for financing MSMEs are poor quality of collateral, inadequate documentation, and improper business plans. With relatively high interest rates for SME lending, stringent collateral and guarantee requirements might be a critical barrier to SME access to finance. Banks, on their part, tend to be less flexible about the collateral requirement in the case of the SMEs as they perceive SME loan to be more risky and the cost of monitoring and supervision of small loans to be higher. Banks also tend to hesitate to provide credit for new borrowers and in most cases business experience of 2 or more years is needed for SMEs to access bank credit.

In recognition of the financing constraint, the Government in recent years has focused considerable attention to MSME finances to boost its potential role. Despite substantial expansion of microfinance and credit from banks, non-bank financial enterprises and specialized refinancing windows, total access to financial services is still low relative to the size and needs of the MSME sector, especially in the rural areas. The high cost of financial products (including the cost of microfinance institutions (MFIs)' products) has regularly been highlighted as a major hurdle in accessing financial services.

Weak financial infrastructure is a key impediment to the development of the MSME financing ecosystem in Bangladesh. There are policy and regulatory constraints including the absence of start-up capital options, inadequate lending instruments that cater to various financial and risk management situations, high cost of doing business, and the dominance of fixed-asset based collateral requirements for SMEs. As evident from Table 4 above, the low rank for Bangladesh in getting credit access are its very low scores in its Depth of Credit Information index (score of 0 compared to 8 for China,), Credit Registry Coverage (0.9% of adults versus 91.9% for China), Credit Bureau Coverage (0 % of adults versus 21.3% China). This is particularly challenging for MSME's to access credit, as it limits the availability of credit, particularly to its small and lower end of the medium enterprise segments, as they are unlikely to be in the credit bureau or credit registry coverage, thereby raising the cost of lending to these enterprises thus reducing access to credit. Here lies a major regulatory challenge of setting Registry so that need for providing physical collateral would diminish for smaller sized loans.

Within the MSME sector, startups with limited operating histories face particularly challenging environment in accessing financing. Startups have the potential to create

jobs in emerging and innovative industries if they can obtain the funds they need to grow. Due to institutional factors, banks are not well positioned to address their financial needs. However, entities such as seed funds, angel investors, venture capitalists, accelerators and growth equity firms can play this role. The pre-bank startup-financing ecosystem in Bangladesh is nonetheless, nascent, with a limited number of formal investors focusing on startups.

One issue that becomes apparent is that there needs to be reduction in costs of delivery of financial services in order to increase accessibility of those not being served by the formal financial system. One solution is increased use of technology in providing financial services through what is known as Fintech solutions. Bangladesh has entered in a limited way through opening up mobile financial services (MFS), but more dynamic policies and regulatory reforms needs to be undertaken so that Bangladesh can keep up with the technology revolution.

3.10 Institutional, Regulatory structures affecting business environment – the role Bangladesh Investment Development Authority (BIDA), and Bangladesh Economic Zones Authority (BEZA).

A host of public and private institutions and agencies in Bangladesh are involved with the business related regulatory environment and the investment climate in which manufacturing enterprises operate. It is apparent from the review of DB and the GCI indicators that there needs to be changes/reforms in a number of areas and institutions. One of the critical challenges that business faces is the time it takes to get electric connections. There have been efforts to increase electricity generation but there are gaps in transmission and distribution needs. It is particularly important to note there are three areas where there has been deterioration of Bangladesh's position (Figure 17 above).

The business regulatory environment is impacted by a complex institutional structure comprising multiple Ministries and Department's and agencies under them. While focus of all Ministries is on development of the country, they are stuck by their individual goals and strategies, which may not be supportive of each other's goals. For example while Ministry of Commerce is supposed to in charge of ensuring a more business friendly trading environment, it is the national Board of Revenue (NBR) under ministry of Finance which has final say on setting tariffs, though de jure the Tariff Commission under Ministry of Commerce is supposed to be key player in this. The NBR is driven by its strategy of meeting revenue targets which many a times runs counter to the Ministry of Commerce's goal of trade promotion and trade facilitation. There is then the Ministry of Industries with many of the regulatory bodies affecting manufacturing working under it. These include agencies bike boiler inspection, BSTI. The issue is Ministry of Industries (MoI) is also in charge of some of the public sector manufacturing units (SOEs) like Fertilizer and Steel products. A lot of the decisions of MoI are driven by their focus on SOEs, which may not be amicable for private industry. The complexity within manufacturing further increases because for Jute and Textiles there is a separate Ministry and for pharmaceuticals it is the Ministry of Health.

While different sectors within manufacturing may have different special regulatory needs, the overall business regulatory needs are same for all industry. The structural problem that

Bangladesh has been facing is that there is no exclusive Ministry for private industry. All these Ministries have agencies/corporations under them that continue to be in business. The Ministries are much more driven by policy and institutional support to protect the SOEs under them. Even beyond policies, the Ministries sometimes play the role of regulator. This is a problem as it fails to separate policy making from regulations and service delivery. In the case of telecommunication sector this had happened and we saw strong FDI flow into this sector.

Given the difficulty with the multiplicity of institutions that in some way linked to business environment through both policy and regulatory interface and its impact on private investments, the government has in more recent times have set up some institutions to promote and facilitate private investments. Among them, two of the institutions are important as they are directly working to reduce cost of doing business and reducing regulatory hassles. These two institutions are Bangladesh Investment Development Authority (BIDA) and the Bangladesh Special Economic Zones Authority (BEZA). Both these institutions are under the administrative control of the Prime Ministers Office, with their governing Boards chaired by the Honorable Prime Minister.

Bangladesh Investment Development Authority (BIDA). Bangladesh Government formed BIDA by amalgamating the former Board of Investment (BOI) and the Privatization Commission. This has institutionally strengthened BIDA because besides undertaking steps to simplify different procedural steps for business registration and other tasks along with promotional work for bringing in new investments, it also now has assets of SOEs that it inherited from the PC. These assets sit on valuable land, which is identified as a key constraint.

BIDA has taken on itself the very important task of moving forward the necessary regulatory reforms that will help bring transparency while it also embarked on making institutional changes backed by an Act to provide one-stop service to investors. BIDA being the nodal agency for promoting investments in the country will have to undertake the coordinating role of working with Ministries to ensure that the one-stop service window works. BIDA is the agency for leading and coordinating the process of bringing in necessary regulatory and institutional reforms that will reduce cost of doing business in Bangladesh. BIDA has already embarked on the task improving Bangladesh's DB ranking and come into par with competing countries. This is a laudable goal and should be pursued in coordination with the concerned Ministries and agencies.

This task will get easier if adequate infrastructure supply is available to meet demand. Improving infrastructure supply like power, energy, road and rail communications, ports will help raise GCI rankings. Here BIDA as support to the Government Ministries can provide promotional role of getting more private sector investments through PPPs and IPPs in energy supply, power generation and transmission, ports and logistics, express toll-road construction. BIDA could be the institutional link between the Ministries and PPP office. An important task the BIDA can perform is working with Land and Law Ministries in getting digitization of all land related records and processing, along with working out a zoning system across the country to clearly delineate land for agriculture, forestry, fisheries, industry, infrastructure and urban needs. This alone could unbundle lot of the hassles allow entrepreneurs to take informed investment decisions.

BIDA has closed SOEs in its portfolio, which needs to be transformed into productive assets. BIDA could learn from BEPZA's success in converting lossmaking SOE's into successful EPZs in a short period of time. Government had handed over two loss making closed State Owned Enterprises (Adamjee Jute mills and the Chittagong Steel mills) to BEPZA to convert to EPZs. BEPZA quickly moved in and set up the Adamjee EPZ and Karnapuly EPZ. When Adamjee was closed it was making annual loss of over Taka 100 crore each year and it had 25,000 permanent/temporarily employed. Besides, both the SOEs had huge debt with the state owned banks and the power company (PDB).

Today Adamjee EPZ has 61 foreign and domestic owned private export oriented enterprises. It has 51,114 (expected to go over 100,000 once all the enterprise construction is complete), direct employments as of December 2016; and during FY 16 exported goods worth US$ 563 Million (expected to go over US$ 1 billion annually once all the enterprises are fully constructed), with cumulative exports since its inception, i.e. FY 06 to FY 16, reaching US$ 2.25 billion.

There is an even better story in the case of Karnaphuly EPZ (formerly Chittagong Steel Mills) where 53 enterprises are operating with employment reaching 66,731 as of December 2016 (expected to go over 100,000 once all the enterprise construction is complete); and during FY 16 exported goods worth US$ 823 Million (expected to go over US$ 1 billion annually once all the enterprises are fully constructed), with cumulative exports since its inception, i.e. FY 08 to FY 16, reaching US$ 2.93 billion. As an option BIDA could consider working with BEPZA in converting a few of these SOEs into EPZs, before it undertakes a broader strategic plan for using these assets. Since BIDA is moving forward with implementing one-stop shop for all approvals, these converted SOEs could help BIDA pilot and test implementation, before rolling out across the country.

Bangladesh Economic Zones Authority (BEZA). Recognizing the importance of zoning and urban planning, Bangladesh has adopted zoning systems and the Government has enacted Economic Zone Act in 2010, and under it Bangladesh Economic Zone Authority (BEZA) has been established. The Act provides legal basis for the establishment of economic zones in all potential areas including backward and underdeveloped regions with a view to encouraging rapid economic development through industrialization. The expectation is that under the new SEZ paradigm, with a regulatory authority in place, there will be quick implementation of new Zones so that local firms can harness spill-over impact from Foreign Direct Investment (FDI), and in the process additional investment can be encouraged within value chains, more local products procured and better linkages could be established between firms and educational institutions (easily available skilled manpower is important for success of SEZs). The Act also has provisions for private and PPP based zones, and has provisions adaptation to required environmental and social practices through rules, streamlined regulations, and institutional setup. It will allow the Government to develop and pilot an approach that is less reliant on Government subsidies, while leveraging comparative advantages and private sector capability wherever possible.

Successful development of SEZ can be expected to provide investors confidence invest and bring in in new technology and produce to take advantage of the GVC using Bangladesh's comparative and competitive advantages. The Act promotes Economic Zones in the Private

sector, Government led EZs or in a combination. The mandate of the BEZA allows it to identify local potential zones, acquire lands and build the zones with necessary facilities. BEZA may seek public-Private Partnership (PPP) to build and effective utilization of such zones. While Economic Zone Act 2010 provides a more organized use of land for industry and urban growth, it also provides an opportunity to bring a better balance with agriculture land use by restricting Economic Zone land in areas, which are less suitable for agriculture and also land, that is productive for agriculture.

BEZA's vision is to develop 30,000 hectares of land for SEZs, establish 100 SEZs across the country in the next 15 years with an employment target of 10 million. Meanwhile, BEZA has promulgated the policies and rules pertaining to setting of SEZs and has 25 areas for providing One Stop Service (OSS) to investors. These 25 areas includes approval of investment proposal, different permits, permission for utility connection, NOC for off-shore banking, Certificate of Incorporation, TIN and VAT registration, building permit, visa, work permit, environment clearance, Customs Clearance etc. These are laudable steps and address some of the core daunting doing business and logistics challenges facing investors, particularly foreign investors wanting to invest in Bangladesh. All these procedural and regulatory reforms that BEZA has undertaken should become operational within next one year.

According to its Annual Report 2016 and other documents, BEZA has by now approved 74 Economic Zones. Of these, 54 zones are to be developed in PPP mode, 20 will be privately developed zones under license from BEZA. Meanwhile BEZA has already initiated issuing of licenses to private SEZs. There has been MOUs between governments have been signed for setting country specific SEZs. Two Zones in Mongla (in Khulna) and Kushtia will be India specific zones and one zone in Anwara in Chittagong will be a Chinese specific zone. All these are very positive steps. The challenge will be for BEZA to go through a steep learning curve, develop its institutional capacity, and move this process forward in a transparent way so that investors find it conducive. The planned one-stop service for which Law has been drafted could be more easily implemented in SEZs, for which necessary BEZA capacity should be in place.

However, given the regulatory environment prevailing in Bangladesh, especially institutional capacity, it needs to be implemented carefully lest the privately licensed zones change course and there is inadequate oversight to effectively enforce regulatory compliance. The caution is because Bangladesh is a land-poor country and land market speculation is an issue. Besides, any rapid proliferation of private zones can also place significant, unanticipated costs on governments, especially in terms of offsite infrastructure and facilities, as exemplified by the Dominican Republic, and more recently the Philippines and Vietnam[4].

Setting up SEZs automatically does not make them successful. To a great extent, the fate of zone initiatives gets determined from the outset, by the choices made in the establishment of policy frameworks, incentive packages, and various other provisions and bureaucratic procedures. The experience suggests that maximizing the benefits of zones depends on the degree to which they are integrated with their host economies and the overall trade and investment reform agenda. In particular, when zones are designed to pilot legal and

4 Special Economic Zones, World Bank

regulatory reforms within a planned policy framework, they are more likely to reach their objectives[5]. The success of zones is also critically linked to how they are developed, managed, regulated, and where **located.**

Learning from Bangladesh Export Processing Zone (BEPZA) experience. It should be noted that Bangladesh has already long experience in setting up successful export processing zones through BEPZA. While BEZA is a relatively new organization, it can learn from BEPZA's experience. The first issue is location of Zones. The most successful EPZs are in the Chittagong and Dhaka regions. This becomes apparent when we see that the Karnaphuly EPZ in Chittagong and the Adamjee EPZ in Narayanganj (greater Dhaka), which were last EPZs built by BEPZA, have already surpassed in terms of employment, investments, and exports compared to EPZs in other regions which were set up much earlier. BEZA has undertaken an ambitious target of implementing 100 SEZs in the country in the coming years. While the goal is appreciated there needs to be a cautious approach in selecting the first few zones which should be based on feasibility and at the right location. Successful implementation of the first two or three SEZs will send positive signal to the world heralding Bangladesh as a competitive destination for investments. Given the limited capacity, BEZA needs to prioritize and put focus on getting the first two or three zones fully operational, along with necessary one-stop service in place at the shortest possible time. Another area of BEPZA experience that could help BEZA are the PPP contracts that they have successfully implemented. BEPZA, to ensure 24/7 quality power supply, innovatively implemented PPPs in power generation, and for ensuring environmentally sustainability used PPPs to build Effluent Treatment Plants (ETPs), and water treatment and supply of quality water in CEPZ and DEPZ.

4. Reform Priorities – Policy, Institutional, and Regulatory - The way forward

The relative stagnation in the private investment rate despite very favorable macroeconomic performance and robust economic growth are indicative of the private investor concerns with the business environment that has made progress but falls short considerably in relation to other countries. The deregulation process seems to have slowed down after 2010, and has become a critical challenge to having an enabling business environment, which is being reflected through the very poor outcomes in all the different global indices that had been earlier discussed. This process now needs total revamping now that Bangladesh has set up BIDA.

BIDA could start with addressing constraints affecting all the 10 Doing Business (DB) indicators that make Bangladesh ranking so low. However, the priority will have to be top six constraints identified in the IFC survey on ease of doing business in Bangladesh for 2016. While addressing the DB identified constraints it will also be important to address the infrastructure related constraints like easy and certain access to electricity, good quality transport infrastructure, and highly efficient ports. These will directly impact in improving performance of getting electricity and trading across border indicators as well as help improve Bangladesh's GCI and GLI indices. A very important reform will be that related to land administration and working of an efficient land market. It has potential to help improve Doing Business rankings in three areas – enforcing contracts, registering property, and facilitating construction permit. As had been discussed earlier having well functioning land market would ease issuing of building permits; and if land related cases decline the

5 FIAS Report, April 2008

courts will have more time for commercial cases and so enforcing of commercial contracts can gain momentum.

Since Bangladesh is substantially lagging behind in attracting FDI relative to comparator countries like China, Hong Kong, India, Vietnam and Singapore, policy reforms should focus on resolving issues that affect both domestic and foreign private investors. It is important to note that the reform agenda is large and priorities have to be set. The reform process should be seen as a continuous process that should be reviewed annually to assess progress and identify new issues.

4.1 Simplifying regulations and improving implementation – BIDA needs to anchor and steer the process.

Despite past efforts to deregulate the business rules of operation, regulatory constraints remain serious in many areas and implementation is an even bigger problem. While it is understandable that improvements in the civil service is a long drawn process, several practical steps can be taken to alleviate the concerns without any major overhaul of the civil service. Government has already set up BIDA and BEZA as institutions to alleviate doing business challenges. BIDA which has been tasked with improving global Doing Business ranking of Bangladesh by facilitating policy, regulatory, and process changes should as priority undertake review of all regulations, processes, and policies negatively affecting business environment, and take measures to improve Bangladesh's rankings GCI, DB, and GLI. More specifically some of the actions are as follows.

- A high-powered business deregulation task force needs to be established with representation from the private sector to overhaul the entire regulatory regime with a view to abolishing all regulations that constrain investment and ensuring that prudential regulations required to protect public interest are business friendly. BIDA could be the Secretariat for the task force. It should be a continuous process where with BIDA acting as the Secretariat, and prioritize policies, regulations, rules, and procedures that needs most urgent attention and facilitate implementing the changes. It should undertake periodic Regulatory Impact Assessments (RIA) to determine which regulations and policies need amendments or abrogation.
- BIDA needs to set up specific targets and monitoring mechanisms to attain higher levels of GCI, DB, and GLI indices. It will require good coordination with different Ministries and agencies to be able to come up with positions where investor surveys will show the positive developments.
- BIDA will have to work with both Customs and Port Authorities and their controlling Ministries in identifying procedural and regulatory steps/measures for urgent reforms and also facilitate private investments in related infrastructure through PPPs, particularly in improving capacity of Chittagong port in the short to medium term, and the new deep sea port in the longer run.
- BIDA should set up a "doable" mechanism for instituting the proposed one stop service (OSS). It will be very important to gain confidence of investors about OSS. OSS needs to be cautiously approached with realism in time frames promised for delivery of particular services.

- Government should take care to ensure the predictability of policies and avoid frequent changes that could hurt investment choices. This is particularly important in the case tax and tariff policies where periodic certainty must be ensured to allow investors to decide on taking risks.
- Public administration capacity prevents proper implementation of rules and regulations, especially in the areas of Drug Administration, environmental clearances, and testing labs. Along with efforts to strengthen these agencies, outsourcing options to private sources may be examined.
- All clearance and licensing agencies must be digitized with online applications and approvals. Service standards for clearance/licensing lead times should be established.
- Discretionary application of rules/regulations by bureaucracy should be avoided through political oversight at the Minister level.

4.2 Improving the tax regime for business.

The business sector is mindful that paying a fair share of taxes is a national obligation. It is therefore committed to working cooperatively with the government to help increase the revenue performance of the tax system. However, the tax system must be business friendly rather than averse to the development of the business sector. A strong private sector has been the engine of growth in Bangladesh. As private sector grows total GDP also grows that helps tax revenues. The main challenge for NBR is to increase the tax base to bring in more enterprises that are out of the tax net either because they are in the informal sector or because they are able to take advantage of the loopholes in the tax laws. The global experience is that high corporate tax rates discourage investment and encourage tax avoidance. Similarly, too many tax exemptions to any one sector leads to unfair competition and discourages diversification. Based on results of different IFC surveys and also on the basis some feedback form business groups the following reform options are proposed which can be have very positive impact in improving DB indicator and raise Bangladesh's ranking.

- There needs to be rationalization of the income and corporate tax rates to make it competitive with comparator countries. The government needs to consider lowering maximum corporate tax rate could to around 25% over a three year period (35%; 30%, 25%) to be in line with more competitive economies like Malaysia (22%-24%), Thailand (20%) and Singapore (17%).
- The tax laws, rules and regulations must be simplified and streamlined and made consistent with good international practices. NBR should consult business sector in this task. For the short term, several specific actions can be taken: (i) withdraw the 20% withholding tax on technology service providers; (ii) remove the NBR pre-determined gross profit level set for the footwear industry and assess tax on actual profit; (iv) make the income tax refund process more streamlined (like VAT return) and excess tax payment should be refunded in designated company's bank account within 30 days from assessment completion; and (v) withdraw the minimum tax provision for loss making companies.
- A simplified low-tax regime will eliminate the need for expensive tax holidays and tax exemptions. But when these are provided, these must be done in a simple non-discretionary way.

- The NBR needs to transform to a tax service agency rather than a tax-policing agency with professional staff and service orientation.
- The interface between NBR staff and corporate staff should be minimized through digitized transactions.
- Dispute resolution mechanism including ADR must be made more efficient and effective.

4.3 Addressing the infrastructure problem.

Despite considerable new investments in power generation and transport, business responses show that supply of infrastructure services and trade logistics, especially port services, are of major concern. Several steps can be taken in the short term.

- Bangladesh needs to build multimodal transport network backed up high quality express roads, higher speed double track railway, and accessible and efficient river transport system backed by efficient container and cargo handling at designated places. It will facilitate trade and will help raise the DB, GLI and GCI indices for Bangladesh. In this context all highways connecting to Chittagong port should have access controlled express lanes immediately implemented.
- Ensure long term supply of gas, other energy, and power supply. Urgently complete implementation of LNG imports and ensure effective availability to all industries, particularly to SEZs by 2019/2020. Implement the Power sector Master plan diligently and on time. The plan should be that there should be enough along with quality transmission, and distribution back up to ensure that all industries coming on line from 2020 onwards are given connection certainty within reasonably declared time. After 2025 this should be automatic on demand. This measure will raise Bangladesh's ranking on the electricity related DB, GCI indices.
- Meanwhile, adopt a fair and equitable gas connection policy for business enterprises, rather than on an ad-hoc policy based on personal connections. In this regard, enterprises that were given gas connection commitments prior to new investments /expansion programmes (e.g. the example of Jalalabad Gas Co, cited earlier) must be provided with gas connections to avoid large financial loses.
- Public utilities, e.g. DESCO, Titas Gas, WASA, REB, etc.) must adopt a proper policy for supplying timely and quality services with well-defined service standards. The transaction costs in terms of time and money must be reduced in line with good international practice, published and monitored.
- All utility services should be digitized so that personal interface is not needed.
- Improve the turnaround time of ships as Chittagong port faces congestion affecting trade facilitation. There is urgent need to increase handling capacity of the ports and also recruiting necessary manpower. The target should be to reach the level of Colombo in both Turn-Around time and Throughput by 2022. This will improve Bangladesh's DB, GCI and GLI rankings.
- Accelerate implementation of the Deep seaport so that the Throughput of Bangladesh can be at par with ports like Shanghai. Use private investments through PPPs, particularly in improving capacity of Chittagong port in the short to medium term, and building the new deep-sea port in the longer run.

- The Dhaka airport's cargo handling facility needs to be improved urgently. A possible solution is to outsource the airport cargo handling services to the private sector and appoint the Civil Aviation Authority as a regulatory body.
- For ensuring road safety, the Bangladesh Road Transport Authority (BRTA) needs to reintroduce mandatory installation of speed governors in trucks and buses to control their speed and enforce it through the routine fitness test.
- Revive use of railway for transporting tea from Sylhet Division to Chittagong for auction, thereby reducing pressure on Sylhet-Chittagong road connection.

Additional measures are necessary over the medium term.

- The service quality in all land, air and sea ports need substantial upgrading through investments in port facilities, digitization and better staffing.
- Connectivity from Chittagong Port to factory-gate service could be substantially improved by developing the inland water and rail services.
- Establish a new Inland Container Depot (ICD) in the proposed site of Dhirasram in Tongi to ease the pressure on Kamlapur ICD and its connecting roads.
- The waste management and disposal service for manufacturing enterprises needs urgent attention with possible PPP solutions.
- Over the longer term much higher investments in infrastructure will be needed. Public sector alone cannot deliver this. The PPP initiative is dormant and must be energized by over-hauling the institution with internationally trained experts and a well thought out enabling framework learning from international good practices.
- China, Japan and Korea have substantial capacity and funding to develop large infrastructure projects on a turnkey basis. The government should look into this carefully.

4.4 Strengthening land administration

The long delays and high cost of land procurement are reflective of another binding constraint to private investment: the availability of land for manufacturing enterprises. The land market is very inefficient in view of weak land ownership data, lack of computerization of land records, poor zoning laws, and high transaction cost. On top, population pressure and rapid urbanization have contributed to a growing scarcity of urban land. As land prices have sky rocketed so have land disputes and various forms of corruption including land grabbing.

- Computerize all land ownership data.
- As priority complete cadastral survey using digital and satellite technology and digital record of rights of all land in greater Dhaka (includes Gazipur, Narayanganj, Narsingdhi, Manikganj, Munshiganj, and Tangail Districts) and greater Chittagong (includes Cox's bazar District).
- Work with Ministry of Land and other concerned Ministries in comprehensive Zoning the whole of Bangladesh, starting as priority greater Dhaka and Chittagong.
- Undertake regulatory reforms to simplify land transactions and registration and reduce the cost of land registration in terms of both time and finances.
- Implement institutional reforms to improve land administration and record keeping.

4.5 Make all necessary policies, rules, and procedures including proposed One Stop Service (OSS) fully operational for SEZs in the short run.

The government has recognized this constraint and has responded by developing SEZs. This is an excellent initiative. However, the process of completing SEZs in a shape that such that they land can be immediately used for productive purposes is fairly long. Also, the demand for land far outstrips the SEZ plans. So, measures will have to be taken to both fast-track the completion of SEZ projects as well as to develop the land market to facilitate efficient private land transactions. A range of policy actions are needed here including:

- BEZA should immediately operationalize its OSS, given that it will be much easy to implement within each SEZ.
- Ensure timely supply of necessary social and economic infrastructure to enable quick completion of SEZs. In addition to supply of road connectivity, electricity, gas and water supply, schooling facilities also need to be provided to enable worker and family relocation to SEZs
- BEZA should complete the Mirershai SEZ within its stipulated time and ensure that at least one anchor investor (e.g. Samsung or Toyota type global brand) sets factory there within 2020, followed by another by 2023. In between other industry could be set up.
- Ensure that Chinese and India specific Anwara, Kushtia, and Mongla SEZs be up and running within 2020.
- The success of BEZA will greatly depend on its capacity to manage implementation of PPP based zones. It needs to work closely with PPP Office for it. Besides, it should find ways of leveraging BEPZA experience in not only Zone development but also the PPPs implemented by them in their EPZs.
- Since BIDA has SOE assets in its control it could work with BEPZA or BEZA to develop these as economic Zones. BEPZA's experience in successfully converting two SOEs into EPZs can be used.
- Facilitate private investments in SEZs to provide land for domestic and foreign private investors, including simplifying the clearance procedures and ensuring that these clearances are provided without inordinate delays, and ensuring timely infrastructure supply to the private EZs.
- Revisit the restrictions on agricultural land holdings to facilitate commercial agriculture for agro-processing industries
- Strengthen enforcement of zoning laws. This is a serious problem causing haphazard growth of commercial enterprises in residential areas that has contributed to severe traffic jams and law and order problems.
- Given the difficulty in building new institutions and also having different institutions (BEZA, BEPZA, HTPA, Private EPZ Cell, BSCIC) pursuing the same goal under different paradigms, it would be optimum for a country like Bangladesh to have one Authority regulating the entire zone development program, be it private, public, or PPP. One challenge will be to separate regulatory authority from development of public funded zones.

4.6 Lowering the cost of trading across borders

With increasing integration with the global economy the cost of trading across borders for both imports and exports have a determining influence on the global competitiveness of the Bangladesh economy. Bangladesh has done well to eliminate most export duties. It has also abolished most quantitative restrictions on imports and reduced import duties. Yet, owing to a complex system of supplementary and regulatory duties (SRDs), overall trade protection is high and there is a huge anti-export bias of the trade regime. While Bangladesh has tended to address this concern by allowing duty-free imports for a few large export products, especially RMG, through the bonded warehouse system and has established a duty drawback system for exporters, feedback from business sector showed that there are problems with the implementation of these measures. Importantly, the complexities of the tariff and SRD system and their uneven application create many problems for business. Additionally, the customs administration process involves high transaction costs. Given these concerns, several policy measures can be taken to lower the cost of trading across borders.

- Establish a customs tariff reform commission drawing from officers from the NBR, the and the finance and commerce ministries as well as outside experts and representatives from private business to develop a comprehensive reform proposal that seeks to simplify the customs tariff regime and substantially reduce its anti-export bias.
- Computerize all import/export clearance processes.
- Improve customs clearance facilities in all land ports.
- As in the case of RMG, allow bonded warehousing facility for all export industries. Like RMG the warehousing should also be allowed on 60 KM radius similar to bond facility for all other export oriented industries. Also, the renewal of bond license and Utilization Declaration (UD) should be brought under similar footing as that provided to RMG through BGMEA. Where Customs certification is needed for renewal, this should be done within 7 days since they already have all data on imports and usage.

4.7 Improving Access to Credit to MSMEs

The financial infrastructure in Bangladesh needs to be studied to identify specific bottlenecks to higher levels of MSME financing. Given the discussions earlier on getting credit challenges that constrains the doing business environment particularly for small and lower end of the medium segments of MSMEs some actionable recommendations are suggested below to address the deficiencies.

- *There needs to be in place the infrastructure to have in place a continuously expanding and easy access to high quality credit information,* and the private sector can play a role in the credit information market – as an example the telephone companies have large database on which could be used if proper policies are adopted. As discussed earlier, the low rank for Bangladesh in getting credit access are its very low scores in its Depth of Credit Information index, Credit Registry Coverage index, and Credit Bureau Coverage index.

- *Bangladesh needs to introduce secured transactions regime by enacting necessary laws so as to* enable lending against movable collateral and help reduce the financial sector's reliance on fixed assets as collateral. This is very important as weakness in the credit information system causes the scheduled banks to tend to be less flexible about the collateral requirement in the case of the SMEs as they perceive SME loan to be more risky and the cost of monitoring and supervision of small loans to be higher. The stringent collateral and guarantee requirement practices of the banks makes SME lending rates relatively higher, thus acting as a barrier SMEs to access credit.
- Policies and regulatory changes need to be brought so the mobile financial services are able to go beyond the present scope and move to a digital financial regime provide different financial services that will make access to finance to small and the lower end of the medium enterprises easy. Bangladesh should draw on international experiences in East Africa (mainly Kenya), India, China and elsewhere and put in place various Fintech enabled SME financing business models. It needs to put in place the policy and regulatory actions that are necessary to allow these business models to flourish while mitigating risks to financial integrity, stability and investor protection.

4.8 Improving the legal framework for contract enforcement and solvency

The total FDI inflows into Bangladesh are a mere $2 billion as compared with a total supply of $600 billion for all developing countries. While the dynamic East Asian economies of China, Hong Kong and Singapore have led the way for the developing countries in attracting FDI, India and Vietnam are also doing well. Armed with low-cost labor and good macroeconomic management, Bangladesh has tremendous potential to attract FDI. The investment climate improvement measures noted above should have a positive impact on this. Additional, foreign investors are very particular in paying attention to certain aspects of the legal framework, including contract enforcement and resolving business insolvency. The IFC ease of doing business have identified these two issues as the biggest investor concerns, especially for foreign investors. So, it is imperative to modernize the regulatory framework for private investment, especially for foreign investors, through proper policy actions in these two areas.

A number of actions are recommended.

- As a first step, the Law Ministry should check the adequacy of these two important enabling regulations in light of international good practice. Based on that review, appropriate steps have to be taken to streamline and strengthen the related regulations.
- Secondly, the government should ensure that adequate administrative and legal procedures are in place to enforce the sound implementation of these regulations. The government can learn from the experience of good practice examples how business disputes are resolved and how bankruptcy proceedings are implemented internationally. This review can then inform what actions are needed to enforce proper implementation, including whether there is a need for separate legal entities to resolve business disputes in a timely manner and with minimum transaction costs.

5. Conclusion. Over the next two decades, the regulatory regime will have to reach a transparency level that will provide certainty to the entrepreneur to undertake investment risks similar to the more developed countries now. During this period the focus should make institutions and regulatory agencies impacting doing business environment to become world class and fully digitized. In this context some of those key institutions which should be leading the way are Tax Administration, Customs Administration, VAT Administration, Land Titling Administration, Land Registration, Department of Environment, Registrar of Joint Stock Companies, BIDA, BEZA. At the same time there has to be zoned development and backed by adequate and high quality infrastructure.

Part-2

Developing Transportation and Quality Infrastructure to Support Sustained Rapid Growth and Economic Transformation

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Developing Transportation and Quality Infrastructure to Support Sustained Rapid Growth and Economic Transformation

1.0 Introduction

An efficient transport system is essential for promoting economic development. It is instrumental in influencing the distribution of economic activities and enhancing productivity. It is particularly helpful in generating economies of scale, fostering competition, reducing cost of production, facilitating systematic urbanization and assisting export-led faster growth. Thus an efficient transport system is part of the enabling environment that facilitates rapid, efficient and sustainable economic growth.

Transport system in Bangladesh comprises a number of distinct modes and services, notably railways, roads, road transport, ports, inland water transport, coastal shipping, airports and airlines. Roads and inland water transport are the dominant means of transport carrying more than 90% of total traffic generated in the country. Although other modes like railway, coastal shipping would play a greater role, roads and IWT would continue to dominate the transport landscape in the foreseeable future. Presently there are about 55,000kms of paved roads; 2,877 route-kilometers of railways, 3,800 km of perennial waterways which increases to about 6,000 km during the monsoon, 2 seaports, 2 international airports (i.e. Dhaka and Chittagong) and 8 domestic airports.

Public sector is mainly responsible for development and maintenance of transport infrastructure in Bangladesh. The public sector is involved in transport operations in road, inland water transport (IWT) and ocean shipping alongside the private sector. In the road transport and IWT sub-sectors, the private sector is dominant. In ocean shipping, however, public sector still predominates, although the private sector has considerably increased its role in recent years. Recently private sector has also become important operator in air transport, both domestic and international. Involvement of the private sector in railway operation, however, is very limited.

2.0 Present Status of Transport System and Services

The transport sector plays an important role in the socio-economic development of Bangladesh. Bangladesh witnessed rapid growth of transport sector since independence. The overall annual growth rate was nearly 8.2 percent for freight transport and 8.4 percent for passenger transport. Even then the transport intensity of the Bangladesh is considerably lower than that of many comparable developing countries. The relative roles of transport modes are evolving with road transport expanding at the expense of railways and inland water transport because of its inherent technical and cost advantages.

2.1 Road Transport

A good road network is a critical infrastructure requirement for rapid growth. It provides connectivity to remote areas; provides accessibility to markets, schools, and hospitals; and opens up backward regions to trade and investment. Roads also play an important role in inter-modal transport development, establishing links with airports, railway stations, and ports. There has been tremendous expansion of road network in the country since independence.

In 1971 total length of paved roads was 3000 kms which increased to about 55,000 kms. at present. Dhaka is connected with the major urban centres and the sea ports by roads. The Roads and Highways Department (RHD) manages several categories of roads. As recorded in 2012, the total length of road under RHD is 21,462 km. 16.52 percent of these roads are national highways while 19.93 percent and 63.55 percent are regional highways and feeder roads respectively. RHD has under its control a total number of 4,507 bridges and 13,751 culverts. It is currently operating about 153 ferry boats in 60 ferry ghats on its road network throughout the country. The road network under RHD combining different types of roads built over a period from 2001 to 2012 is shown in Table-1 below:

Table- 1: Various Categories of Roads under RHD

Year	National Highway (km)	Regional Highway (km)	Feeder Road 'A' type (km)	Total (km)
2001	3086	1751	15962	20799
2004	33723	4832	13823	22378
2008	3462	4128	13255	20865
2012	3544	4278	13640	21462
2016	3813	4247	13242	21302

Source: Ministry of Finance, 2012, 2017

The Local Government Engineering Department (LGED) is also involved in the development of urban and rural roads. Since its inception up to June 2017, LGED has so far constructed, reconstructed and rehabilitated a total of 1,07,910 km. upazila, union and rural roads, as well as 1,335,174 metres of bridges/culverts on these roads (Ministry of Finance, 2017).

There has been significant increase in the number of mechanized vehicles on roads in recent years. Between 2011 and 2016 mechanised vehicles on roads increased by about 14% annually. Growth rates of smaller vehicles, especially, car, auto-rickshaw, motorcycles etc. were higher than the larger vehicles such as bus and truck.Table-2 presents the estimated Number of Motor Vehicles in Bangladesh in different years between 2011 and 2017 registered by Type.

2.2 Railways

For many years railways played a significant role as a dominant mode of land transport because of its less hazardous and less expensive transport services. In recent years the railway has been losing its market share to other modes, especially the road because of its flexibility and capability to provide door to door service. Policy shift of the successive governments in favour of road has also been responsible for the decline of railway's share of passenger and freight traffic.

Table-2: Estimated Number of Motor Vehicles in Bangladesh Registered by Type (Thousand)

TYPE OF VEHICLE	2011	2012	2013	2014	2015	2016
Auto Rickshaw	147.19	170.73	186.43	206.33	226.33	237.50
Bus	29.54	30.98	32.09	33.57	35.96	39.80
Covered van/pick-up etc.1	72.79	82.89	93.30	107.50	122.23	140.14
Microbus/jeep etc.2	112.52	117.85	122.09	128.49	138.46	152.64

Private Passenger Car	232.78	242.00	252.48	267.18	288.24	308.54
Truck	90.20	94.53	99.66	107.80	114.13	121.40
Other3	124.74	129.89	134.14	139.26	145.64	155.31
Total Excluding Motor Cycle	809.76	868.87	920.18	990.13	1070.99	1155.34
Motor Cycle	873.87	975.46	1061.27	1151.95	1392.31	1724.37
Total Including Motor Cycle	1683.63	1844.33	1981.45	2142.08	2463.3	2879.71

Source: BBS (2016)

1. Covered Van, Pick-Up, Cargo Van, Delivery Van
2. Microbus, Jeep, Human Hauler
3. Ambulance, Auto Tempo, Tanker, Taxicab, Tractor, Minibus and different other vehicles

Bangladesh Railway (BR) provides, environment-friendly less hazardous and less expensive transport services. It has got a total network of 2,877.10 route kilometres (broad gauge 659.33 km, dual gauge 374.83 km and metre gauge-1,842.94 km). After the construction of railway tracks over the Bangabandhu Bridge, railway link between the East and West Zones has been established. Dual gauge rail track constructed from Jamtoil to Joydebpur over Bangabandhu Bridge has established direct rail link between East and West zones (Ministry of Finance, 2012).

The Railway has been involving the private sector in some railway operation during the last few years. These include the leasing out of commercial functions for passenger trains such as development, operation and maintenance of their ticketing reservation and for the maintenance, expansion and provision of telecommunication services to both railway and general public utilizing the railway's fibre optic network. Bangladesh Railway has also introduced computerized wagon control system (RAILWICS) in 1999-2000. UNESCAP assisted programme, can now be used for tracking and monitoring movement and status of all rolling stock, containers and cargo.

2.3 Inland Water Transport (IWT)

Inland Water Transport (IWT) is an extremely energy efficient, environmentally clean and economical mode of transport. But it has not been able to realize its full growth potential partly because of the road bias of the infrastructure development policy of the government. Bangladesh has about 14,000 km of waterways (rivers/canals) of which about 5,968kms. remain navigable during monsoon and 3865 km of rivers/canals are navigable during the dry season. The water transport network of the country not only caters to the inland movement of freight and passengers but also plays an important role in the transportation of import and export items through the ports of Chittagong and Mongla. During the monsoon season when roads become impassable, riverboats are the only mode of transport for an important part of the Bangladesh's rural population. The country boat plays significant role and provides for about 50% of the total employment in the transport sector as a whole. They are also the main mode of transport in the south coastal areas where the road network is little developed. Currently, most of these waterways suffer from navigational hazards like shallow water and narrow width of channel during dry weather, siltation, bank erosion, absence of infrastructure constrained by the absence of proper surface road links to facilitate the smooth transit of cargo.

2.4 Civil Aviation

The demand for air services has grown substantially during the last two decades because of increase in per capita income exports of worker services and expansion of tourism. Civil Aviation Authority, Bangladesh (CAAB) functions as the regulatory body for all aviation related activities in Bangladesh. This organization is the custodian of all airfields and allied facilities including air navigation facilities. CAAB renders its services to regulate and to develop required aviation facilities for national and international air transportation. It is now maintaining 3 international airports and 7 domestic airports and another 2 Short Take-Off and Landing (STOL) ports. Out of these, 8 airports (3 international and 5 domestic) are in operation. Due to inadequacy of passengers, no flight is operating at 2 other domestic airports and 2 STOL ports.

Hazrat Shahajalal International Airport (HSIA) at Dhaka is the busiest airport in Bangladesh through which 80% of the total air traffic flow takes place. The airport has an area of 1,981acres (802 ha). The airport has a capacity of handling 15 million passengers annually, and is predicted by the CAAB to be enough until 2026. Air traffic volume rapidly is increasing at 9.5% during last 3years. In 2014, it handled 6.1 million passengers, and 248,000 tonnes of cargo. Average aircraft movement per day is around 190 flights. The opening up of air traffic to private domestic carriers has also paid dividends in terms of quality and frequency of air services. With growing income, the demand for international and domestic air services continues to grow. The existing terminal and runway is not A380 or B747-8F compliant. It has become necessary for upgrading and expanding HSIA, to meet the growing air traffic demand and to accommodate Code F Aircraft (A380, B747-8F).

2.5 Maritime Ports

The maritime port sector plays an important role in the country's development, especially growth of GDP through sea borne trade. Total tonnage of sea borne trade is presently over 45 million tons, growing over 10 percent per annum. Chittagong and Mongla are the only two sea borne trade ports in Bangladesh. Chittagong is the main gateway port and handles over 95 percent of total tonnage. The installations of Chittagong Port are situated along the bank of the River Karnafuli, 16 km from its outfall into the Bay of Bengal. The maximum permissible draft ranges from 8.50 m to 9.20 m with length restriction of a vessel being 188 m. The Chittagong port has a total of 41 berths including private and public terminals and lightering operations in the outer anchorage.

At present annual growth of import-export trade conducted through Chittagong is 12 percent to 14 percent on average. A total of 2,136 and 2,294 ships came to the port In FY 2012-13 and 2013-14 respectively. In FY 2012-13 and 2013-14, 433.72 and 472.99 lakh metric tonnes of imported cargo and 14,68,713 and 16,25,509 Twenty- Foot Equivalent Unit (TEUs) containers have been handled through this port. There is an ongoing process of building Chittangong Port as a modern sea port keeping pace with other modern sea ports in the world. CTSM (Computerised Container Terminal Management System) and VTMIS (Vessel Traffic Management Information System) have been introduced to automate the port (Ministry of Finance, 2015).

The installations of Mongla Port are situated along the bank of the River Pussur, 130 km inland from the Bay of Bengal. The maximum permissible draft ranges from 6.00 m to 8.50 m with length restriction of a vessel being 200 m. It has three container yards with a

total area of 35,752 sq. metres which can accommodate 2,180 TEUs containers of same heights. In addition, it has got 4 transit sheds and 2 warehouses which can store 33,258 metric tonnes of cargo. Monglaport is capable of facilitating trade between north-west part of Bangladesh, Nepal, Bhutan and places adjacent to the Indian border. In FY 2014-15, a total of 45.0 lakh metric tonnes of imported cargo and 42,137 TEUs container have been handled through this port (Ministry of Finance, 2015).

Payra Port as third Sea-port of Bangladesh was inaugurated on 19 November 2013. Scale of operational activities of the port is, however, very limited at present. Only bulk carrier vessels call in at the outer anchorage and discharge the cargo (cement clinker, fertilizer etc.) onto the inland vessels for hinterland transportation. For hassle free inland vessels movement fareway and mooring buoys have been laid to earmark navigational channel. In addition, a VHF Bade station had also been installed with telecommunication equipment. The customs and shipping facilities have also been established. Electric Sub-Station for uninterrupted power supply, water treatment plant for supplying pure drinking water, A Pontoon jetty and two Electric cranes with lifting capacity of 5 tonnes each have also been installed for ship berthing (Ministry of Finance, 2017).

2.6 Urban Transport

Rapid urbanization in Bangladesh during the last few decades increased transport demand quite significantly leading to manifold increases in the number of motorized and non-motorized vehicles on city streets. The increase in the number of vehicles relative to road facilities has led to severe congestion on roads and deterioration in urban environment. Such trends are likely to continue as further urbanization takes place.

In urban areas road transport system is the main means for carrying passengers and commodities. Rail and water transport systems are mainly used by commuters and for transporting commodities between urban areas. As of 2007, total length of paved roads in the country was 80,915 kms which is about 30% of the total length of roads in the country. These roads include both urban and rural roads. Data on total length of roads in urban areas, however, is not available.

Table-3 represents the lengths of road and the level of service in six city corporations. Length of metalled (paved) road is highest in Dhaka followed by Rajshahi, Chittagong, Barisal, Sylhet and Khulna. Level of service (LOS) is defined as meter per person which is the most satisfactory condition in Rajshahi and is in worst situation in Chittagong. If all types of roads are considered best level of service is found in Barisal followed by Rajshahi, Sylhet, Khulna, Dhaka and Chittagong. Chittagong performs worst both in terms of paved roads and all types of roads probably due to physical characteristics of the city. Among the six city corporations, Dhaka is confronted with the most serious transportation problems. The transport sector of the city is comprised of many different modes of travel-both motorized and non-motorized-often using the same road space – resulting in a high level of operational disorder, that significantly diminishes the efficiency and effectiveness of the existing transport uses.

Table-3: Road facilities in different City Corporations

Division	Population	Metalled Road (Km)	Semi Metalled Road (Km)	Unmetalled Kacha Road (Km)	Total (Km)	LOS-Metalled Road (m/ person)	LOS-Total Road (m/ person)
Barisal	328278	233	36	324	593	0.71	1.81
Chittagong	2592439	250.80	90.5	47.39	378.35	0.10	0.15
Dhaka	8906039	1594	104	533	2231	0.18	0.25
Khulna	751230	158	67	18	243	0.21	0.32
Rajshahi	449756	346	225	0	571	0.77	1.27
Sylhet	485138	217	0	12	229	0.45	0.47
Total	13512880	2798.8	522.5	934.39	4245.35	0.21	0.31

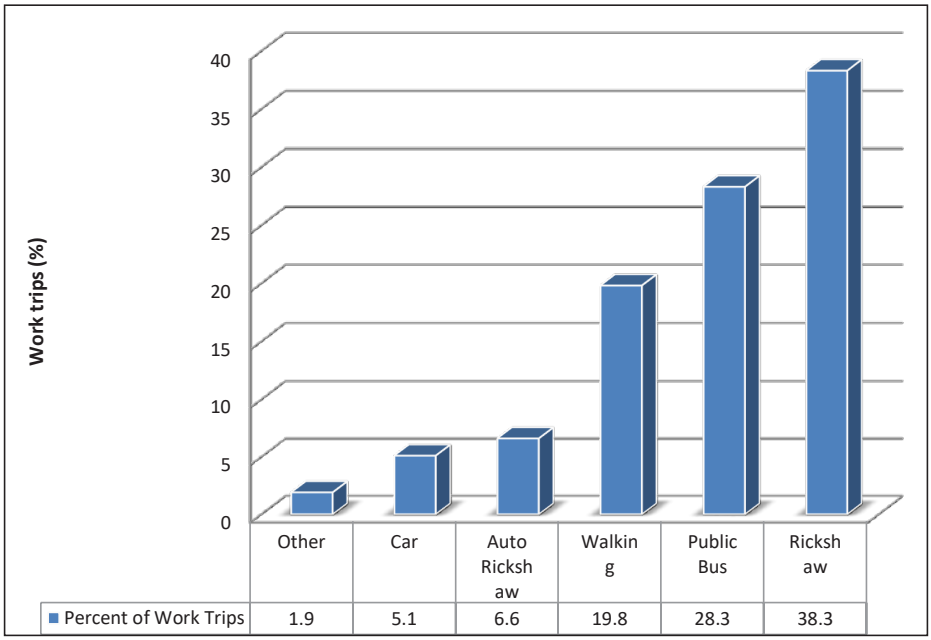
Source: District Statistics, 2011, Bangladesh Bureau o Statistics, Ministry of Planning

Heavy concentration of motorized and non-motorised smaller vehicles with almost 80 per cent of the available road space occupied by private passenger cars and rickshaws is expected to continue in the foreseeable future. Private passenger cars in Dhaka account for only 5% of the total trips (figure-1) and about 25% of the vehicles but occupy about 39% of the road space. Public buses on the other hand, account for about 28% of the total number of trips but occupy only 6% of the road space. Rickshaws' share of trips and road space is 38% and 40% respectively (DTCB and JICA, 2010).

Continuous and rapid increase in the number of private passenger cars is considered primarily responsible for congestion on urban roads. Cars cause problems not only when they are moving, they also require an inordinate amount of space for parking. Private car ownership in Dhaka has increased steadily from 5.85 vehicles per 10,000 persons in 1971 to 34.6 in 1992, an increase of about 490 percent (Hoque, M.M., Ahsan, H.M &Alam, J.B, 2002). By 2011 car ownership reached 123 per 10,000 persons indicating continuous increase in the number of cars on the roads. Although private cars account for a small proportion of total number of trips in the city, they occupy much larger road space. Car is the most inefficient transport mode in terms of number of passengers and occupation of road space (Bari, M. and Efroymson, D., 2005). In their research, Bari and Efroymson showed that the average number of passengers per vehicle is 1.50 for a car, 1.60 for a rickshaw and 52 for a bus. Such car- dependency results in heavy congestion even in smaller cities and an increasing impact on the environment and the climate through emission of greenhouse gases and particles (Pantzer, M., 2011).

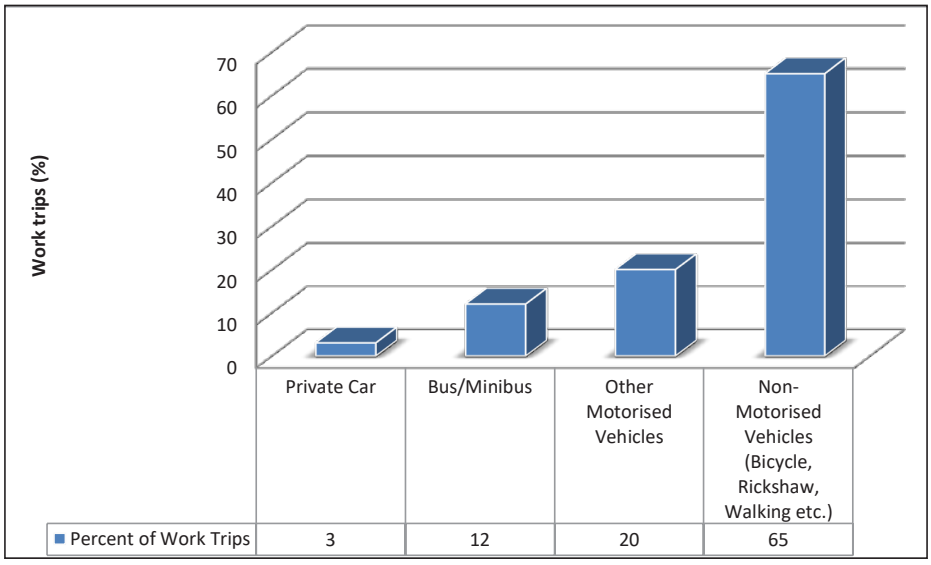
Being a megacity and the capital of the country, Dhaka receives most attention from the policy makers in terms of addressing its transportation problems while major secondary cities like Chittagong, Khulna, Rajshahi, Sylhet, Comilla, Bogra and Mymensing do not receive proper attention despite the fact that these cities also face significant transportation problems. People in these cities mainly depend on non-motorised transport modes which facilitate more than 60% of the trips they make for various purposes. Figure-2 presents the distribution of work trips by modes in urban areas of Bangladesh. 65% of the trips are made through non-motorised means such as rickshaw, bicycles and walking. This proportion is more than 80% in smaller urban centres.

Figure-1: Work Trips by Modes in Dhaka city



Source: DTCB and JICA (2010)

Figure-2: Work Trips by Modes in Urban Areas



Source: World Bank, (2007) "Bangladesh-Transport at a Glance"

It is unfortunate that despite being a megacity with a large number of residents, Dhaka does not have a Mass Transit (MRT) in any form to move a huge number of people at a time at high frequency. Public transport in Dhaka is road based and consists of non-motorized such as rickshaws and motorized transport such as buses, minibuses, human haulers, taxis and auto-rickshaws. Buses are the only mode which can carry a large number of people at one time and has the potential to cater to all income groups. But the number of operational buses is not more than 20 to 25% of the number required to meet the demand. Moreover bus service in the city is characterized by overcrowding, long waiting time and journey time, lack of comfort, difficulty in transferring from one route to another, long distance to and from bus stop etc.

3.0 A Comparative Analysis of Transport System Performances

The transport system of Bangladesh comprising distinct modes such as road, rail, civil aviation, inland water transport and coastal shipping serves a land mass of 144000 square km and a population of about 160 million. The degree of contribution of each of these transportation modes in the economy depends largely on the volume of passenger and freight traffic handled by the mode. It is obvious that land based transportation modes (road and rail) account for largest share of passenger and freight movement within the country compared to water or air-based transportation modes. An idea about the relative contributions of land, inland water and air transportation can be obtained from table-4 which presents the shares of GDP (%) attributable to land, water and air transport at constant prices.

Table-4: Sectoral Shares of GDP (%) at Constant Prices (Base Year 2005-2006)

Transport Mode	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Land Transport	7.32	7.31	7.27	7.24	7.18	7.17
Water Transport	0.86	0.84	0.81	0.79	0.76	0.74
Air Transport	0.14	0.13	0.12	0.12	0.12	0.11
Total	**8.32**	**8.28**	**8.20**	**8.15**	**8.06**	**8.02**

Source: BBS

Out of a total contribution of about 8.20 percent on an average during the last 6 years land transport (road and rail together) contributed an average of about 7.25 percent while water and air transport together contributed only about 1.00 percent in the GDP.

Table-5 below compares Bangladesh's global competitiveness score and quality of different types of infrastructure with those of a number of Asian countries including countries of south Asia. The information is collected from World Economic Forum's Global Competitiveness Report 2016-17. In terms of overall global competitiveness only Pakistan is behind Bangladesh while all other countries including Nepal, Bhutan and Sri Lanka have higher scores than Bangladesh. In case of overall infrastructure quality only Nepal is behind Bangladesh while all other countries have higher scores than Bangladesh. Similar is the picture with respect to different types of transportation infrastructure such as road, railway, port and air transport. This means that Bangladesh is badly in need of drastic improvements in its transportation infrastructure in order to reach the goal of reaching high-income nation by 2041.

Table-5: Bangladesh's Global Competitiveness Index and Infrastructure Quality- An International Comparison (2016-2017)

Country	Global Competitiveness		Quality of Overall Infra-structure		Quality of Roads	Quality of Railway	Quality of Port	Quality of Air Transport
	Score	Country Ranking	Score	Country Ranking	Score	Score	Score	Score
Bangladesh	3.8	106	2.8	120	2.9	2.7	3.5	3.2
Bhutan	3.9	97	3.9	78	3.8	N.A	1.9	3.7
India	4.5	39	4.5	51	4.4	4.5	4.5	4.5
Nepal	3.9	98	2.6	124	2.8	N.A	1.3	2.6
Pakistan	3.5	122	3.5	93	3.8	3.1	3.7	4.0
Srilanka	4.2	71	4.4	55	4.7	3.6	4.3	4.6
Thailand	4.6	34	4.0	72	4.2	2.5	4.2	5.0
China	5.0	28	4.5	43	4.8	5.1	4.6	4.8

Table-6 shows Bangladesh's global competitiveness and infrastructure scores over time. Over a period of 9 years between 2008-09 and 2016-17 some improvements can be observed in global competitiveness, quality of overall infrastructure, quality of railway, port and air transport. The score for port quality increased from 2.6 in 2008-09 to 3.5 in 2016-17, registering an increase of about 46%. Air transport experienced an increase of 36% in its score during this periodfollowed by rail transport which experienced an increase of about 17% in its score. What is important to note is that the score for roads has remained more or less the same during this period indicating that thecountry has not experienced any significant improvement in the quality of road transportation according to the Global Competitiveness Report of the World Economic Forum. Since roads account for largest share of passenger and freight traffic in the country it is extremely important for the government to focus on the qualitative improvement of the road sector for efficient functioning of the economy. The government also need to pay attention to the qualitative improvement of rail, port and air transport facilities to boost the economy. Even to reach the present level of Chinese infrastructure a score close to 5.0 out of 7.00 must be achieved with respect to each mode of transportation.

Table-6: Bangladesh's Global Competitiveness and Infrastructure Scores over Time

Country	Global Competitiveness		Quality of Overall Infra-structure		Quality of Roads	Quality of Railway	Quality of Port	Quality of Air Transport
	Score	Country Ranking	Score	Country Ranking	Score	Score	Score	Score
2016-2017	3.8	106	2.8	120	2.9	2.7	3.5	3.2
2015-2016	3.8	107	2.8	124	2.9	2.5	3.6	3.2
2014-2015	3.7	109	2.8	130	2.9	2.4	3.7	3.0
2013-2014	3.7	110	2.8	134	2.8	2.4	3.5	3.2
2012-2013	3.6	118	2.8	131	2.8	2.5	3.3	3.5
2011-2012	3.7	108	2.8	129	2.9	2.5	3.4	3.5
2010-2011	3.6	107	2.7	130	3.0	2.5	3.4	3.5
2009-2010	3.6	106	2.5	125	2.9	2.3	3.1	3.4
2008-2009	3.5	111	2.2	121	2.8	2.3	2.6	3.4

Source: Global Competitiveness Reports of the World Economic Forum

4.0 Transport Demand: Status and Trend

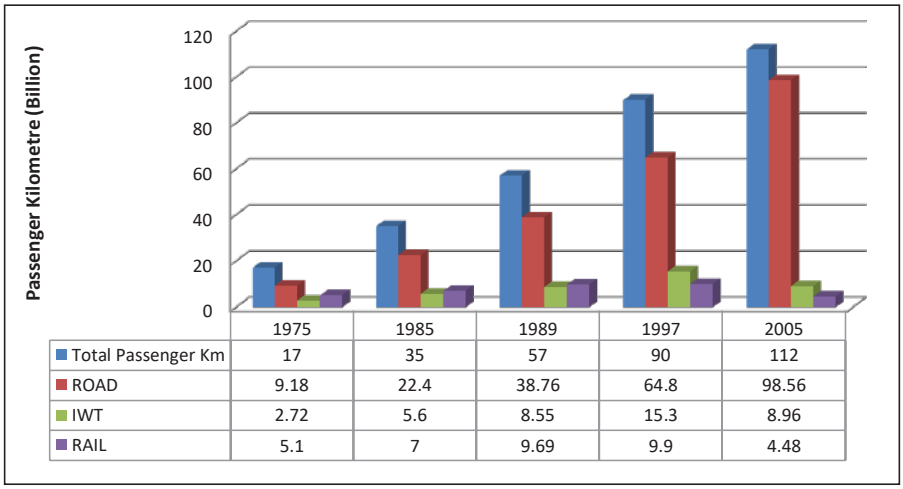
There has been significant expansion in the transport sector since independence. The growth of freight transport averaged about 8.2 percent per year while the passenger traffic grew by 8.4 percent on an average. Even then the transport intensity of Bangladesh is considerably lower than that of many comparable developing countries. The relative roles of transport modes are evolving with road transport expanding at the expense of railways and inland water transport because of its inherent technical and cost advantages. This is clearly evident from figure-3 and figure-4 which show the temporal changes in passenger and freight traffic. What is important to note is that while there has been significant growth in both passenger and freight traffic in road and inland water sectors, no such growth could be observed in case of railway. Railway lost its ground to road and IWT and even experienced decline in its passenger traffic.

There are considerable variations in the projection of traffic on road by various studies. Bangladesh Road Master Plan study carried out in 1990-91 estimated that the average annual growth of both freight and passenger traffic would be around 5- 6%. Bangladesh Road Master Plan, on the other hand, estimated that the growth of both freight and passenger traffic would be around 6.4% per year for the period 2010-2015 and 6% over the Master Plan period (2005-25). The Plan indicated that truck traffic will grow 2.5 to 4 times during the plan period while Car traffic will grow at an even faster rate, between 4 and 7 times, depending on the state of the economy. Growth of bus traffic, however, will depend on the implementation of recommended improvements in railway infrastructure and services over the plan period. If such improvements take place, growth of bus traffic will be slightly lower than expected. The Road Master Plan observes that the road network will need to respond to these challenges. Over the next twenty years, many of the major National Highways will require to be widened to accommodate this extra traffic, and this major programme of works needs careful phasing in the plan.

5.0 Institutional Arrangement

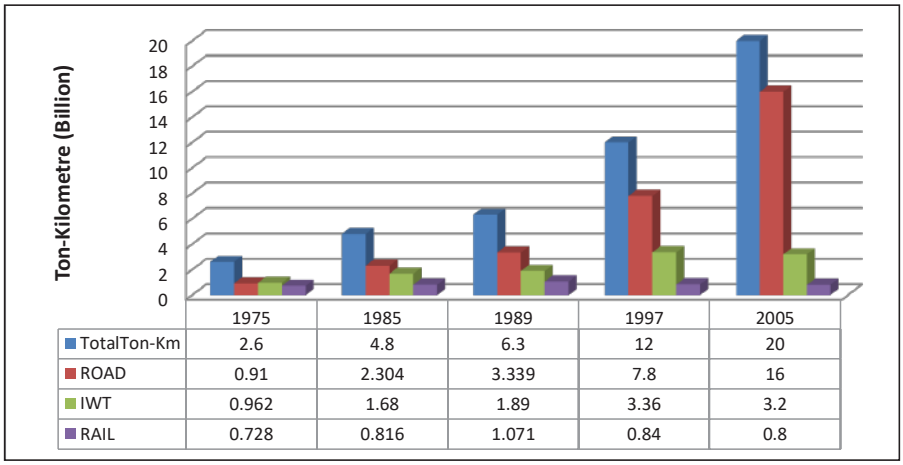
Both public and private sector institutions are involved in the management and development of the transport sector. Public sector involvement in the transport sector, especially road, rail and IWT consists of ownership and operation of a number of State Owned Enterprises and Authorities that include Roads and Highways Department (RHD), Bangladesh Road Transport Authority (BRTA), Bangladesh Road Transport Corporation (BRTC) and Dhaka Transport Coordination Authority (DTCA) under the Ministry of Transport and Communication; Local Government Engineering Department (LGED) under the Ministry of Local Government, Rural Development and Cooperatives; Bangladesh Inland Water Transport Authority (BIWTA) and Bangladesh Inland Water Transport Corporation (BIWTC) under the Ministry of Shipping, andBangladesh Railway under the Ministry of Transport and Communications. A brief description of each of these organizations is given below.

Figure-3: Growth of Passenger Traffic by Mode



	1975	1985	1989	1997	2005
Total Passenger Km	17	35	57	90	112
ROAD	9.18	22.4	38.76	64.8	98.56
IWT	2.72	5.6	8.55	15.3	8.96
RAIL	5.1	7	9.69	9.9	4.48

Figure-4: Growth of Freight Traffic by Mode



	1975	1985	1989	1997	2005
TotalTon-Km	2.6	4.8	6.3	12	20
ROAD	0.91	2.304	3.339	7.8	16
IWT	0.962	1.68	1.89	3.36	3.2
RAIL	0.728	0.816	1.071	0.84	0.8

Source (Data for Figure 3&4): Bangladesh Transport Sector Review (The World Bank publications), People's Republic of Bangladesh: Revival of Inland Water Transport-Options and Strategies, 2007, Bangladesh Integrated Transport Sector Study, 1997, Planning Commission

5.1 Roads

The Roads and Highways Department (RHD) is a major public sector agency directly responsible for planning, design, construction, improvement and maintenance of primary and secondary road network in the country, which include National and Regional Highways and Zila Roads. RHD is also responsible for the operation, and maintenance of an extensive ferry system in the country. Gradual replacement of ferry system with bridges is another broad dimension of RHD's regular activities.

Bangladesh Road Transport Authority (BRTA), the only regulatory body in road transport sector under the Ministry of Communication, Government of the People's Republic of Bangladesh is mandated to perform the following activities a) formulation of rules and regulations for control of motor transport as and when required; b) registration of motor vehicles and ownership transfer; c) issuance of motor vehicle driving licenses; d) issuance of fitness certificates for motor vehicles; e) issuance of route permits for transport vehicles; f) inspection of vehicles involved in road accidents; g) ensuring road safety and enforcement; h) registration of driver training schools; i) maintaining accident records and statistics; j) collection of motor vehicles tax and fees etc.

Bangladesh Road Transport Corporation (BRTC), the only government organization in road transport sector under the Ministry of Communication is mandated to provide fast, efficient, economic, reliable, comfortable, modern and safe road transport services in the country. The BRTC is charged with the responsibility of running publicly owned buses and it has, in recent years, adopted a policy of leasing out public buses to private operators. BRTC's share in the transport sector is only 1.2%. With the passage of time and considering the growing demand for BRTC services, BRTC has undertaken several projects for procuring buses and trucks.

Local Government Engineering Department (LGED) is the major public sector agency directly responsible for design, construction, improvement and maintenance of rural roads. The LGED made significant contribution towards rapid expansion of the rural transport network resulting in rapid growth of transportation services. LGED has made significant progress in building an extensive rural network of roads with significant impact on ensuring affordable transport services in the transport sector and improving the living conditions of the rural poor.

Dhaka Transport Co-ordination Authority (DTCA): The main objectives in establishing Dhaka Transport Co-ordination Authority (DTCA) are: to plan and coordinate transport infrastructure facilities and traffic management, to build institutional capacity of different organisations working in Dhaka Metropolitan Area (DMA) and to prepare a long-term transport development plan

5.2 Railway

Bangladesh Railway (BR): It is state owned and government managed transportation organization. It provides safe and less expensive mass transport facility. BR also provides critical transport services during natural calamities such as flood and cyclones on an emergency basis. After liberation, like other agencies, BR had to emphasize on rehabilitation and reconstruction of damaged railway system. Till then the bulk of the investment was for replacement, renewal and rehabilitation of track, rolling stock and signaling system. Until recently government resource allocations have had heavy road bias, but there are some important policy signals that things are beginning to change. This particular sub-sector has been losing ground in competition with both water and road transportation.

5.3 Inland Water Transport

Bangladesh Inland Water Transport Corporation (BIWTC): It is a service-oriented government-owned organisation. It is also the largest inland water transport entity. Currently with a fleet of 210 vessels BIWTC is playing a significant role in the economic activities of the country by carrying passengers and cargo.

Bangladesh Inland Water Transport Authority (BIWTA): Bangladesh Inland Water Transport Authority (BIWTA) is mainly responsible for carrying out regulatory functions of the inland water transportation system of the country. Among other responsibilities of the entity include excavation and re-excavation of dying river ways, development and maintenance of navigability of different river routes, ensuring safe movement of water crafts, development of inland river ports, activating the circular waterways around Dhaka, creating infrastructure facilities to carry container goods through inland waterways and preparation of hydrographic charts using digital system.

5.4 Weaknesses of the Institutional Arrangement

The institutional set-up for planning, development and management of the transportation sector suffers from a number of serious deficiencies. There is no effective coordination among the institutions that leads to severe competition among the modes thus hindering sustainable development of the transport sector. There is no assessment as to whether a particular mode of transport could undertake a particular task more economically and with less damage to the environment. Consequently, the transport system is characterized by sector bias, inappropriate modal mix and lack of integration within and among various modes of transport.

The institutional set up also handicaps intermodal planning and execution at all levels of government. Fragmentation of responsibilities leads to system inefficiency and the top-down approach to planning fails to take opinions of all stakeholders into account thereby lowering the capacity of the system to respond to demand. Another important weakness of the institutional arrangement is the lack of capacity in terms of knowledge in various fields of transportation. At present knowledge gaps exist in all areas of transport activity, ranging from understanding of actual travel patterns, effi¬ciency and performance of different technologies and modes in use, life cycle costs of different modes, management systems needed for large transport networks that are undergoing rapid transformation, the requirements for multimodal transport planning, and the interaction of the transport sector with other sectors of the economy, society and the environment. Consequently the existing institutional arrangement cannot go a long way in fulfilling the goal of a sustainable and inclusive transportation in the country.

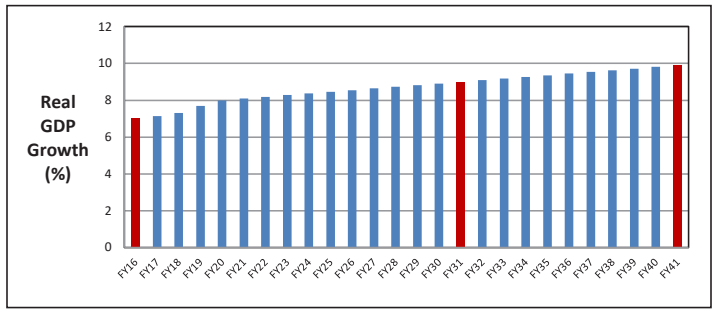
6.0 Macro_Economic Growth and Transport Demand in Bangladesh Over the Next Twenty Five Years

The transport system in Bangladesh comprises distinct modes such as road, rail, civil aviation, inland water transport and coastal shipping. If Bangladesh has to emerge as a high income country by 2041 the transport system must play its role to facilitate it. The macroeconomic framework designed to steer the economy of Bangladesh towards

achieving the high-income status envisages a growth path starting with an annual growth of GDP of 7.05% during FY 2015-16 and reaching 7.9% annual growth rate by 2041(figure-5).

As the economy develops demand for transport also increases quite significantly. Although transport demand is influenced by a number of factors, the growth of GDP is considered as the most dominant one for calculating elasticity for both freight and passenger traffic. Thus elasticity of traffic demand with respect to GDP has been taken as the underlying approach for assessment of traffic projections keeping in view the growth of GDP during the next twenty five years.

Figure-5: Projected Real GDP Growth



6.1 Road Transportation

The demand for both freight and passenger traffic has been growing rapidly over the years. The modal split between rail and road transport in both freight and passenger traffic is heavily inclined towards road transport. Road transport is estimated to hold 80 and 88 per cent share in case of freight and passenger traffic respectively (World Bank, 2007). As a consequence number of motorized vehicles on road has also increased tremendously. The growth of freight traffic, passenger traffic and motorized vehicles on road has been estimated/projected using the elasticity of traffic demand and demand for vehicles with respect to GDP. On the basis of a general trend in the elasticities both in India and Bangladesh over different time periods, traffic and vehicle projections have been made. Different GDP growth rates for each year as provided in the macro-economic framework have been used for the purpose of projection.

Passenger Traffic

As far as freight traffic is concerned, it is assumed that the total freight traffic holds an elasticity of 1.2 with respect to GDP. In case of passenger traffic, the elasticity of road passenger traffic has been assumed 1.8 with respect to GDP, keeping the GDP estimates same as in the macro-economic framework, which appears reasonable given the historical trend. Figure-6 shows the passenger traffic estimates with elasticity 1.8 and base year 2015-16. It is estimated that total passenger traffic is expected to grow at about 16% per annum to reach about 4874 Billion Passenger Kilometre (BPMK) in 2041 from 131 BPKM in 2015-1. Thus total passenger traffic is expected to grow nearly 4 times the current level during the next 10 years and about 37 times during the next 25 years.

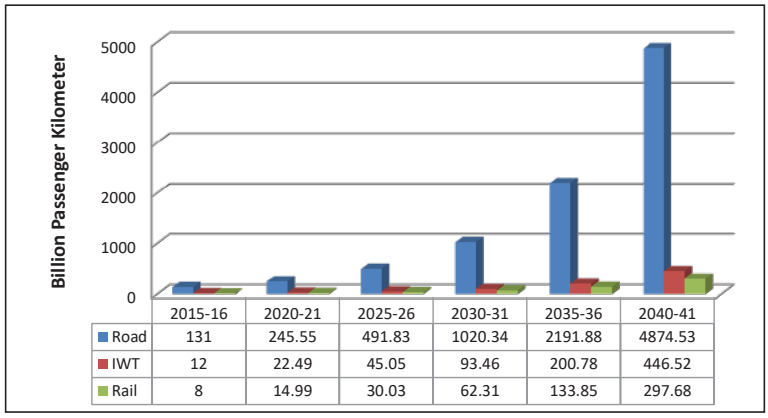
Freight Traffic

Figure-7 shows the freight traffic estimates with elasticity 1.2 and base year 2015-16. It is estimated that total freight traffic is expected to grow at about 10.83% per annum to reach about 236 Billion Ton Kilometre (BTMK) in 2041 from 20 BTKM in 2015-16. Thus total freight traffic is expected to grow nearly 2.4 times the current level during the next 10 years and about 12 times during the next 25 years.

Motorised Vehicles

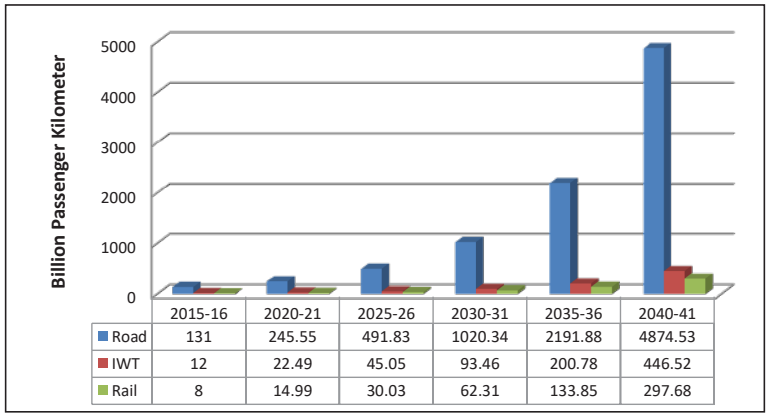
Continuous increase in the share of road in both freight and passenger traffic during the last few decades has been accompanied by rapid growth of motorized vehicles on roads. Figure below shows the growth rates of motorized vehicles in Bangladesh between 2011 and 2016. Growth of two and three wheelers has been much higher compared to bus, truck, private cars etc. It is expected that at higher income levels demand for private cars, taxicabs etc. would be higher and increase in freight traffic would also increase demand for trucks and similar vehicles. Projection

Figure-6: Projected Passenger Traffic by Modes Up-to 2041



	2015-16	2020-21	2025-26	2030-31	2035-36	2040-41
Road	131	245.55	491.83	1020.34	2191.88	4874.53
IWT	12	22.49	45.05	93.46	200.78	446.52
Rail	8	14.99	30.03	62.31	133.85	297.68

Figure-7: Projected Freight Traffic by Modes Up-to 2041



	2015-16	2020-21	2025-26	2030-31	2035-36	2040-41
Road	131	245.55	491.83	1020.34	2191.88	4874.53
IWT	12	22.49	45.05	93.46	200.78	446.52
Rail	8	14.99	30.03	62.31	133.85	297.68

of motorized vehicles is, therefore, based on elasticity of these vehicles with respect to GDP. In India private cars, buses and trucks are projected on the basis of an elasticity of 1.2 with respect to GDP. Similar pattern has also been observed in Bangladesh. Motorised vehicles are, therefore, projected on the basis of an elasticity of 1.2 with respect to GDP.

Table-7 presents the projected number of motorized vehicles up-to 2041. It is estimated that total number of motorized vehicles is expected to grow at about 10.83% per annum to reach about 34 million in 2041 from 2.9 million in 2015-16. Thus total number of motorized vehicles is expected to grow nearly 2.5 times the current level during the next 10 years and about 12 times during the next 25 years.

Figure-8: Annual Growth Rate of Motorised Vehicles Between 2011 and 2016

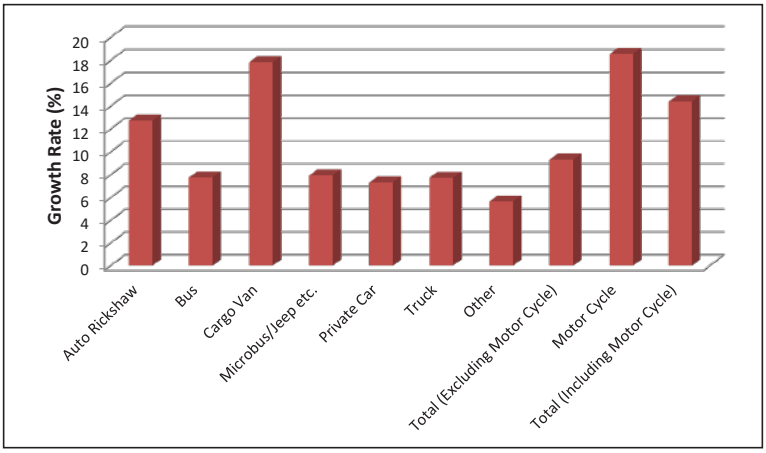


Table-7: Projected Number of Motor Vehicles in Bangladesh Up-to 2041 (Million)

TYPE OF VEHICLE	2015-16	2020-21	2025-26	2030-31	2035-36	2040-41
Auto Rickshaw	0.237	0.363	0.583	0.96	1.619	2.798
Bus	0.04	0.061	0.098	0.162	0.273	0.472
Covered van/pick-up etc.1	0.14	0.214	0.344	0.567	0.956	1.652
Microbus/jeep etc.2	0.152	0.233	0.374	0.616	1.038	1.794
Private Passenger Car	0.308	0.472	0.758	1.248	2.105	3.636
Truck	0.121	0.185	0.298	0.49	0.827	1.428
Other3	0.155	0.237	0.381	0.628	1.059	1.83
Total Excluding Motor Cycle	1.155	1.771	2.844	4.68	7.892	13.636
Motor Cycle	1.724	2.643	4.245	6.986	11.781	20.353
Total Including Motor Cycle	2.879	4.414	7.089	11.666	19.673	33.989

1. Covered Van, Pick-Up, Cargo Van, Delivery Van
2. Microbus, Jeep, Human Hauler
3. Ambulance, Auto Tempo, Tanker, Taxicab, Tractor, Minibus and different other vehicles

6.2 Inland Water Transportation (IWT)

The current level of passenger traffic of IWT is about 12 Billion Passenger Kilometre (BPKM). With elasticity at 1.8, total passenger traffic is expected to grow at about 16% per annum to reach about 446 Billion Passenger Kilometre (BPMK) in 2041 from the current level (figure-6). Thus total passenger traffic is expected to grow nearly 3.75 times the current level (2015-16 level) during the next 10 years and about 37 times during the next 25 years.

The current level of freight traffic of IWT is about 4 Billion Ton Kilometre (BTKM). Figure-7 shows the freight traffic estimates with elasticity 1.2 and base year 2015-16. It is estimated that total freight traffic is expected to grow at about 10.83% per annum to reach about 47.22 Billion Ton Kilometre (BTMK) in 2041 from the current level. Thus total freight traffic is expected to grow nearly 2.46 times the current level during the next 10 years and 11.8 times during the next 25 years.

6.3 Rail Transportation

The passenger traffic of Bangladesh Railway as of 2015-16 is about 8 Billion Passenger Kilometre (BPKM). With elasticity at 1.8, total passenger traffic is expected to grow at about 16% per annum to reach about 298 Billion Passenger Kilometre (BPMK) in 2041(figure-6) from the current level. Thus total passenger traffic is expected to grow nearly 3.75 times the current level during the next 10 years and about 37 times during the next 25 years.

The current level of freight traffic of the railway is about 4 Billion Ton Kilometre (BTKM). Figure-7 shows the freight traffic estimates with elasticity 1.2 and base year 2015-16. It is estimated that total freight traffic is expected to grow at about 10.83% per annum to reach about 47.22 Billion Ton Kilometre (BTMK) in 2041 from the current level. Thus total freight traffic is expected to grow nearly 2.46 times the current level during the next 10 years and 11.8 times during the next 25 years.

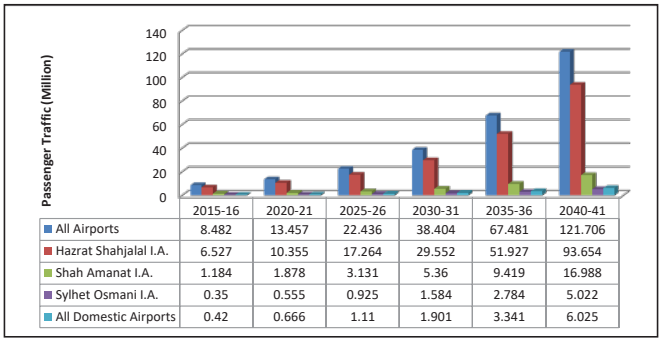
6.4 Civil Aviation

In recent years there has been a significant increase in the number of air passengers in Bangladesh, both domestic and international. Table-8 presents the growth of passenger and freight traffic in different periods during the last 16 years through all the airports in Bangladesh. During last 10 years (between 2006 and 2016 annual average growth rate of air passenger traffic was more than 10%. Based on GDP and air passenger growth rates in Bangladesh and comparable experience in India, air passenger elasticity of 1.30 with respect to GDP can be considered appropriate for projection of air passenger traffic in Bangladesh. Figure-9 presents the projected air passenger traffic up-to 2041. The projection was based on GDP estimates of the macro-economic framework. At present nearly 8 million passengers travel through 3 international and 5 domestic airports. Nearly 77% of the passengers, however, use Shahjalal International Airport of Dhaka for travelling. The projection shows that total passenger traffic is expected to grow at about 12% per annum to reach about 122 Million Passenger Kilometre (BPMK) in 2041 from the current level. Thus total passenger traffic is expected to grow nearly 2.4 times the current level during the next 10 years and about 14 times during the next 25 years.

Table-8: growth of passenger and freight traffic

Period	Growth of Passengers (Compound Annual Growth Rate in percent)	Growth of Freight (Compound Annual Growth Rate in percent)
2001 - 2004	05.32	08.39
2006 - 2010	17.17	11.80
2010- 2016	08.43	10.81
2006 - 2016	10.28	09.90
2001 - 2016	06.45	07.71

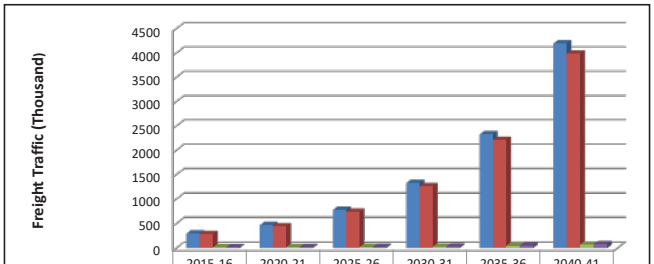
Figure-9: Projected air passenger traffic up-to 2041



	2015-16	2020-21	2025-26	2030-31	2035-36	2040-41
All Airports	8.482	13.457	22.436	38.404	67.481	121.706
Hazrat Shahjalal I.A.	6.527	10.355	17.264	29.552	51.927	93.654
Shah Amanat I.A.	1.184	1.878	3.131	5.36	9.419	16.988
Sylhet Osmani I.A.	0.35	0.555	0.925	1.584	2.784	5.022
All Domestic Airports	0.42	0.666	1.11	1.901	3.341	6.025

Air freight movement has also increased quite significantly during the last 10 years. Table-8 shows that during last 10 years (between 2006 and 2016) annual average growth rate of air passenger traffic was nearly 10%. Based on GDP and air freight growth rates an elasticity of 1.30 with respect to GDP is also considered appropriate for projection of air freight traffic in Bangladesh. Figure-10 presents the projected air freight traffic up-to 2041. The projection was based on GDP estimates of the macro-economic framework. At present nearly 0.3 million Metric Tons of cargo move through 3 international and 5 domestic airports. Nearly 95% of the cargo,however, are moved through Shahjalal International Airport of Dhaka. The projection shows that total freight traffic is expected to grow at about 12% per annum to reach about 4.2Million Metric Ton in 2041 from the current level. Thus total freight traffic is expected to grow nearly 2.64 times the current level during the next 10 years and about 14 times during the next 25 years.

Figure-10: Projected air freight traffic up-to 2041



	2015-16	2020-21	2025-26	2030-31	2035-36	2040-41
All Airports	292	463	773	1323	2325	4193
Hazrat Shahjalal I.A.	277	440	733	1255	2206	3980
Shah Amanat I.A.	4.45	7.07	11.78	20.17	35.44	63.92
Sylhet Osmani I.A.	5.21	8.27	13.8	23.62	41.5	74.84

6.5 Maritime Ports

Growth of freight handled by seaports, especially the Chittagong Port, during the last ten years has been quite high. Table-9 shows the growth of container and cargo handled by seaports since 2009. Table-9 shows that between 2009 and 2015 annual average growth rates of containers and cargo were nearly 9% and10% respectively. Based on GDP and growth rates of containers and cargo an elasticity of 1.50 with respect to GDP is considered appropriate for projection of containers and cargo through Seaports in Bangladesh. The projection shows that both container and cargo is expected to grow at about 14% per annum. Number of containers is expected to reach about 7 million in 2025-26 and about 48 million in 2040-41 (figure-11). Similarly the amount of cargo is expected to increase three-fold to reach about 222 Million Metric Ton in 2025-26 from the current level (figure-12). By 2041 the amount of cargo is expected to increase by 22 times to reach about 1.6 billion metric ton.

Table-9: Growth of Freight Handled by Seaports (Container and Cargo)

Period	Growth of Containers (Compound Annual Growth Rate in percent)	Growth of Cargo (Compound Annual Growth Rate in percent)
2009 – 2012	06.62	06.41
2012 – 2015	11.60	15.00
2009 - 2015	09.00	10.62

Figure-11: Projected container traffic up-to 2041

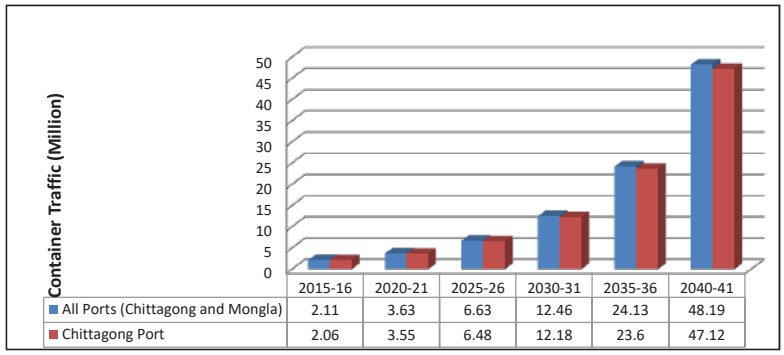
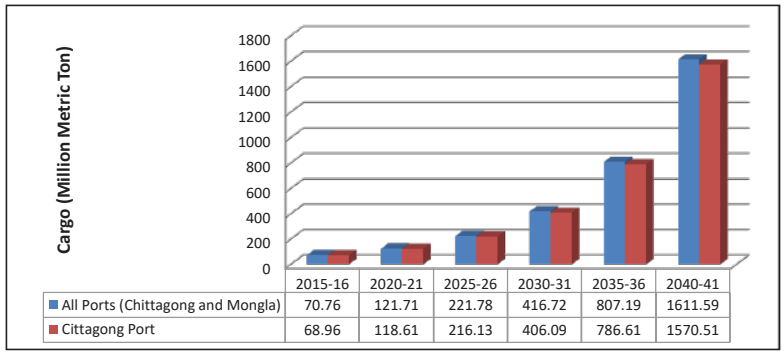


Figure-12: Projected cargo traffic up-to 2041



The challenge confronting Bangladesh is to take necessary steps for achieving high income status over the next 25 years. Achievement of this would depend on whether the economy grows in accordance with the macro-economic framework as proposed. Growth and development of the transport sector must also be commensurate with the growth as envisaged in the macro-economic framework. What is important to realize is that transport is an important growth driver. Adequate transport provision in terms of quantity and quality is essential to satisfy the projected passenger and freight demand that would be associated with increased GDP growth rates. If the required transport investment is not made, economic growth targets as envisaged in the macro-economic framework will not be achieved.

7.0 Development of Sustainable and Inclusive Transport Systems: Issues And Challenges

Bangladesh is one of the most densely populated countries of the world. The population is expected to increase substantially over the next decades and reach about 200 million people by 2020. It is estimated that the projected 7-10% yearly economic growth will generate a transport demand of 8.5 to about 17% per year, or even more on certain corridors, such as on the Dhaka-Chittagong corridor. At the same time Bangladesh has, in comparison with other similar countries, fairly low traffic intensity. Despite the low traffic intensity, however, many national highways are congested, largely due to the large proportion of slow moving vehicles, weak traffic management and enforcement, and inefficient utilization of road space. Whilst capacity constraints exist at sections of most major highways, rail and inland water transport remain underutilized along major transport corridors. As a metropolitan city, Dhaka suffers from extreme congestion, especially during peak hours, causing high economic costs and severe externalities, particularly poor air quality and a high incidence of road accidents. In what follows some of these problems and issues faced by road, railway, inland waterway, civil aviation and maritime ports are discussed.

7.1 Road

Despite massive expansion of the road transportation since independence, the services provided to users have not kept up with the demand in terms of quality and safety. The quality of the road network is poor; as roads are often too narrow for the traffic they carry. The road network has been developed mainly on the basis of short term needs rather than long term planning due to the lack of appropriate road sector policy guideline until recently. It is observed that there is large scale deterioration of the network due to lack of proper maintenance, large sections of the network have inadequate structural strength, many of them severely damaged by vehicle overloading. Lack of adequate road safety has already reached an alarming level; faster and smooth movement along the highways is not possible due to the presence of large number of hats and bazaars right on the edge of roads.

Congestion, overloading, air pollution, and safety are major problems faced by the road sector in Bangladesh. It is well recognized that delays in urban areas, especially in Dhaka and main highway corridors, as well as congestion in the Chittagong Port, continue to be major concerns for users. Lack of maintenance and insufficient funding, slow implementation, encroachments on major highways and land resettlement, traffic growth and road safety, climate change, and organizational issues are some of the major challenges that the country

will have to address in the coming years. Bangladesh is one of the countries having highest density of road per square kilometer. But the performance of the country is extremely poor in terms of maintenance of roads. If the maintenance is not done on due time, many roads will require costly rebuilding. A large proportion of roads in Bangladesh are of poor, bad, or very bad condition (about 38%), only due to lack of maintenance. This high percentage of bad roads only point to a high amount of money that would be required to fix these roads..

7.2 Railway

Despite its usefulness as an efficient, affordable, less accident prone, and more environmentally friendly form of transport, Bangladesh Railway (BR) has been unable to realize its true potential as a result of poor services. The current poor performance of BR is the result of a history of poor operating performance which has been primarily caused by inefficiencies in both physical and human capital as well as insufficient resources and a lack of key institutional reform. The railway network of Bangladesh, which was inherited from a pre-independent India, is unsuitable for present traffic flow requirements; these orientation problems have affected the overall functionality of the railway.

One major constraint in BR is its lack of connectivity between rail networks, usually a result of a difference in rail gauge and the incompatibilities in rolling stock. The railway system comprises of different gauges: meter gauge, broad gauge, and multi-gauge, which require transshipments of traffic at certain points where there is a break of gauge points. Specifically, most of Bangladesh's inherited railway networks from the pre-Liberation War railway are meter gauge and broad gauge. The east-west railway system over the Bangabandhu Multipurpose Bridge is inter-connected using a dual-gauge track, but the east part of the network consists of meter gauge.

Little investment has been made to re-orient the railway network towards the capital city, shorten distances between major cities and districts, improve district coverage, or connect the railway to other important inter-modal facilities, such as ports and highways. These variations in track types will require reorientation in order to enhance connectivity and overall efficiency in the Bangladesh rail network. To add, Bangladesh is also a riverine country, with approximately 405 rivers flowing throughout the country.54 Therefore, many areas of the country are difficult to reach as they require the building of costly bridges. This makes it even more difficult for BR to adequately serve the needs of the country. Out of a total of 64 districts in Bangladesh, only 44 districts are connected via railway. Some of the existing route lines are also inefficient and time-consuming, for example, Bangladesh's two largest and economically significant cities, Dhaka and Chittagong, are connected through such a route line. The Dhaka-Chittagong corridor is considered the life-line of the country as it connects its capital city to its port city. This route is currently dominated by road transport because of a less effective railway link between the two cities. This is an example of how the BR's rail track orientation problems cause issues with the efficiency of operations and connectivity. In order for the railway to adequately compete with a sector such as road, connectivity must be greatly enhanced.

A major reason why Bangladesh Railway has suffered steady decline in its share of freight and passenger transportation is that its network is plagued by infrastructural and carrying

capacity constraints. Traffic flows on BR are highly uneven and imbalanced with Dhaka-Chittagong corridor accounting for largest share of freight and passenger traffic. Lack of full and proper maintenance of BR's permanent ways, bridges, signals and other ancillary facilities over a number of decades has contributed to its poor performance. Bangladesh Railway has its own workshops for maintenance of its rolling stocks. These workshops had not been maintained or overhauled for a long time to get the maximum productivity. Aging of rolling stocks, such as locomotives, coaches and wagons together with lack of maintenance on a timely manner, decreases the availability of rolling stock on line on any given day. As a consequence, weight restrictions, speed limit, safety issues have become matter of great concern for train operations. In addition, employee productivity, relating to infrastructure maintenance and train operation in Bangladesh Railway is low compared to other Asian countries, although it is a crucial issue for proper utilisation of public fund and to get optimal output from human resources.

7.3 Inland Water Transport

One of the main causes of declining trend of inland water transport is the deteriorating condition of the river system in Bangladesh caused by both morphological and natural processes, and withdrawal of water beyond the border and within the country and continuous lacking of investment. In 2013-14, BIWTA recorded 87.40 million of passenger and 35.18 million tons of cargo throughput the nine major river ports. IWT is mainly used for transport of bulk, dry bulk and liquid bulk of construction materials, food grains, fertilizer, clinker, petroleum product etc. A large fleet of about 10,000 inland vessels is engaged in the carriage of goods and passengers. Besides there are approximately 750,000 country boats powered by the pump engines operating mainly in the rural waterways.

Rivers are deteriorating and the dredging demand is increasing every year. Annual demand of dredging of 8.9 million m3 as determined by expert committee in 1990s increased to the volume of 18 million m3 in 2009 as recommended by the IWT Master Plan Study Report. As opposed to this, the IWT has not been able to capture the rightful place in budget allocation as it has never been a popular political choice for development in Bangladesh. Against the modal share of 8.9% and 16% respectively in passenger and freight movement, the IWT received on average less than 5% of the total ADP allocation for surface transport.

Poor governance and inadequate institutional capacity and inefficiency are very much evident in the case of construction and registration of inland vessels in terms of ship safety and in case of management and operations of inland ports and inland waterways.

Poor or no intermodal connectivity at inland river ports and landing stations manifests the inherent inefficiency of transportation by inland waterways. At present there are about 380 landing stations developed by BIWTA in the country. Of these, two-third was developed in the rural areas with about 90 percent with no road link. All 21 inland river ports (except Chandpur) do have road links. Only Narayanganj, Chandpur and Khulna do have a railway link. But landing points and stages in these river ports are established in such a way that cargo transfer between vessel and truck is not possible except one point at Dhaka, as well as at Narayanganj and Khulna. The method of transshipment is only by means of head load what prevailed in the last centuries. This causes increase of transportation time and cost in case of inland waterways. Consequently, IWT has lost its efficiency and competitiveness

compared to other modes. Against such a backdrop some major challenges identified in the IWT sector are as follows:

- incremental dredging demand to maintain navigability;
- lack of infrastructure, non-compliance of guidelines for construction of bridge over the rivers, encroachment in the rivers,
- lack of safe vessels and skilled workforce,
- lack of policy guidelines, poor governance,
- inadequate budget allocation,
- lack of intermodal coordination,
- Inadequate progress with regional cooperation.

Road, inland waterways and rail are components of surface transport sector of Bangladesh. Coordination and connectivity among these modes could provide a multimodal transport system to establish an uninterrupted transport chain for door to door services.

7.4 Civil Aviation

Movement of passenger and cargo by air is expected to increase significantly in the coming years. Projection of air traffic indicates that if GDP growth rates as envisaged by the macro-economic framework are maintained both passenger and freight traffic would reach 2.4 times the current level (2016 level) by 2026 and about 14 times by 2041. This has important implications for the aviation sector. The capacity of the air transport network will have to be augmented which depends on each of the following component elements:

- the capacity of airport terminals to process arriving and departing passengers, and to provide gates for aircraft;
- the ability of airlines to deploy more or larger aircraft at higher frequencies; and the efficiency of support provided by other transport networks, importantly roads.

In turn these are dependent on more fundamental factors, including the productivity of the capital invested and of human resources, and on new technologies such as radar or navigation systems that permit aircraft to fly with narrower separations or in difficult weather conditions. At present, a major limiting factor is the capacity of airports, especially the Hajrat Shahjalal International Airport (HSIA). There is a shortage of landing gates and areas for processing passengers are crowded.

Some development activities are however going on at HSIA. A new Terminal Building (T3), Cargo Village, Rapid Exit taxiways and Runway Extension are being undertaken under HSIA Expansion Project in different phases. The third terminal (T3) at Hazrat Shahjalal International Airport, when completed will have 24 Boarding Bridges for wide body aircraft and would be able to accommodate 1,85, 000 passengers per year. It is expected that corresponding to the future passenger growth HSIA would be able to handle 24 million passengers annually by 2035. However, projection of air traffic indicates that by 2030-31 and 2035-36 number of passengers would increase to about 30 million and 51 million respectively. This would require the construction of new international airports. The Government has planned the construction of a new airport away from the Capital. Work for selection of site for the airport is going on.

Land acquisition is a major challenge for construction of airports in Bangladesh. In a fast growing economy like Bangladesh pressure on land has been increasing due to urbanization, industrialization and infrastructure development. Since a large majority of people are dependent on agriculture, acquiring land is a complex process. Moreover, people who forego land are given poor compensation and an undervalued market price of land. This gives rise to dissension among the affected people, thereby impacting land acquisition. Infrastructure projects in Bangladesh thus get affected and delayed due to problems of land acquisition.

Another important challenge is the connectivity of the airport with the region served by it. Airports cannot function well as terminals if good land transport networks are not available to quickly distribute passenger and cargo traffic to and from the region served by the airport. Depending on the size of the airport and the economic and demographic characteristics of the passenger traffic, these transport links may also include mass rapid transit options. The great advantages of air travel in terms of the savings in time that it offers will diminish if the air network does not cohere well with land-based transport. This is especially true for time-sensitive cargo.

7.5 Maritime Ports

Chittagong and Mongla are the two major sea borne trade ports in Bangladesh. Although Pyra Port has been inaugurated recently, it will take some more time to make it operational as a sea port of any significance. Total tonnage of sea borne trade in the country is presently over 45 million tons, growing over 10 percent per annum. Also the trend towards containerization persists and container traffic is growing over 12 percent per annum. Chittagong being the main gateway port of sea borne trade is handling over 95 percent of total tonnage.

The main challenge of two maritime ports is the condition of fairways between the sea and the jetty berths. The Chittagong Port (CP) installations are situated along the bank of the River Karnafuli 16 km from its outfall into the Bay of Bengal. The maximum permissible draft ranges from 8.50 to 9.20 m with length restriction of vessels being 188 m. As such vessels with more than 1,200 TEU cannot berth at Chittagong port, while the average capacity of the vessels calling at the South Asian ports is 3,500TEU. The Mongla is located on the Pussur River about 130 km inland from the Bay and its permissible draft ranges from 7.00 to 8.50 m with length restriction of vessels being 225 m. In the context of regional standard, maritime ports in Bangladesh also suffer from inefficiency. The average handling of boxes per crane hour at CP is 12-15 as against 25 of South Asian standard. The Study also found that dwell time at CP is 6-8 days while it is 3-4 days in the South Asian ports.

Traffic at Chittagong Port is growing rapidly, faster than growth of Bangladesh GDP. Faster growth rate is projected for foreseeable future. Chittagong Port has not responded as yet to this demand effectively, resulting in congestions and delays at the port, as well as high costs to port users. Delays and uncertainties in port services seriously undermine economy's productivity and international trading links. A recent study of the World Bank (KCT Pre-Feasibility Study, September, 2014) identified a number of challenges that must be addressed to improve performance of the ports:

Maritime Access: Navigational restrictions prevent large (deeper draft) vessels from trading to its ports thereby increasing freight and generalized costs.

Port Operations: Current services are inefficient, often lacking equipment and advanced operational practices related to container handling, container yard (CY) and gate management. Independent private sector concessions are not in place nor are recognized International Terminal Operators (ITO) presence.

Inland Connectivity: Inefficient services and poor infrastructure across all modes result in very little container penetration inland and additional handling costs.

Customs and Clearance: Tend to be bureaucratic and lacking transparency adding cost and time.

7.6 Urban Transport

Extreme traffic congestion is the main problem of urban road space of big cities and secondary towns in Bangladesh. As the urban hierarchy of Bangladesh is strongly dominated by Dhaka, this problem is acute in this city. Due to traffic jam a substantial portion of working hours have to be left on streets. Traffic congestion also causes serious air and noise pollution and thus worsens the overall environmental condition. Non-existence of transport planning and inefficient traffic engineering result in low quality traffic management. Public transport systems are poorly organized and there is lack of integration with non-motorized vehicles. Buses are in short supply and there is inadequate metro or rail system to handle day-to-day commuter traffic. Moreover, the growing dependence on private vehicles for intra-metropolitan trips, is currently a crucial component in the debate on sustainable urban development, given the economic, social and environmental impact for which it is responsible. Considering all these factors, it has become a challenging task for the government as well as transport planners and engineers to cater the demand of mobility for the ever increasing urban people in a more sustainable way.

Road accidents, air pollution due to vehicle emissions, hazardous vehicle driving/ operations, overloading, etc are some of the most common phenomena in transport sector, particularly in the urban areas. These phenomena have actually developed due to lack of enforcement of existing rules and regulations with regard to transport operation in the country. Some of the major problems in urban transportation also include:

- fragmentation of organizational responsibilities,
- inefficient use and overcrowding of major roads by low capacity vehicles,
- inadequate road space,
- poor traffic control and management,
- absence of a reliable and dependable mass transit system, and
- absence of adequate pedestrian and bicycling facilities.

In addition, the rapid urbanization had led to unplanned land development in the fringe areas of major urban centers including Dhaka. Although some efforts have been made by the government to address these major problems especially those of the big cities including

Dhaka, they appear to be far less than what is required to bring in an acceptable condition. In the national context, the transport system is not fully integrated, and there is road bias. If this trend continues the transport sector development would become unsustainable from economical, social and environmental points of view.

8.0 Way Forward

8.1 Transport Development: Vision 2041

By 2041, investment in the transport sector will ensure development of a transport network of such an extent and quality that it will serve as a key driver in empowering Bangladesh and its people, enabling:

- Greater mobility of people and goods through transport alternatives that is commensurate with supporting the desired pace of Bangladesh's economic transition
- Improved access to economic, educational, health and various other socio-economic services through transport alternatives that are affordable, reliable and safe
- Economic Development, by supporting the movement of goods from points of production to where they are consumed, facilitating regional and international trade.

8.2 Strategy for Transport Development

During the last few decades transport sector, especially the road transportation has played an important role in the growth of the industrial sector in the country. Improvement in transport infrastructure may lead to reduction in transport cost and travel time as well as provision of better services. Improvement in freight transportation that reduces the costs of moving goods (and services) to and from markets is critical to economic expansion. Thus, investments that reduce the cost of moving goods and people to and from markets (via improvements in reliability, transit times, service levels, etc.) can help to increase and sustain economic growth. As productivity is the most important determinant of economic performance, the efficiency and reliability of the transportation system that affects economic productivity is crucial for growth and development of the economy. This chapter provides major strategies for development of the transportation system of the country to achieve the growth targets as envisaged in the macro-economic framework. Annex-A presents sector-wise benchmarks, milestones and targets of some of the major indicators of transport development in the country. Transport development strategies have been formulated keeping these milestones and targets in view.

8.2.1 Strategy for Road Transport

Density of road (defined as length of road per unit area) in Bangladesh is one of the highest in the world. Over the last few decades construction of new roads and development of existing roads have improved both accessibility and mobility tremendously throughout the country. Despite such improvements, our roads suffer from a litany of ills. These are low capacity, congestion, overloading, air pollution, poor maintenance, lack of safety and so on. Projection of road traffic indicates that if the economy follows the growth path as envisaged in the macro-economic framework, passenger traffic will increase nearly 4 times and freight traffic will increase nearly 2.4 times the current (2016) level in 2026.It is, therefore, necessary to formulate strategies to meet the expected traffic demand and improve transport productivity. Strategies to deal with the emerging situation are described below:

Consolidating and Upgrading National Highway Networks

1. **Multi-lanes and Access Control:** The main functions of the National and Regional Highway Systems are mobility and enhanced productivity of transport. Emphasis should be laid on consolidation of National and Regional Highways in terms of capacity augmentation through multi-laning of existing highways and provision of access controlled expressway facilities.

2. **Expressway Corridor:** Investment friendly Expressway Network that provides unhindered movement of traffic should be given special consideration. An example is the Indian access controlled 'Golden Quadrilateral National Multilane Expressway System'. Following such an example an access controlled 'Backbone Network' should be developed considering strategically important highways connecting the capital city, Dhaka with regional cities such as Chittagong, Sylhet, Barisal, Khulna, Rajshahi, Rangpur and Mymensing. These highways should be developed into six-lane highways by 2035 and should have two-tiered access controlled layout configuration for segregating mobility and accessibility functions.

3. **Service Lanes:** In order to improve transport efficiency and enhancement of safety, all National Highways need to have service lanes to cater to the requirements of local (both motorised and non-motorised) traffic so as to bring in an element of partial access control on such facilities. Provision of wayside amenities along the highways is becoming an integral part of the road projects. Such facilities should be provided by the private sector.

4. **Axle Load Control:** Strict axle load control policy is needed to reduce road damages caused by overloading. In this respect, besides installation of weighing stations, another good strategy could be immediate stopping of vehicle size increasing or modification practice that is commonly followed by the truck owners, and is recognized as one of the main source of overloading problem. The overloading and drainage issues should be addressed seriously to prevent quick erosion of costly road investments.

5. **High-Speed Mobility Facility:** Focus needs to be given to develop quality infrastructures with hallmark attribute of high-speed mobility facilities. Target should be 80-110 km/ph for important highway corridors, which is now operating merely at 25-35 km/ph. It is worth to note here that though we have so far been trying to develop very capital-intensive quality infrastructures structurally, unfortunately we have not been getting the required mobility mainly due to poor operational condition of the structures. As such, strategically main investment emphasis should be given to build necessary access control infrastructures as well as to enforce policies for controlling roadside land use development and conflicting usages of right of way (r.o.w.) throughout the transport corridor.

6. **Bypasses:** While preparing projects for capacity augmentation, the need arises for planning of bypasses around towns to ensure smooth movement of through traffic. In most cases, these bypasses also serve as vehicle for development of the town along or on the other side of the bypass. Therefore, the alignment for such bypasses

should be planned jointly by the road agency and the urban development agency. Further, these bypasses should be planned and provided as access-controlled expressway type facilities with entry/exit at predetermined locations.

Establishing Connectivity

7. **Economic Zones and Corridors:** About 100 Special Economic Zones (EZs) have been set up throughout the country while work is in progress for planning and development of Economic Corridors (EC). These zones and corridors will require road connectivity both within the various lands they are developed over, and also to the rail and road network more generally. These green field roads must necessarily be built well in advance of actual demand.

8. **Connectivity to ports, airports, tourism areas, power plants, etc.:** The efficacy of airports, and especially of ports, is greatly diminished when the quality of the connecting road network is poor. It is important to ensure that each major port has at least four-lane road connectivity. Special needs of connectivity to ports, airports, mining areas, tourism areas and development of power plants should be given special attention in development of the road programmes. In certain cases of power plants, movement of Over Dimensioned Cargos (ODCs) will be involved and this will require advance planning particularly for strengthening of bridges involved.

9. **Container Freight Stations and Railway Stations:** Similarly, there is a need to ensure good connectivity by road to railway stations and container freight stations while formulating plans for development of road network in cities and towns.

10. **Inland Waterways and Water Fronts:** Another area that requires attention would be the road connectivity to identified water fronts on the inland waterway network to facilitate smooth cargo entry to and evacuation from the IWT terminal stations.

Creating Highway Facilities:

11. A well-developed road network is also one that is easy and comfortable to use. Depending on traffic volumes, roads should variously offer opportunities for rest breaks, refuelling and meal purchase. Each of these can also be expected to contribute to the overall safety of the network by preventing driver fatigue and timely assistance to vehicle breakdowns. Facilities like parking lots, drinking water stations, snack bars and restaurants, rest rooms, kiosks, information facilities, petrol pumps with service and repair facilities and communication systems should be developed.

Upgrading Regional Highways:

12. For these roads also, the focus should be on consolidating the existing network, with minimal expansion as needed, due to economic and geographic considerations. The program for development of regional highways may comprise schemes of capacity augmentation by two laning, four laning, construction and rehabilitation of bridges, bypasses, replacement of railway crossings and safety engineering measures. When developing these highways, priority ought to be given to:

- Providing links to minor ports, special economic zones, industrial towns, and tourist centres
- Connecting remaining towns (not yet connected) with population exceeding 5,000
- Connecting remaining Upazila/District headquarters (not yet connected) with national capital
- Construction of missing bridges and reconstruction/widening of existing weak and narrow bridges

Upgrading Zila and Upazila Roads:

13. These roads run within the districts connecting areas of production with markets and serve as connecting links between rural roads and the primary road network and are thus equally vital for agricultural and industrial development of the landscape. However, these roads have not received the desired level of attention and investments in the past. This gap has to be filled to ensure balanced development of all classes of roads and in all parts of the country. Here too, the strategyshould be on consolidation of the road network. Currently, these roads are mostly single-lane with weak road pavement and bridges that are in need of immediate strengthening. A large percentage of these roads are reported to be in bad shape. The situation is further aggravated due to movement of overloaded vehicles. Therefore, the stress should be to accelerate the programme of widening of these roads to regular two lanes, including bridges, and provision of rail over/under bridges on heavily trafficked stretches. Priorities may be governed by the traffic—current and projected. Some limited stretches may be requiring four-laning also in later years depending upon the traffic growth witnessed.

Strengthening Village Roads:

14. For the vast majority of villages, the village road is the only avenue in and out for people, animals and goods. By connecting the village with a district road or highway, the rural road provides faster and better access to markets for the agricultural output of the hinterland, and provides access to social infrastructure including a wider array of education, employment and healthcare opportunities. These roads can stay as single-lane roads in view of low volume of traffic likely to prevail. However, some roads under this category could witness volumes that may justify widening to intermediate or two lanes.

Ensuring Road Safety

15. The issue of road safety is of major concern for policy makers in view of the rapid rise in accident related deaths on roads in recent years. The average number of accident related deaths has been estimated as 57 per 10 thousand vehicles by Mahmud et al. (2013). If the number remains more or less the same the number of fatalities will continue to increase with the increase in traffic volume. Road safety is, therefore, increasingly being recognized as a priority national agenda. Significant reduction in the number of road accidents and casualties is possible by implementing an effective and coordinated safety policy and actions. The 7th National Road Safety Strategic

Action Plan (2014-2016) identifies nine priority sectors for improvement. These are: i) planning, management and coordination ii) accident data system iii) road safety engineering iv) road and traffic legislation v) traffic enforcement vi) driver training and testing vii) vehicle safety viii) road safety education and publicity and ix) medical services for road accident victims. The objective of the action plan is to achieve 50% reduction in road accident fatalities within next 10 years and to reduce the number of road accidents by 30%. Road safety engineering, however, assumes special significance and should focus on geometric standard, intersection design, grade separation, access control on highways, pedestrian facilities, regular maintenance and adoption of road safety audit approach. Special importance should also be given on integrating different organizations both at public and private sectors, civil societies, communities and individuals towards identifying their specific roles and responsibilities and thereby developing effective measures to tackle road safety problems in Bangladesh.

8.2.2 Strategy for Railway Development

To sustain the pace of economic growth, Bangladesh needs an efficient and sustainable transport infrastructure. Rapid urbanization, rising per capita income and the ongoing structural transformation of the economy would give rise to increased demand for travel in general and high-speed, high-quality of rail travel in particular. This represents good opportunity which Bangladesh Railway (BR) can seize by easing capacity constraints, upgrading speeds, and improving quality of service and reengineering the business for sustained viability. BR can also play a critical role in integrating markets and connecting communities throughout the length and breadth of the country and in transportation of passengers and freight. It is uniquely placed to serve the needs of the rapidly expanding and modernizing Bangladesh economy and meet the aspirations of the country.

Strategic Plan

A strategic planning process would need to be institutionalized taking a forward view over the next 25 years. It shall comprise a multi-year investment plan fully supported by a credible funding plan. The plan must provide for the following as envisaged in the Railway Master Plan (2013):

- Augmentation of supply (more trains and longer trains) to ensure full satisfaction of demand.
- Upgradation of speeds up to 200 Km/ph on the identified corridors.
- Redevelopment of stations for smooth flow and comfortable experience of passengers as also to ensure clean and hygienic environment.
- Redesign of coaches to enhance travel comfort.
- Lower port turnaround, loading and unloading times
- Competitive pricing
- Increased capacity on key corridors
- Increase new train service

- Development of new Inland Container Depots
- Development of Rahway Links with all ports including proposed Deep Sea
- Improved custom clearance arrangements
- Quality transfer facilities to road transport
- BR to act as a multi-modal transport (MMT) operator

Developing Railway Corridors

Based on an analysis of railway traffic, the commodity carried, their volume and origin-destination revealed that most passenger and freight movement takes place on a limited number of key corridors. BR identified these nine corridors in its Master Plan which account for about 90% of all traffic movement. These corridors are as follows:

- Corridor 1: Dhaka – Chittagong –- Cox's Bazar – Deep sea port
- Corridor 2: Chilahati – Ishurdi – Khulna – Mongla
- Corridor 3: Dhaka – Bangabandhu Bridge – Darsana/Benapole
- Corridor 4A: Dhaka – Bangabandhu Bridge – Rajshahi – Rohanpur
  4B: Dhaka – Bangabandhu Bridge – Ishurdi – Parbatipur-Chilahati/Biro
- Corridor 5: Dhaka – Sylhet/Shahbazpur
- Corridor 6: Dhaka – Bangabandhu Bridge– Sirajganj/Roypur(Jamtoil) – Burimari
- Corridor 7A: Dhaka – Mawa – Bhanga – Jessore – Khulna – Mongla
  7B: Dhaka – Mawa – Bhanga – Jessore – Benapole
  7C: Dhaka – Mawa – Bhanga – Barisal
  7D: Dhaka – Mawa – Bhanga – Kashiani – Gopalganj – Tungipara
- Corridor 8A: Dhaka – Mymensingh – Jamalpur – Tarakandi- Bangabandhu Bridge
  8B: Dhaka – Bhairab Bazar – Mymensingh
- Corridor 9A: Dhaka – Mawa – Jajira – Rajbari – Moukuri (Mizanpur) – Pabna – Ishurdi
  9B: Dhaka – Paturia – Douladia - Moukuri (Mizanpur) – Pabna – Ishurdi

Development of these corridors would require infrastructural interventions that would be necessary to attract long-distance passenger and freight traffic. In this regard Investment should be focused on total capacity creation including rolling stock, asset renewal, technology induction, Information Technology and investments in modernization etc.

High-Speed Rail in Selected Corridors

Some of these corridors, especially those connecting the capital city Dhaka with the regional cities- Chittagong, Sylhet, Barisal, Khulna, Rajshahi, Rangpur and Mymensing should have provision for high-speed rail. For maximizing benefits there should be segregation of freight and passenger lines in these corridors and passenger lines should have provision of speed between 160 to 200 km/ph. Dhaka-Chittagong corridor should have the potential to raise speed upto 350 km/ph similar to bullet trains in Japan.

Gauge Rationalization

Bangladesh Railway network consists of MG (64%) and BG (24%) lines and newly introduced Dual Gauge (DG) (12%) lines. So, it is obvious that uniformity in Gauge rationalisation leading to uniform gauge across the whole country must be one of top priority development activities of Bangladesh Railway. Considering both passenger and freight traffic carrying capacity, future national and regional connectivity requirement, and taking into account the connectivity issue of neighbouring countries, Bangladesh Railway must convert its network into Broad Gauge all over the country. Though this conversion will require a huge amount of investment for replacing the track, rolling stocks and ancillary facilities, but phase-wise conversion will be feasible and in next 25 years this can be accomplished.

Maintenance and rehabilitation of infrastructure

Highest priority must be given to ensure unconstrained maintenance of the existing infrastructure. A substantial portion of the Annual Development Programme (ADP) in the early years needs to be targeted at track rehabilitation and signalling to improve safety and reliability. Adequate resources for maintenance need to be guaranteed annually for the strategic corridors for improving the quality and reliability of service and thus competing effectively with road transport. Programme for outsourcing maintenance will be encouraged. In this respect, training of supervisor and labour gang would be required.

Marketing and Business Plan

Strategic plan also must include a marketing and business plan listing sequential steps on gaining market share in bulk and non-bulk cargo segments by providing mix of cost efficient services and premium value added service.

8.2.3 Strategy for Developing Inland Water Transport

The geography of Bangladesh connects almost all 64 districts to each other by an inter-connected system of major and minor rivers. The major rivers in turn provide a convenient access to sea. This massive internet of water connectivity if properly harnessed and nurtured can provide a major development advantage for Bangladesh. In recent years, given the rapid GDP growth and associated demand for passenger and cargo services along with constraints in developing road and railway transport (owing to land and financial scarcity), the prospects for inland waterway look brighter. There is now a growing appreciation that with proper investments, policies, regulations and institutional development the IWT can be a major low-cost transport alternative to the high-cost of land transport. The positive effects of this strategy for income, employment and poverty reduction are large,

IWT has the potential to become a major actor in the transport of container between Dhaka and Chittagong. With the strong growth of container traffic in the port of Chittagong, the port throughput will soon reach one million TEUs per year. At present, railways are congested and the road does not have the bearing capacity to carry container trailers. The government has already taken steps to promote container transport by IWT. ICD has already been developed near Dhaka jointly by BIWTA and the Chittagong Port Authority

(CPA). BIWTC is also acquiring two 100-TEU container vessels. While the Government may continue to play a role in the future development of IWT infrastructure, further development of container transport by IWT should be left to the private sector.

Development of adequate depth (LAD):

Efforts should be made to develop deeper stretches of the rivers for IWT/navigational purposes (at least 2.5 m, preferably 3.0 m LAD) for round the year navigation. Given that the available draft in the waterways is low, the appropriate strategy would be to focus on development and maintenance of the waterways linking three maritime ports, Chittagong and Mongla, and Dhaka/Narayanganj area and routes under Bangladesh-India Protocol on IWT. The river corridors between Dhaka and Chittagong and between Dhaka and Ashuganj (with extensions to Narayanganj and Barisal) are identified as high priority routes for domestic trade and bilateral trade with India. About 80% of country's IWT is routed through these corridors and daily about 200,000 passengers use these routes. Inland river terminals at Dhaka, Narayanganj, Chandpur and Barisal along these routes play very important role in transporting and handling passenger and cargo.

Morphological and hydraulic problems of inland waterways demand maintenance and improvement strategies and methods. Development of shoals in navigable waterways need to be monitored regularly by sounding followed by dredging of fairways and where feasible by application of river training. For this financial and logistics resources are required. Logistics resources include hydrographic survey equipment and apparatus and dredging apparatus. Proper maintenance and development of navigability in waterways management and functions involve the following: i) Hydrographic survey; ii) Dredging; iii) Bandalling; iv) Aids to navigation; and v) Pilotage and dissemination of navigational information. Large scale investment is needed for Capital Dredging Project in all major rivers for sustainable river management through extensive dredging programs to control river bed siltation and aggradations, reclaim land, and improve inland navigation. Network development and dredging strategy should be

prepared in line with the National Water Management Plan. It will be justified to provide more resources for the development and maintenance of waterways. The new dredging strategy should coordinate and integrate programs of BIWTA and Water Development Board.

Modal integration:

IWT has to be integrated with other transport modes. Due to lack of appropriate intermodal distribution system of containers, further traffic growth is restricted. Road, inland waterways and rail are components of surface transport sector of Bangladesh. Coordination and connectivity among these modes could provide a multimodal transport system to establish an uninterrupted transport chain for door to door services.

IWT terminals need to have sufficient connectivity with road and preferably with rail for last mile connectivity, on lines of bi-modal and tri-modal concept of developed waterways of other countries. Steps should be taken to set up terminals and cargo handling facilities at strategic locations and provide adequate connectivity to road and rail. Provide support at concessional terms for setting up cargo handling facilities and for the acquisition of vessels

Identification of potential multimodal corridors:

This requires detailed mapping of waterways and industrial clusters and analysis of origin and destination cargo to undertake development of suitable waterways as well as multimodal transport hubs in IWT Corridors. In many stretches, IWT and coastal shipping operations could be integrated to accommodate hinterland, coastal and international traffic.

Development of IWT feeder routes:

There is need to develop the feeder routes to National waterways so that the entire channel can be developed on the 'fish bone structure'. Class-II: Routes (IWT Master Plan) in the north-west and north-east with a total length of 1,000km and Class-III:Routes in the south-west/central region with a total length of 1,885km can be used for this purpose.

Improving IWT Safety Standards

Navigational safety is an important issue for the development of IWT. Boosting the role of IWT will depend significantly on better safety standards and track record. In the light of the National Integrated Multimodal Transport Policy (NIMTP) following measures should be taken to improve safety in Inland waterway sector :

- Set up Deck Engine Personnel Training Center (DEPTC) for training of engine and deck hands;
- Ensure that water vessels are designed and built following correct design through modernization of design checking and involvement of naval architects;
- Reform and improve of vessel registration system;
- Improve regulations and enforcement to prevent overloading of vessels;
- Ensure that vessels are provided with sufficient life saving devices;
- Ensure adequate vertical clearance in inland waterways for safe passage of vessels and providing Low Tension Lines and High Tension Lines to safe heights;
- Ensure addition of necessary equipment including Differential Global Positioning System to use electronic hydrographic chart;
- Ensure use of Digital Mobile Radio and wireless technology to ensure uninterrupted communication from bank to bank, vessel to bank and vessel to vessel; and
- Strengthen marine guards/marine police and establishing police station for waterways to ensure security of passengers and freight.

Improving IWT Governance

Poor governance of the IWT sector stands in the way of proper implementation of the policies of the government. So, in order to improve safety, the governance has to be improved significantly, involving implementation of the above regulations and better management of the sector. Furthermore, there should be clear guidelines and their implementation with regards to approval of ship design, construction of inland ships, issuance of registration and survey certificates in favor of inland ships, port management, enforcing rules and regulations of navigation and issue of competency certificates to master and engine drivers.

Poor inter-departmental coordination is also a major problem for better functioning of the system. Currently, approval of ship design, supervision of construction of inland ships, issue of registration and periodical fitness survey certificates, awarding competency certificates to members of crew and enforcing rules and regulations are responsibilities of DOS. BIWTA is responsible for providing services to users. Inland ports and landing stations are administered by BIWTA. Actual handling operations are performed by the lessees appointed by BIWTA. These processes should be streamlined through better coordination among various departments of the concerned ministry.

Involving Private Sector in IWT Development

Involvement of the private sector is essential for development of IWT. Steps should be taken to ensure participation of the private sector in the field of port management and operations, development of IWT infrastructure, dredging and maintenance of waterways, mechanization of cargo handling, development of inland container terminals and container traffic in the waterways. To this end, new guidelines and procedures should be prepared. The existing lease arrangement should be replaced by a mid-term and long-term concession arrangement to private stevedores and terminal operators to encourage investment for better services to users and maintenance of facilities. Infrastructure at commercially attractive places should be developed and operated by private sectors or on a PPP basis. BIWTA should continue to develop landing stations in rural and coastal areas. Installation of navigation aids and maintenance in core waterways should be awarded to private sector. Pilotage service should also be awarded to private sector. Appropriate support should be given to private sector for construction of inland container terminals for container traffic.

8.2.4 Strategy for Aviation Sector Development

Air transport is a vital element of the country's transport infrastructure. Its contribution to the the process of development in terms of enhancing productivity and efficiency in the movement of goods and services, facilitating the growth of business, trade and tourism and generating employment opportunities directly and indirectly can hardly be over-emphasized. In fact Civil Aviation is a key infrastructure sector that facilitates rapid growth of international trade by offering a reliable and faster mode of transport services to move products and personnel across long distances. Countries with higher connectivity in general are stated to be more successful at attracting Foreign Direct Investment. This underlines the need for developing a viable aviation industry that is vital for the future growth in foreign trade and investment.

It has already been mentioned that Bangladesh has been experiencing tremendous increase in air passengers, both domestic and international in recent years. Air freight movement has also increased quite significantly during the last ten years. Responding to this surge in air passenger and cargo traffic would require significant investments in terms of construction of new airports, expansion and modernization of existing airports, improvement in connecting infrastructure (road, metro, sea link, etc.) and better airspace management. Following strategies are recommended to deal with the emerging situation in the aviation sector:

Building New Airports

The Hajrat Shahjalal International Airport at Dhaka through which 80% of the total air traffic flow take place is undergoing expansion for facilitating movement of growing number of passengers. But the number of passengers in this airport will reach saturation point by 2026. A new green field airport will have to be created to address the needs of the projected number of passengers beyond 2026. The government has already planned the construction of a new airport with most modern facilities away from the capital. This airport should t have a capacity of handling 80 – 100 million passengers and 5 – 6 million tons of cargo annually at full development stage to deal with projected passenger and freight traffic in 2041 and beyond.

Upgrading and Modernising Existing Airports

Existing international and domestic airports must undergo massive development to handle the situation arising out of expected surge in air traffic during the next decade. Some development activities are, however, going on to upgrade three international airports and two domestic airport (Cox's Bazar and Saidpur). Augmented capacity of these airports would reach the point of saturation in about ten years. In order to cater to the needs of the passenger and freight traffic beyond 2026 further improvement would be required to:

- Create additional runways and taxiways
- Augment gate and apron capacity to accommodate more aircraft;
- Increase terminal capacity to accommodate more passengers;
- Improve ground traffic management and ancillary aviation processes to ensure quick aircraft turnarounds.
- Improve air traffic and air space management practices, and new radar technology
- Provide complementary services such as fuel supply, passenger and luggage handling, warehousing, workshop facilities, hangars etc.

Upgrading Non-Operational air-strips:

Non-operational air strips need to be upgraded in places of economic significance such as ports, tourist places and industrial clusters. These need to be done at the lowest possible cost without compromising on safety. The air-strip may attract a small number of flights initially and if it has a strong business case, it may ultimately lead to full scale operations in future, with significant benefits to the local economy.

Connectivity to the Airports

Good land transport networks should be available to quickly distribute passenger and cargo traffic to and from the region served by an airport. The great advantages of air travel in terms of the savings in time that it offers will diminish if the air network does not cohere well with land-based transport. This is especially true for time-sensitive cargo. There is therefore a need for effective coordination between road development agencies with the Railway authorities to enable seamless intermodal connectivity for passengers and cargo to and from the airports.

Specialised Cargo Terminal

Surge in air freight is expected in future. This would necessitate investment in specialised cargo terminal and equipment for carrying out cargo operations in the airports, especially the international airports. There is also a pressing need to augment Off-Airport cargo processing facilities on the lines of Container Freight Stations/ICD so that congestion and delays in cargo terminals at airports can be reduced. This would require investment for upgrading/expansion of capacity and modernization of processes in the airports. Good performance of air cargo terminal would obviously enhance the image of Bangladesh as a reliable supplier in the international market.

Air Navigation Services (ANS)

Constant upgrading of the systems and equipment that are the part of the Air Navigation Services is needed for building seamless air space with augmented capacity and safety. Broadly, it involves deployment of equipment relating to CNS (Communication Navigation and Surveillance) and Air Traffic Management Systems. For enhancing capacity and safety levels in the face of higher air traffic movements in future ANS infrastructure should move towards greater integration and automation with implementation of state-of-the-art technologies.

Maintenance, Repair and Overhaul (MRO)

Expected rapid growth of aviation in Bangladesh underlines the need to encourage MRO infrastructure to support the growth in the sector. Low cost carriers would also prefer servicing of aircrafts locally to save cost and time in a highly competitive market. For proper maintenance of aircraft, adequate facilities are needed which include trained personnel, tools, equipment, spares, consumables and proper working conditions. Increased requirement for maintenance of aircraft would need additional hangar spaces, engine run-up areas, rest facilities maintenance personnel etc. MRO zones can be created with working environments which are conducive to proper maintenance. Particular effort is also needed to encourage component overhaul facilities

Human Resource Development

Human resource development is a vital element and should not be overlooked. A well-functioning airport infrastructure in future will require a well-trained workforce to operate it--one that integrates effectively the management of airport and safety systems. The Civil Aviation Authority, therefore, should focus on augmenting skilled manpower including adequate number of air traffic controllers (ATC). Unless concerted efforts are made to develop and retain adequate number of skilled manpower, sustaining the air traffic growth without having safety implications will be extremely difficult. Training facilities should be developed both in the public and private sectors for various categories of aviation personal including pilots, engineers, ground staff, cabin crew, and aviation management specialists. Creation of simulator training facilities both for flying and maintenance training will help airlines to carry out meaningful skill tests within the country.

Private Sector Participation in Airport Development

In view of the requirements of huge investments for building new airports and upgrading existing ones participation of the private sector in such activities should be encouraged. The objective should be to create an investment climate to facilitate time bound creation of world-class infrastructure to cater to the growing demand for air traffic. Policy should be formulated for private sector participation in creation, operation and management of airports through induction of private capital and management skills. PPP model that facilitates flow of loans from banks and financial institutions should be adopted.

8.2.5 Strategy for Maritime Port Development

Bangladesh has been striving hard to emerge as a modern economy. The Government is committed to ensure that the economy grows at 7 to 10% or more per year in a sustained manner over the next 25 years. The international sea borne traffic in maritime ports is growing faster than the GDP growth in Bangladesh, the growth of tonnage is 10%per annum while the growth of container traffic is 12% per annum. In order to realize this growth potential, and to become globally competitive, utmost importance should be placed on the development of physical infrastructure like roads, airports, seaports, railways in general and Port Sector in particular.

Challenges ahead for the Ports

In order to meet the challenges resulting from intense global competition, advancement in Information & Communication Technology, technological changes in shipping and related sectors coupled with stiff demands from trade, ports in Bangladesh, especially the Chittagong and Mongla Ports are required to gear-up themselves by modernizing the port infrastructure, enhancing the quality of service and increasing the productivity level at par with International standards. Particular attention should be given to the following:

Immediate Requirements

- Each Port should pay more attention in improvement of productivity – both ship berth-day and gang-shift output further through modernisation, induction of more sophisticated equipment in handling cargo, etc.
- Handling operations in selected areas may gradually be outsourced / privatised for injecting more competition and increasing output.
- Efforts should be made for full mechanization of cargo handling operation and movement in Major Ports
- Development of adequate storage area in the Ports
- Allied infrastructure being more vital and the same may be encouraged, if needed be, through private participation for operation.
- All out efforts should be made to reduce Pre-berthing Detention and improve Turn Round Time of vessels through minimization of both Port and non-Port related factors.

Dredging

- The draft in most of our ports is not adequate for dealing with bigger ships, the use of which is an important component of reducing costs. Deepening of selected ports and also intermediate off-loading terminals offer solutions that should be carried forward in the course of the Perspective Plan. The pace of dredging has been inadequate and needs to be greatly expanded.
- The capacity for dredging of ports in the private sector needs to be further augmented and full operational flexibility given to the ports to use it. While capital dredging of ports will lead to further deepening and larger size ships will be able to use the ports, maintenance dredging will ensure a continued efficient operation of current port capacity.

Container transportation

With the world entering the information age and with the globalisation of the world economy and trade, container transportation, as one of today's most advanced cargo transportation modes is growing rapidly. In order to be able to stay abreast with the globalization of the world economy and meet the transportation requirements of foreign trade, it is a matter of great urgency to construct deep water container hub port. Access to the existing major container handling ports is limited by the depth of water of the approach channels restricting calling of large container vessels. Main line container vessels are progressively getting larger and faster. Today's large container vessels draw 14.5 meters draft and move at speeds of 25 knots. To accommodate such vessels, container hub port must have access channels of sufficient depth i.e. draft of 17 metres, along with advanced and highly efficient terminal facilities and large cranes.

Connectivity

Another constraint that has emerged is the lack of capacity / availability of rail and road networks linking ports. Connectivity projects should be identified on a priority basis and implemented using private participation wherever possible. In such cases the projects will need to be facilitated including in the matter of land acquisition.

Rail Transportation

Port traffic within Bangladesh is carried largely by railways and road transport. Alternative modes such as inland waterways have remained largely undeveloped and the situation is unlikely to change substantially in the medium term.

The main reason for the railways declining share has been inadequate investments in capacity, particularly for freight, the poor quality of service and slow response to various segments of the growing freight demand. The non-availability of wagons, even when line capacity is available is a common problem hurting both bulk and containerized cargo.

- Ministry of Railways should undertake the construction of a Dedicated Freight Corridor (DFC) between Dhaka and Chittagong. It will be a high speed rail connection with multi modal linkages. The focus of the DFC is to ensure high impact developments on either side of alignment of DFC. Feeder lines to DFC from the ports need to be planned /carried out by Railways to compliment the capacity and efficiency of DFC.

- A coordinating body should be created jointly by three public sector organizations- Roads and Highways Department, Bangladesh Railway and the Department of Shipping for providing integrated transport services as an integrated entity. Such an entity should be able to resolve the problems in ensuring seamless movement of cargo, and to provide an 'end-to-end transport solution."

Road Transportation

Road transport is now the predominant mode of inland transport for port cargo. As the economy grows and diversifies into higher value manufacturing goods the option of road transport share of port traffic will grow. The other factor favoring road transport is the convenience of door-to-door transport for high value goods which are increasing as trade in finished and intermediate goods increases. For developing hinterland connectivity and improving the efficiency of services to shippers, following facilities should be ensured

- Each Major port should have at least four lane road connectivity and double line rail connectivity.
- Roads and Highways Authority should undertake port connectivity (less than 50 km) projects on a BOT basis, and hinterland connectivity highway projects on a BOT basis where possible.

Inland Water Transportation

Steps should be taken to:

- Provide better connectivity with other modes of transport
- Develop all BIWTA terminals with passenger transfer infrastructure
- Construct more inland container terminal (ICT) at strategic locations
- Provide fairway with 3m/2m/1.5m depth in core river network to make it fully functional
- Provide fixed and floating terminals with access and egress by road/rail.
- Develop facilities for day and night navigation; and
- Dredgers/vessels for channel development works

Modernization of Ports

The potential for increasing output performance and handling capacity through the introduction of improved handling techniques varies by cargo type. In addition to modernisation of existing port facilities, new operational procedures and practices need to be developed coupled with simplified documentation and communication/information systems.

Mechanisation of Cargo Handling

Modern cargo handling techniques must be introduced to improve port performance in the Major ports, particularly in the dry bulk cargo, conventional and unitized general cargo trades. There must be a greater dependence on the use of mechanical plant and equipment in cargo handling activities, which will speed up operations and make better use of storage

space and other resources. These actions should be accompanied by new regulations, tariff amendments and other policies to induce ship owners to deploy modern vessels equipped with appropriate lifting equipment on the major shipping routes. Ship owners should also be encouraged to use advanced cargo handling techniques and make the most efficient use of berths and other facilities through appropriate regulations and effective tariffs.

Information and Communication Technology (ICT)

Ports deal with a wide range of activities like movement of ships, passengers, cargo/ containers through different modes of transport, loading and unloading of ships and interaction/clearance from different statutory bodies and port users. In addition, allocation and management of physical resources like berths, anchorages, channels, tugs, equipment (both port-owned and private), warehouses, storage space, human resources, etc. are also to be considered. Therefore, management of a port involves efficient deployment and utilization of all resources, backed-up by timely and accurate information, which can be successfully achieved only by efficient deployment of state-of-the-art Information Technology.

Computerization at the Ports

Ports are now rapidly moving towards application of state-of the-art technology / internet to implement integrated Port Operations System and to move towards paperless regime so as to reduce dwell time as also transaction cost to the users. The major areas where such automation is aimed at, include :

- *Vessel Traffic Management System (VTMS)*
- *Information Technology in Scientific Application, the Cargo/Container handling operations and non-operation areas*
- *Surveillance System and Safety & Security System*
- *Electronic Commerce (EC)/Electronic Data Interchange (EDI)*

8.2.6 Strategies for Urban Transport Development

The strategy for urban transport should aim at improving transport and traffic infrastructure so as to meet existing and potential demands, and developing an integrated and balanced system in which all modes (motorized and non-motorized) can perform efficiently and each mode can fulfil its appropriate role in the system. The main objective of urban transport strategy will be to support sustainable urban development. Urban transportation strategies will focus on developing an integrated and balanced transportation system taking into consideration the needs of the road system, non-motorized transport, public passenger transport and mass transit issues such as a city's balance in the locations of employment and housing, demand management, and the roles for the public and private sectors.

Developing Public Transport Alternatives

Provision of rail-based mass rapid transit (R-MRT)

Rail-based mass transit systems should be considered as parts of a long-term integrated transport strategy for Dhaka and Chittagong Metropolitan Areas. A wide spectrum of urban public transport modes (including metros, suburban railways, and light rail transit) that either use fixed tracks or have exclusive and segregated use of potentially common-user roadways (World Bank 2002) come under this category. Operating capacity and performance of these modes are better than road-based public transport (such as buses, taxis, and paratransit). Metro is the most expensive form of mass rapid transport per kilometre, but has the highest theoretical capacity. Metros can be elevated, underground or a combination of both depending on density of development in the urban area. Implementation of a metro rail project is going on in Dhaka. Chittagong City also needs a metro system to deal with its traffic congestion.

Provision of Bus Rapid Transit (BRT)

Bus Rapid Transit (BRT) is a system that is characterized by dedicated lanes for rapid movement of buses. The extent of dedicated infrastructure and the level of sophistication of different systems vary considerably depending on the technology used. Well-planned BRTs have high capacities to carry passengers and can provide comfortable, rapid, and low-cost public transport alternatives. Implementation of a BRT system is also going on in Dhaka.Introduction of Rapid Bus Transit through the use of high capacity dedicated bus lanes should also be given due consideration in different Divisional Headquarters to deal with traffic congestion in those cities.

Non-Motorized Transport

Creating special lanes for pedestrians and cyclists

Walking and cycling are viable options by which to meet the basic mobility needs of all groups in a sustainable way. In some higher-income countries (Sweeden, Netherlands, Germany etc.) walking and cycling have become two major modes of non-motorised transport (NMT). Many people also walk or cycle for exercise and pleasure. Pedestrians, cyclists, and cycle rickshaw passengers, generate no air pollution, no greenhouse gases, and little noise pollution. Furthermore, they are more efficient users of scarce road space to combat congestion. Walking is a main way of transport for a significant percentage of urban dwellers including the urban poor, suggesting significant investments in walkways and rearrangements of public space in favour of pedestrians. Bicycles should be considered as forming part and parcel of a long term urban transport solution and therefore investments should be oriented towards this way of transport. Rickshaws will continue to be the main transport mode in small and medium towns in the foreseeable future. Traffic rules and management in these towns, therefore, should focus on rickshaws.

Promoting high efficiency and alternative fuel vehicles

Vehicles that have higher efficiency compared with conventional gasoline and diesel vehicles, and lower emissions need to be promoted in view of the danger of future

energy crisis. Some high efficiency gasoline and diesel vehicles, equipped with emission control devices have fuel efficiency of less than 3 litres per 100 kilometres. Vehicles that run on fuels such as compressed natural gas (CNG), Liquefied petroleum gas (LPG) - methanol (methyl alcohol), denatured ethanol (ethyl alcohol) and other alcohol, Bio-diesel - Electricity (stored in batteries) - Hydrogen (fuel-cell) - Solar Alternative fuels etc. are generally cleaner than gasoline and offers the potential to reduce both regulated and greenhouse gas emissions, reduce the transportation sector's reliance on petroleum, and provide a boost to the alternative fuel vehicle industry.

Intelligent Transportation Systems

The use of intelligent transport systems, or ITS is an important mark of transport development in cities with relatively advanced systems of transportation. The major application areas of ITS technology include electronic road pricing, traffic management, integrated ticketing systems for different public transport modes, and traveller information. Typical applications like en-route traffic information systems using Variable Message Sign (VMS), traffic surveillance and incidence management are quite common, especially for the management of expressways. Intelligent transport systems assist travelers in making informed choices about public transport, telecommuting or driving outside peak hours. They enable commuters to plan their trips and avoid unnecessary journeys and congested routes. They also allow for the better coordination of public transport modes and online timetables, thereby enhancing the operations and services. Common ticketing systems and prepaid cards can make travelling more convenient as well as reduce travel time by facilitating transferring between modes.ITS have also helped to improve safety on highways in many countries. In South Korea, for example, the application of an automatic traffic enforcement on its entire highway network has resulted in a reduction in road traffic crashes significantly. By 2031, all the major cities and the national highway networks of Bangladesh should be brought under Intelligent Transportation Systems.

Strengthening Linkages with Cities and Towns around Metropolitan Areas

Investment should be made to strengthen transportation linkages of metropolitan centers with surrounding urban centers through bus and rail-based commuter services.

Coordinated Development of Land Use and Transportation

Emphasis should also be given to coordinated land-use and transport planning in order to facilitate access to such basic necessities as workplaces and socio-economic facilities. Such development should also emphasize decentralization of job centres and activity areas, and development of multiple centres

9.0 Concluding Remarks: Developing Multimodal Transport

The economic expansion and social development witnessed in Bangladesh since independence was accompanied by rapid growth in transport demand. Much of this growth was met by road transport, which emerged as a dominant mode of transport over the years. Development of a 'Multimodal Transport System' which has now become a major issue in modern sustainable transport development, has particular significance for Bangladesh

with her acute resource scarcity (CPD, 2001). Thus there is an urgent need for an optimum mix of modes and minimization of consumption of resources. In order to improve overall efficiency of transportation systems each mode should be used for what it does best in an overall transport chain. In Bangladesh, each mode of transport operates on its own without any initiative to establish efficient logistic chains between O-D involving different modes as necessary. Thus an integrated system involving different modes, as appropriate from the origin to ultimate destination is needed.

To move towards an integrated transportation system, there is a need in Bangladesh to strengthen legislation and regulation by adopting (i) a multimodal transport act or similar (viz. US, EU countries, India, etc.), (ii) an appropriate pricing regime, and (iii) appropriate regulation of transport services for rail, bus and IWT (covering fair competition, customer protection, safety and service quality, etc.). Resource allocation under the annual development programme (ADP) should be decided based on the role that each mode is expected to perform within the guiding framework of the MMT policy. Transport interventions in urban and national contexts should aim at improving transport and traffic infrastructure so as to meet existing and potential demands, and developing an integrated and balanced system in which all modes can perform efficiently and each mode can fulfill its appropriate role in the system.

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ANNEX-A

BENCHMARKS, MILESTONES AND TARGETS OF SOME MAJOR INDICATORS OF TRANSPORT DEVELOPMENT

Sector	Indicators	Bench Mark	Milestones		Target
Sub-Sector	**Year→**	**2017**	**2020**	**2031**	**2041**
Road	**Increasing Connectivity** Connecting District Headquarters with Dhaka by 4-Lane National Highways (Number) **Enhancing Speed** Creating 6-Lane High-Speed Expressway Corridors (Number)	40	45	55	64
Inland Water Transport (IWT)	**Increasing the Share of IWT** Passenger Traffic (% of total) Freight Traffic (% of total)	8 16	10 18	12 20	15 25
Rail	**Enhancing Speed** Creating High-Speed Railway Corridors (Number)	0	1	3	7
Civil Aviation	**Increasing Capacity** Upgrading Existing Airports and Building a New International Airport to Handle the Following: Passenger Traffic (Million) Freight Traffic (Million M. Ton)	8.48 0.29	13.45 0.46	38.40 1.32	121.70 4.20
Maritime Ports	**Increasing Capacity** Upgrading Existing Ports and Building a Deep-Sea Container Port to Handle the Following: Container Traffic (Million) Cargo (Million M. Ton)	2.11 70.76	3.63 121.71	12.46 416.72	48.20 1611.60
Urban Transport	**Providing Mass Transit Option in cities** Bus Rapid Transit -BRT (Number of cities) Mass Rapid Transit-Metrorail (Number of Cities)	0 0	1 0	3 1	5 2
LPI (WB)	Logistics Performance Index Rank*	87	82	70	40
GCI (WEF)	Global Competitiveness Index**	106	85	70	55
***2017 rank out of 160 countries; **2017 rank out of 137 countries**					

Part-3

Power Sector Strategy for the Perspective Plan

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Power Sector Strategy for the Perspective Plan

I. Introduction and Background

Power shortages became the number one constraint to economic growth during 2005-2009, with no new generation capacity added over almost one decade. For a long period during 2001-2008, due to lack of serious attention and decisive policy actions, no new power plant was installed and older and inefficient gas-based power plants also started to suffer from frequent breakdowns and shortage of gas supply. With a power sector which is almost entirely dependent on natural-gas fired generation, Bangladesh was confronting a simultaneous shortage of natural gas and shortage of electricity generation capacity. Nearly 800 MW of power with fully installed capacity could not be availed from the power plants due to shortage of gas supply. During this 8-year period installed capacity was hovering at 5202 MW and actual peak production was 4130 MW. As the demand for electricity continued to surge with economic activity measured in terms of real GDP growth at 6% or more, power shortage became more acute and load shedding became wide spread. In all forms of indicators such as Doing Business or Global Productivity Index—based on perception surveys of business entrepreneurs—power shortage came out as the number one constraint limiting investment and business operations in Bangladesh. Electricity shortage has high economic costs. The World Bank estimated that load shedding represented a loss of 0.5 percent in GDP and a $1 billion loss in terms of industrial output a year. There are also significant financial and environmental costs of owning generators to compensate for power outages.

The Awami League government which came to power in 2009, made power generation as the number one economic priority of the government by adopting short-, medium- and long-term strategies for the power sector in the context of the Power Sector Master Plan (PSMP) 2010. Because of the government's strong commitment to the power sector, Bangladesh has made commendable progress in electricity generation during the last eight years (2009-2017). According to Bangladesh Power Development Board (PDB), installed generation capacity including captive power as of December 2017 amounted to (13,846+2,200) = 16,046 MW, which was more than 3 times greater than the volume eight years back. More than 80% of households have now access to electricity compared with less than 50% in 2009. As a result, per capita power consumption has doubled to about 450 kWh over this period, but still Bangladesh's per capita power consumption remains one of the lowest among the South Asian countries.

Despite the impressive progress, Bangladesh power sector faces numerous challenges over the long term. The challenges are and will continue to be arising from diverse sources such as:

- Improving efficiency in power sector operations to ensure adequate power supply at affordable and competitive prices and ensure financial sustainability of the major expansion currently underway;
- Diversification of primary fuel for power generation from its continued dependence on natural gas as domestic gas reserves are declining rapidly;

- Projected rapid growth in power demand in line with the projected acceleration of real GDP over the medium and long term and consistent with the government's objective to become an upper middle-income country by FY31 and a high income country by FY41;
- Determination of the optimum production mix (gas, coal, hydro, import of power from regional countries, and renewable sources), taking into account, logistical considerations for handling coal and LNG, potentials for trade in power with regional countries and environmental considerations/commitments; and
- Mobilization of financing for the massive amounts of investment that would be needed to realize the targeted generation capacity expansion and associated transmission and distribution network.

In order to address the challenges in a systematic manner, the government had prepared the Power System Master Plan (PSMP) 2010, and much of the implementation during the Sixth Five Year Plan (covering FY10-14) was in line with the strategy underpinning the PSMP 2010. On the basis of the lessons learned during the Sixth Plan period, the PSMP was revised by the Ministry of Power and the new PSMP 2016 has been adopted by the government. The PSMP 2016 was however prepared by the Ministry of Power before the GDP growth targets for the Perspective Plan FY41 were finalized. Since power sector plays a critical role in supporting economic growth, capacity expansion in power generation and distribution would be critical for realizing the growth targets under the Perspective Plan (PP) FY41. We also believe that the underlying elasticity of growth in power demand with respect to real GDP growth might have been understated in the PSMP 2016. Both these factors appear to have contributed to a much lower demand for power under the PSMP 2016, compared with what we believe would be needed in support of the ambitious growth targets required for Bangladesh to become an upper middle-income country by FY31 and a high-income country by FY41.

The objective of this study is to determine the medium-and long-term energy needs of Bangladesh, from which sources these growing demands are expected to be met, and what should be the strategy to ensure that supply of power grows in line with the demand without becoming a constraint to growth potential of the country. As part of the strategy to meet the power sector challenges, the study will cover size of potential investment requirement in the power sector, the potential financing mix between the public and private sectors, challenges and risks involved in such financing, risk mitigation strategies, etc.

The remainder of the paper covers the following issues. Section II, discussed Bangladesh's recent performance in the power sector and how this performance compares with the Sixth Plan and Seventh Plan targets and also compared with the PSMP 2010. Where Bangladesh currently stands in terms of power tariff, energy mix, infrastructure and logistics for handling coal and LNG, state subsidy and other constraining factors are to be discussed in this section. Power generation targets to support the growth/income objectives envisaged under the PP and the related requirements for investment are discussed in Section III. The following section (Section IV) identifies the key challenges in ensuring primary fuel supply due to the rapid dwindling of natural gas reserves to achieve the PP and PSMP 2016 Objectives. In particular, this section focuses on the prospects for domestic gas supply, logistical and other problems with increased reliance on coal and LNG based power plants.

Section V highlights the key opportunities and challenges in realizing the potential for trade in electricity, investment in regional power generation projects, and trans-national grids in electricity covering the regional countries. The following section (Section VI) covers other emerging long-term challenges and opportunities in non-renewable power generation and nuclear technology. Issues related to mobilization of financing needed for implementation of the power sector objectives under the PP are discussed in Section VII. In particular, this section covers issues related to financing requirements, financing mix, and the role of domestic and international financial institutions. Some concluding observations are provided in the final section (Section VIII).

II. Bangladesh's Recent Performance in the Power Sector

With the rapid growth in electricity generation, per capita consumption of energy has more than doubled and has also helped sustain the rapid GDP growth in Bangladesh in recent years. Supply of electricity was also boosted by alternative solutions such as increased electricity imports from India. Although the installed capacity was a little behind the original PSMP 2010 objective, the tripling of generation capacity within an 8-year period was certainly impressive. Maximum power generation has also almost tripled to 9,500 MW over this period, although the gap between installed capacity and maximum generation has widened significantly over the years. This raises questions about efficient utilization of the installed capacity and consequently the issue of return on capital in the power sector.

Table 1: Power Situation in Bangladesh at a Glance

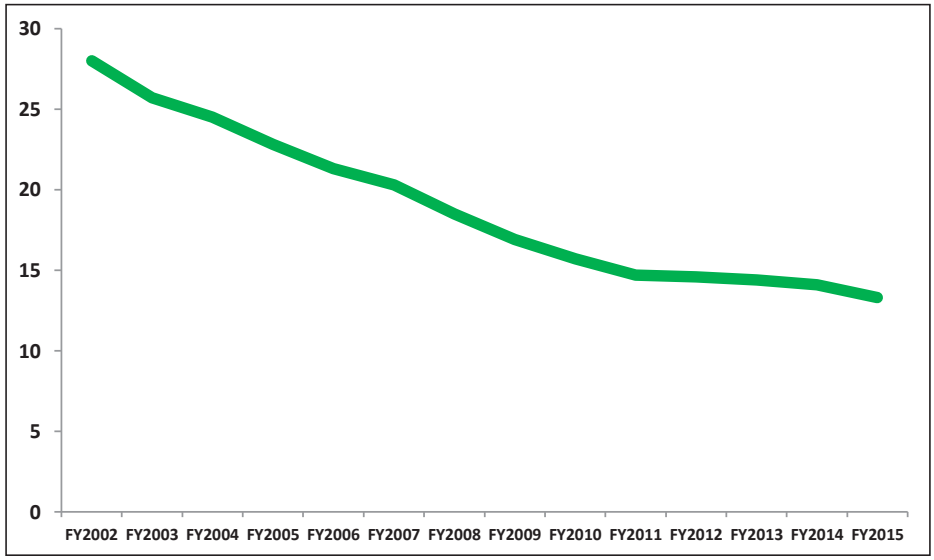
	2009	2017	Achievement (2009-2017)
Installed capacity of electricity (MW)	4942	15829 (with captive power)	+10879
Maximum generation (MW)	3268	9507	+6239
Per-capita electricity generation (kWh)	220	433 (with captive power)	+213
Power Import (MW)	----	660	+660
Access to electricity (% of households)	47	80	+33
System loss (%)	16.85	12.19	-4.66
Total Subsidy (billion Tk.)	25.1	55	+25.1
Average Tariff Rate (Tk. per unit):			
Households (0-400units)	2.8	5.2	+2.4
Commercial	5.77	10.6	+4.83
Small Industries	4.28	8.47	+4.19

Source: Bangladesh Power Development Board (PDB), Power Division

The rapid growth in power generation was also reflected in per capita electricity consumption, which almost doubled to 433 KwH in 2017. Despite this impressive growth in power consumption in per capita terms, Bangladesh's per capita electricity consumption still continues to remain one of the lowest in South Asia and among the developing countries. Access to electricity has also increased with 80% households having access to electricity in 2017 compared with only 47% of households in 2009. At this pace, Bangladesh is firmly on track to achieve its stated objective of providing electricity to every household by 2021. The quality of electricity supply however is still very poor due to poor transmission and distribution networks and frequent load shedding across the country.

Bangladesh also made remarkable efficiency gains in terms of reduction of transmission and distribution (T&D) losses. The T&D losses fell from a high of 32 percent in FY00 to 17 percent in FY2009. It declined further to 12.2 percent in 2017. A part of the T&D loss reflects power leakage, which has been substantially curtailed. Improvements have also been made in reducing the incidence of power outages, increasing the efficiency of billing and collections and reducing the backlog of accounts receivable.

Figure 1: Transmission and Distribution Losses (in percent)



Source: Power Development Board

Progress with transmission and distribution system has also continued under the Sixth Plan and beyond, although much more investment will be needed in this area. Some nine development & renovation projects have already been completed and another five development projects are in progress. The total infrastructure projects that were added to transmission network by the end of Sixth Plan are shown in Table 2.

Table 2: Major Transmission Programs Implemented in the Sixth Plan

Investment Project	Actual Implementation
400kV Transmission Line	154.7 ckt. Km
230kV Transmission Line	381 ckt. Km
132kV Transmission Line	433 ckt. Km
400kV HVDC Station	500 MW
Substations Capacity 132/33kV	2400 MVA
Capacitor Banks installation at Grid substation at 33 level	600 MVAR

Source: Power Division

These impressive gains however did not come without costs to consumers and taxpayers. In particular, electricity tariffs were adjusted upwards repeatedly and despite the tariff increases the budgetary subsidy for electricity generation increased rapidly.

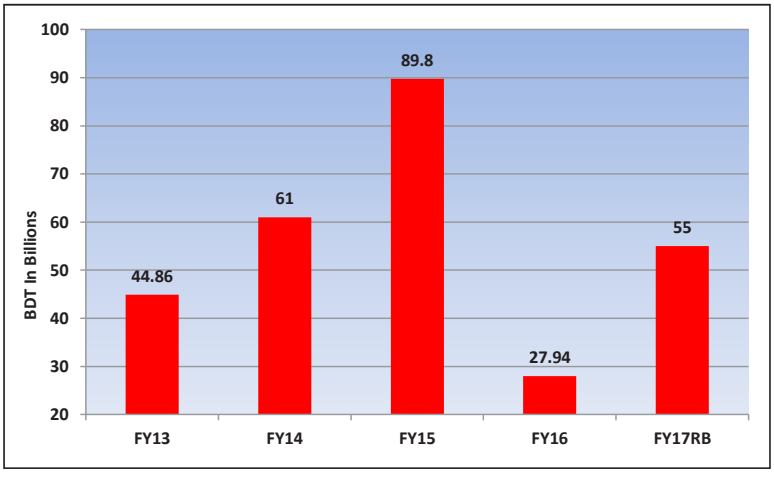
Power Tariff and subsidies

Electricity pricing policy: The establishment of the Bangladesh Energy Regulatory Commission (BERC) in FY04 improved power tariff setting mechanism. Tariffs now get adjusted fairly regularly in accordance with established BERC guidelines. Nevertheless, the gap between the average cost of electricity production and the average selling price remains large, leading to a rapid growth in budgetary subsidy for the power sector.

Electricity subsidy: The average cost of power generation in Bangladesh increased by a galloping 23 percent per annum. BERC responded by increasing the bulk average tariff at regular intervals, but the average selling price of electricity fell significantly short of the average cost of production. The resulting financial losses have created substantial pressure on the national budget **(Figure 2)**, with the electricity subsidy bill increasing from Tk. 44.86 billion in FY13 to a record high level of almost Tk. 90 billion in FY15. However, because of aggressive tariff adjustments and the sharp decline in liquid fuel prices in the world market, the subsidy bill sharply declined to Tk. 26 billion in FY16 and thereafter estimated to have increased to Tk. 55 billion in FY17 primarily due to a partial recovery in liquid fuel prices in the world market and volume growth due to coming on stream of a new liquid-fuel based power plants.

The availability of even flow of electricity is dependent on expensive imported machineries and maintenance equipment. As a result, the government continues to subsidize a significant share of the power tariff in Bangladesh. At present, both implicit and explicit subsidies in electricity transmission and distribution by the government allow the bulk of retail tariff rates to be set below the supply cost of electricity. As a result, the subsidy bill on account of the power sector is likely to continue to remain sizable. The recent decline in international fuel oil prices provided some relief for the Budget. Yet, in view of uncertainties of international oil prices, electricity pricing and subsidy will continue to pose substantial policy challenges during the Seventh Plan.

Figure 2: Power Subsidies and Cash loans (Taka billion)



Source: Ministry of Finance

Developments in electricity tariff structure: Electricity tariffs in all six customer categories have become almost doubled during the last 7 years. With a view to containing the budgetary subsidy in an environment of rapidly growing domestic supply and demand, the government had to raise the electricity tariff rates across the board. The huge supply constraints in electricity generation--along with the rapid increase in power generation through the high cost quick rental power plants using furnace oil (as well as diesel) as the feedstock--has resulted in tariff increases for all categories of consumers (households, businesses and industries) in recent years. Nevertheless, the industrial and commercial sectors pay higher tariffs while domestic and agriculture sectors pay lower subsidized tariffs. Thus, the domestic and agriculture sectors are partially cross-subsidized by the industrial and commercial sectors.

Table 3: Electricity Tariff Increase (March 2010 – December 2017)

Customer Category:	**March 2010** (Per-unit average rate in Tk.)	**December 2017** (Per-unit average rate in Tk.)	**Increase in tariff (%)**
Residential (0-400units)	2.95	5.2	76%
Agriculture	1.93	4	107%
Small Industries	4.6	8.47	95%
Medium Industries (11 KV)	4.9	8.56	103%
Heavy Industries (33 KV)	4.69	8.45	114%
Commercial	6.03	10.6	90%

Source: PDB and DESCO

Bangladesh's average household electricity tariff is now US cents 9.84 (Tk. 8.14) per unit (1 kilowatt-hour), which is US cents 12.5 in India, US cents 15.48 in Nepal, US cents 17.36 per unit and US cents 11.05 per unit in Sri Lanka and in Pakistan respectively, all of which are higher than in Bangladesh, as shown in Table-4.

Table 4: Summary of Electri city Tariff Rates
(Average Unit price in equivaent US cents per Kwh)

Customer	**Industrial**				**Commercial**			**Household**			
Class	**Very Large**	**Large**	**Medium**	**Small**	**Large**	**Medium**	**Small**	**Very Large**	**Large**	**Medium**	**Small**
India	23.87	24.05	23.79	18.18	32.48	34.77	31.47	20.87	13.95	9 .74	5.42
Bangladesh	11.85	12.07	12.23	10.16	12.96	12.46	12.60	11.93	10.08	10.14	7 .22
Nepal	15.95	17.73	18.24	18.88	22.72	23.20	23.52	21.50	19.52	11.20	9.50
Pakistan	13.65	13.65	13.65	10.92	13.65	10.92	14.56	13.65	12.13	10.01	8.42
Sri Lanka	15.28	13.33	13.33	9.43	15.58	17.29	15.28	37.05	20.80	8.45	3.15

Source: DESCO, Public Utility Commission of Sri Lanka, India Power Corporation, Islamabad Electric Supply Company, Nepal Energy Authority

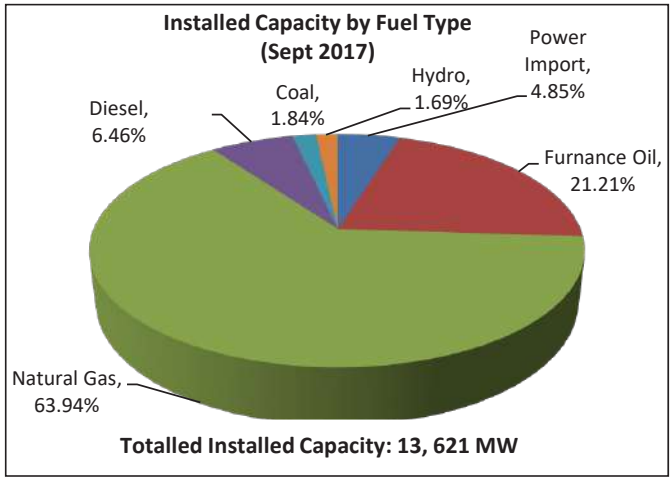
There are many reasons that account for tariff rate differences. The price of power generation depends largely on the type and market price of the fuels used in power generation, level of government subsidies, government and industry regulations including schemes to cross-subsidize the poor households, and even weather patterns. Although Bangladesh used to have the lowest electricity tariff rates with about 85% electricity generation from domestic natural gas in the past, the cost of generation has risen dramatically with the depleting domestic gas reserves and installation of oil-fired rental and quick rental power plants over

the past several years. To provide electricity on an emergency basis, the government signed 3- to 5-year contracts with private suppliers operating diesel or furnace-oil fired 'quick rental' power plants. While these plants came on-line rapidly, use of liquid fuel is always costly and these plants are much less fuel-efficient than large coal or gas-fired power plants.

Energy mix:

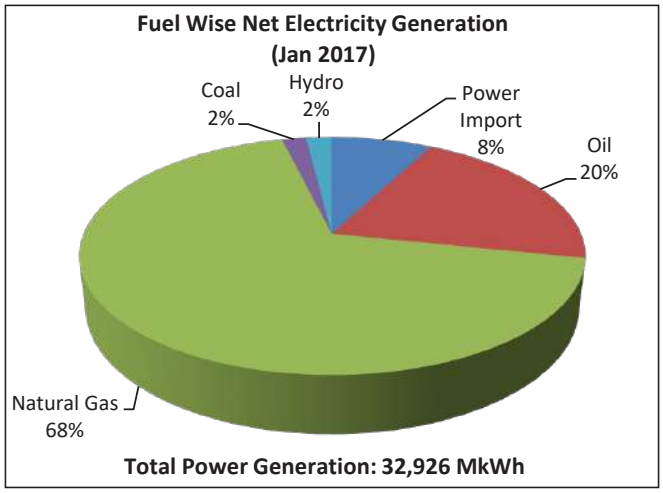
The Government has undertaken lots of activities to improve primary energy mix in electricity generation, thus shifting its reliance on depleting natural gas power plant to various other alternatives.

Figure 3: Installed Capacity by Fuel Type (Sept 2017)



Source: Bangladesh Power Development Board (PDB)

Figure 4: Fuel Wise Net Electricity Generation (Jan 2017)



Source: Bangladesh Economic Review, MoF

Thus, we can see that furnace oil and diesel is accounting for a significant share of power generation in recent years, followed by power import and coal. Additionally, the government has taken various initiatives to enhance installation and power generation from the private sector and from regional power trade.

Table 5: Power Generation and Installed Capacity (2017)

	Public	Private	**Power Import**	**Total**
Installed Capacity (Feb'17)	6985 MW (53%)	5535 MW (42%)	659 MW (5%)	13179MW (100%)
Power Generation (Jan'17)	14817 MkWh (45%)	15475 MkWh (47%)	2634 MkWh (8%)	32926 MkWh (100%)

Source: Bangladesh Economic Review, Mof

At present, the private sector is producing more electricity than the public sector due to inefficiencies and poor productivity in the old public sector power plants. Power trade has also flourished significantly in order to meet the growing electricity consumption. However, there is a huge discrepancy between installed capacity and maximum generation, and the trend is deteriorating.

Table 6: Surplus Capacity (FY2010 – FY2016)

Fiscal Year	**Installed Capacity (derated) (MW)**	**Maximum Generation (MW)**	**Surplus Capacity (MW)**
2009-10	5823	4606	1217
2010-11	7268	4890	2378
2011-12	8716	6066	2650
2012-13	9151	6434	2717
2013-14	10416	7356	3060
2014-15	11534	7817	3717
2015-16	12365	9036	3329

Source: Bangladesh Economic Review, Mof

Although having sufficient generation capacity, actual demand of electricity could not be served to the consumers due to transmission and distribution bottlenecks. The shortage of gas supply and other fuel requirements is another main constraint for not being able to utilize full capacity of power generation. Nevertheless, the power sector reform programs have taken various measures like continuous performance monitoring of the utilities, reforms and target-oriented measures to reduce the system loss. The system loss in both transmission and distribution has come down to 13.10% in FY2015-16 from 15.73% in FY2009-10 mainly because of more private involvement during these years.

Power subsidies:

Since the international prices of crude and refined petroleum products were higher than their domestic selling prices, Bangladesh Petroleum Corporation (BPC) incurred losses until FY15, which used to be covered through government subsidies to pay for import of petroleum products. The amount of subsidies given to BPC by the government to recover from losses is shown below:

Table 7: Government Subsidies to Bangladesh Petroleum Corporation and Power Development Board, FY10—FY17

Fiscal Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-2017 ®
Subsidy to BPC (in billion Tk.)	9	40	85.5	135.5	24.8	6	0	0
Cash loan to PBD (in billion Tk.)	9.9	40	63.6	44.9	61	89.8	27.9	55

Source: Ministry of Finance

However, the sharp reduction of petroleum prices in the international market helped to recover the losses in the recent years, leaving the subsidy figure in FY16 to zero. However, cash loans to PDB, which cover operating costs and essentially amount to subsidy, continued to remain high since FY11.

The fact that actual average generation is far less than the installed capacity, due to constraints in transmission and distribution systems along with inefficiencies resulting from inadequate gas supplies and other irregularities, poses a major problem for financial sustainability of PDB. Addressing the issue of such high unutilized capacity is a way to improve financial position of PDB and also to achieve un-interrupted power supply.

One of the foremost challenges the present government is facing with the power sector is that, despite some progress it is primarily dependent on natural-gas fired generation, which is in short supply. Thus, Bangladesh is confronting a simultaneous shortage of natural gas and electricity. The government decided to diversity the use of primary fuels to coal, nuclear and renewable energy sources. Planning and work on some major large power plants have already been initiated like the two coal-based 1200 MW each power plants with Japanese assistance at Materbari in Chittagong, the Bangladesh-India public sector joint venture 1200 MW coal-based power plant at Rampal near Mongla, and Ruppur nuclear power plant with 2,400 MW capacity with technical, financial, and other support from Russian Federation. Some rehabilitation of old PDB owned power plants are also being done largely by the government sector with financial support from bilateral official and multilateral sources. These developments notwithstanding, public sector alone will not be able to mobilize and implement the massive investment plan and private sector (foreign, domestic and joint venture), would need to finance more than half of the required investment in the power sector in the coming years.

The government has developed short, medium and long-term plans for the power sector. Under the **short-term plan,** Quick Rental Power Plants to produce electricity within 12-24 months have been installed using liquid fuels and natural gas as the primary fuel. In total, 1,653 MW of electricity is generated from quick rental power plants by this time. Some 300-450 MW gas based power plants have also been planned for setting up in Bibiana, Meghnaghat, Ashugonj, Sirajgonj and in Ghorashal. Under the **medium-term plan,** initiatives have been taken to set up larger power plants with a total generation capacity of 11,497 MW. The plants would primarily be gas and oil based. In the **long-term plan,** some large coal fired plants have already started construction, one in Rampal between Khulna and Mongla and two others at Matherbari in Chittagong, each having an

installed generation capacity of 1200-1300 MW In the event, none of the large, medium and long-term plants could come into operation so far due to substantial delays in project design, financial closure, contracting out, and implementation problems. The government accordingly, continues to depend on small and medium-size quick rental power plants.

In the meantime, as the access to power is increasing rapidly and consumption of electricity per capita is accelerating, the demand for power is going to grow very fast. In recent years the demand for electricity has been rising rapidly in Bangladesh with growth in per capita income, increasing industrialization, and expansion of electricity use in agriculture and commercial sectors of the economy. Bangladesh witnessed a rise in electricity demand by 8-9% during 2010 to 2015, with implied elasticity of 1.2-1.5, which is not unusual for the state of development in Bangladesh.

Performance under the Sixth/Seventh Five Year Plans

A review of power sector performance under the Sixth and the ongoing Seventh Five Year Plans —based on the developments and considerations/issued noted above—can be summarized in the following manner:

- Government put the top most priority in the development of the power sector during the Sixth Plan and the ongoing Seventh Five Year Plan. The Power Division has been receiving the highest priority in ADP allocations through the annual budgets and the amount of resources allocated for the power sector has been increasing progressively. As a result, important successes were achieved in the power sector in terms of new installed power generation capacity and associated supply of power.
- The government has taken various investments initiatives to diversify the sources of primary fuels in the contexts of the Sixth and Seventh Plans. However, progress with diversifying and increasing the supply of cost effective primary fuel till now has been very limited.
- Power tariffs and subsidies have risen more than estimated, but the average power generation cost still significantly exceeds the average tariff rate, primarily due to high cost power purchases from new plants.
- Gas pre-paid meter is being introduced in some areas/households to conserve the rapidly depleting resources. Nevertheless, such efforts are inadequate and significant amounts of gas are being wasted in the household sector due to lack of proper metering of gas usages.
- In addition to conservation, Bangladesh urgently needs to focus on the exploration and development of its untapped potential natural gas resources.
- Improvements have been achieved in reducing the incidence of power outages. Access to electricity has risen, but demand-supply gap persists primarily due to transmission problems. Furthermore, quality of power, particularly in terms of uninterrupted supply continues to remain a major problem in industrial, business and rural areas.

- Although Bangladesh intends to increase its reliance on coal-based power generation, there is no national coal policy so far to enhance domestic coal mining along with addressing the environmental and social concerns related to coal mining. The required investments related to handling of coal import will be massive and are delaying the planned implementation of cost effective coal-based power plants.
- The main driving force for the power generation during the sixth plan was the Public Private Partnership (PPP) initiative in the form of guaranteed power purchase agreements. Bangladesh has so far gained significant power generation through IPP, SIPP, Rental, Quick Rental and Joint Venture policies under the PPP framework.
- The country attained impressive performance in terms of expansion of generation capacity. The growth in generation capacity alone, without the associated expansion of transmission and distribution networks, is contributing to under-utilization of generation capacity undermining the economic impact of power sector investment.
- System loss has reduced prominently, but there is scope for further improvement.

III. Power Generation Targets to Support the Perspective Plan and Related Investment Plan

The main driver for growth in electricity demand in any economy is the underlying expansion of economic activity which is generally captured through the growth rate of GDP. The other major driver for growth in electricity demand is the elasticity of electricity demand with respect to real GDP growth or per capita real GNI. Because the PP aims to transform Bangladesh into a high income by FY41, the real GDP growth is projected under the PP is far higher than the GDP rates projected in the PSMP 2010 and PSMP 2016, which were probably not done in consultation with the Planning Commission and did not even reflect the growth objectives stated in the Seventh Plan.

While the PP projects Bangladesh's real GDP growth rate to accelerate to 9.9 percent in the outer years of the Plan period, in order to reach High Income country status by FY41, the PSMP 2010 projected the average real GDP to be 7 percent throughout the projection period. It is surprising to observe that PSMP 2016 projected even lower GDP growth rate than PSMP 2010. In fact, the projected GDP growth rates in PSMP 2016 in the outer years are less than half that of PP GDP growth projection. Since real GDP growth rate is one of the major drivers of power demand in any economy, a much higher projection of real GDP growth under the PP certainly contributed to much higher power demand forecast under the PP scenario (see Box 1).

Box 1: Perspective Plan Projection vs. PSMP Projections/Assumptions

The Power System Master Plans (2010 and 2016) and Perspective Plan (PP) of Bangladesh (2021-2041) have different projections on future power demand in Bangladesh. While all three projections are long-term covering broadly overlapping/similar timelines, the differences in forecasted power demand is rather sizable. In fact, the power demand forecasted for FY41 in the PSMP 2016 for FY41 is almost half of what is forecasted in the PP for the same fiscal year. This huge difference in power demand forecast is mostly attributed to the PP's objective to achieve an upper middle-income (UMI) status by FY31 and high income country (HIC) status by FY41.

Box Table 1. Perspective Plan Projection vs. PSMP Projection

Fiscal Year	Projection for Perspective plan			PSMP2010			PSMP16	
	Real GDP growth	Forecasted Demand (MW)	Elasticity	Real GDP growth	Forecasted Demand (MW)	Elasticity	Real GDP growth	Forecasted Demand (MW)
FY16	7.1	9229	1.5	7	11405	1.5	6.30	8921
FY20	8	14054	1.4	7	17304	1.4	7.40	12949
FY21	8.1	15591	1.35	7	18838	1.35		
FY25	8.5	23012	1.15	7	25199	1.15	7.40	19191
FY26	8.6	25189	1.10	7	26838	1.10		
FY30	8.9	35371	1	7	33708	1.00	6.30	27434
FY31	9	38554	1					
FY35	9.4	54924	1				5.30	36634
FY36	9.5	59881	0.95					
FY40	9.8	85047	0.95				4.40	49034
FY41	9.9	92625	0.9					

Source: PRI Staff Projection, PSMP 2010 and PSMP 2016

The rationale behind this higher power demand forecast under the PP scenario is that Bangladesh would need rapid and sustained expansion of power generation, transmission and distribution to support the rapid growth in Industrial/Manufacturing, Service, and agriculture sector in line with the objective to reach the goal of becoming a High-Income country. The elasticity of electricity consumption with respect to real GDP/GNI is another major factor in power demand projection. The income elasticity of electricity demand is important, especially in the case of a rapidly developing country like Bangladesh. Cross country estimates indicate that the elasticity is very high for least developed counties like Bangladesh, and it is below unity for the industrialized countries. Current income elasticity for Bangladesh is 1.5, which has been used in the PP projection. In the earlier years the elasticity was even higher at close to 1.9. As the economy develops and per capita income of the households increase steadily, the elasticity is expected to fall over the long term. Accordingly, as Bangladesh becomes and UMY and HIC, the elasticity is projected to decline to 1.0 by FY31 and thereafter further decline to 0.9 by FY41. PSMP 2010 also had similar elasticity assumption over the projection period through 2031.

As seen in the Table below, the annual average electricity demand growth rate is assumed to be only 4.8% under the PSMP 2016. Such a low growth rate in generation capacity would not at all be compatible with the PP GDP average growth rate of more than 8%.

Box Table 2. Projection of Primary Energy Supply Under PSMP 2016

Primary Energy Sources	2014		2041		Annual growth rate ('14-'41)
	ktoe	(share)	ktoe	(share)	
Natural gas	20,728	(57%)	**49,783**	**(38%)**	**3.3% p.a.**
Oil (Crude oil + refined products)	6,060	(17%)	**32,162**	**(25%)**	**6.4% p.a.**
Coal	1,038	(3%)	**25,401**	**(20%)**	**12.6% p.a.**
Nuclear power	-	-	**12,029**	**(9%)**	-
Hydro, solar, wind power and others	36	(0%)	**199**	**(0%)**	**6.6% p.a.**
Biofuel and waste	8,449	(23%)	**4,089**	**(3%)**	**-2.7% p.a.**
Power (Export)	377	(1%)	**6,027**	**(5%)**	**10.8% p.a.**
Total	**35,880**	**(100%)**	**131,151**	**(100%)**	**4.8% p.a.**

In the end, it comes down the differences in Goals and Visions of these plans that are reflected in the components of the forecasting model which contributed to a stark difference in power demand projections under the PP and the two Power Sector Master Plans. In order to fulfill objective of the Bangladesh government as envisaged in the PP, the growth projection of PSMPs must be revised upwards significantly. Certainly, Bangladesh is not aiming to limit its GDP target to 4%-5% over the long run and become an upper middle income and a high-income country over time as targeted under the PP. To meet the much higher power demand as projected in PP much more investment will be needed in the power sector and the associated investment plan would need to be revised upwards by the Ministry of Power.

The income elasticity of power demand ranges from 0.7 for industrial countries to more than 1.5 for least developed countries like Bangladesh and Nepal. The income elasticity is higher in the case of a rapidly growing low-income country where one can expect to see large increases in income of households in the next decades and a corresponding increase in demand for electricity by the households, industries and businesses. Since this elasticity is below unity for industrial countries, income growth apparently results in a less than proportional increase in electricity demand in developed countries. Thus, Japan has a relatively high income and we can observe it has elasticity less than 1, which is 0.7.

Table 8: Elasticity between Per capita GNI and Electricity Consumption in Different Countries, Averages for 1991-2010

Countries	GNI Per capita (1991-2010 AVG) US Dollars	Electricity Consumption per capita (1991-2010 AVG)	Elasticity between Per capita GNI and Electricity Consumption (1991-2010)
Developed			
Japan	37292.29	7847.80	0.74
Australia	29857.79	9968.97	0.6
Upper Middle Income			
China	1443.24	1452	1.05
Lower Middle Income			
India	647.62	436.22	0.77
Pakistan	788.41	449.25	1.09
Lower Income			
Bangladesh	401.48	131.55	1.91
Nepal	336.74	66.72	1.5

However, in developing countries like Bangladesh and Nepal the elasticities for the period 1991-2010 were 1.91 and 1.5, respectively, which were much greater than 1. This shows that Bangladesh's income elasticity for power is very high. Since electricity is a normal good (service), higher disposable income is expected to increase the consumption through greater activity and purchases of electricity-using appliances in both the short and long run.

In a typical developing economy, a one percent increase in GNI/GDP leads to 1.1-1.5 percentage point increase in electricity demand. This implies that even at the current average real growth rate of 7% percent, supply of electricity needs to grow at more than 8%-10% percent per annum. In the event Bangladesh achieves the targeted growth rates of 8% or more over the medium term, as envisaged in the government's Seventh Five Year Plan (covering FY16-20), it would require about !0%-12% rate of growth in supply of electricity per year over the Seventh Plan period.

Since Bangladesh plans to become a high-income country by 2041, with the projected real GDP growth of 9.9% in FY2041, we have estimated the peak-power demand using the GDP-elasticity method for the following years.

Table 9: Projection for Electricity Demand in Bangladesh Under the PP, Fy16-41

Fiscal Year	FY16	FY20	FY21	FY25	FY26	FY30	FY31	FY35	FY36	FY40	FY41
Real GDP growth (%)	7.1	8	8.1	8.5	8.6	8.9	9	9.4	9.5	9.8	9.9
GDP elasticity of power demand	1.5	1.5	1.5	1.5	1.5	1.5	1.3	1.3	1	1	1
Change in Demand (%)	10.65	12	12.15	12.75	12.9	13.35	11.7	12.22	9.5	9.8	9.9
Forecasted Demand (MW)	8921	13682.9	15393.3	24711.9	27899.7	45691.2	51037.0	80379.2	88015.3	127230.7	139826.5

Source: PRI staff estimation

The peak power demand according to PSMP 2016 was used as the baseline for forecasting the power demand. The baseline was derived by adding the base and intermediate load in summer and peak load in winter. The peak power demand in 2016 is thus estimated at

8,921 MW and the subsequent years' demand is forecasted accordingly. As the country gradually shifts from low middle income to high middle-income country by FY31 and to a high-income country by FY41, the income-elasticity for power demand steadily falls from 1.5 to 1.0 by FY31 and thereafter to 0.9 by FY41, as shown above. On the basis of these assumptions, the projected peak power demand exceeds 92,000 MW with the GDP growth rate reaching a peak of 9.9% in FY41.

Investment Requirements

In order to meet such a high peak power demand, Bangladesh would need to invest massively in power generation and transmission in the coming years. If the power generation cost at current (2017) prices comes to about 100MW= US$100 million on average, by FY41 total investment in power generation would amount to about US$92 billion. After including the initial high cost of the Ruppur Power Plants, the estimated generation cost could exceed US$100 billion, We have to add additional investments associated with distribution and transmission to this US$100 billion plus amount. Thus, Bangladesh will have to invest about US$120 billion in the power sector, and public investment alone would not be sufficient to meet the required investment target. Bangladesh will need private investors and FDI to meet this massive investment challenge.

IV. Key Challenges in Ensuring Primary Fuel Supply to Achieve the Perspective Plan and PSMP 2016 Objectives

In order to implement the power sector road map over the medium and long term, the government should address a number of important challenges related to:

(i) Ensuring primary fuel supply to achieve the targeted electricity generation mix envisaged under the PSMP 2016 (see Box Table 2);

(ii) logistical issues relating to transportation of fuel and equipment and storage of fuel;

(iii) coping with and taking advantage of technological changes including the scope for rapid expansion in renewable energy and conservation of energy;

(iv) regulatory regimes to promote generation and distribution of power by private sector players and to promote regional trade in electricity at a broader scale;

(v) financing of such a large investment plan for the electricity generation and the related new transmission and distribution system along with up gradation of the old network;

(vi) human resource development for the related activities.

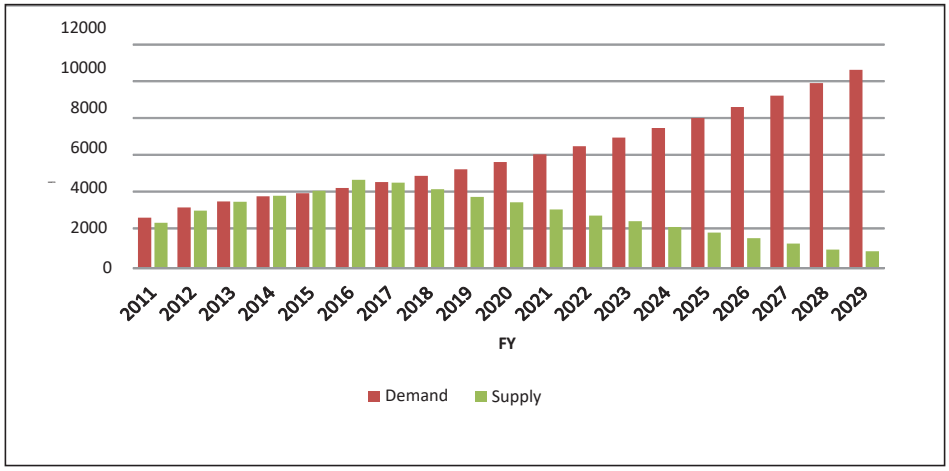
The remainder of this section primarily focuses on challenges in primary fuel supply in terms of composition of primary fuel and logistical challenges in handling new primary sources of power like import based coal, LNG, and nuclear power. Other related important issues like renewable power, trade in electricity, and financing of the power generation and transmission projects have been covered in the subsequent sections.

1. Enhancement of Gas Exploration and Production

Bangladesh's recent experience with discovery of new gas fields has been disappointing. No major new gas field has been discovered in recent decades and the rate at which the gas is extracted, the current stock of proven and recoverable natural gas would last for only about 10-13 years. The rapid loss of pressure in the offshore Shanghu field in the Bay of Bengal along with the absence of new gas field discoveries is forcing Bangladesh to face a major natural gas supply shock in the coming years from domestic sources.

Owing to the absence of new major discoveries and very extensive use, a burning issue for Bangladesh now is the growing shortage of natural gas. Petrobangla estimated in 2010 that the widening gap between demand and supply would be 7 to 9 TCF by FY2029 (Figure 5). Most recent data suggest that the current reserve will likely be depleted in less than 10 years. Out of the 27.1 TCF recoverable reserves, Bangladesh already used 12.3 TCF of natural gas by 2014. As a result,

Figure 5: Gas Demand and Supply Balance 2010-29



Source: Petrobangla

some 14.8 TCF reserve remains for future consumption. If Bangladesh's gas demand continues to grow at the current pace of 7% per annum, the current reserve will be completely depleted by FY2023 (Table 10), unless gas supply capacity is substantially added through new gas field exploration/development and gas imports.

Table 10: Reserve to Production (Supply) Projection from 2014

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Production (TCF)	1.1	1.2	1.3	1.3	1.4	1.5	1.7	1.8	1.9	2.0
Growth Rate	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Cumulative Production (TCF)		2.3	3.5	4.9	6.3	7.9	9.5	11.3	13.2	15.2

Source: Ministry of Power, Energy and Mineral Resources and Petrobangla.

As against this difficult current situation, the potential outlook is not necessarily bad. Bangladesh has abundant untapped gas resource. Despite its low R/P ratio, Bangladesh is very likely to have sizable unexplored/undiscovered gas resource. Although the survey was conducted more than 10 years ago, available data indicates that Bangladesh has at least 8.4 TCF of gas resources. If 50 percent of the 8.4 TCF becomes available for power generation (based on the current gas consumption pattern where Power Sector contributes a half of the total gas sales), it will support around 2,500MW highly efficient combined cycle power plants over their 30-years lifetime. It should be noted that the Petrobangla-USGS Survey indicates that the majority of unexplored/undiscovered resources are in on-shore, rather than highly costly and risky off-shore (see Table 11). This is a welcome prospect as this will allow Petrobangla to undertake most of the exploration on its own at relatively lower cost.

Table 11: Potential/Unexploited Gas Resource

Survey/Probability	95% POE	50% POE	10% POE
Petrobangla and United States Geological Survey (USGS) 2001 Survey	8.4 TCF • On-shore: 6 TCF • Off-shore 2.4 TCF	32.1 TCF • On-shore:23.3 TCF • Off-shore: 8.8 TCF	-
Bangladesh's Hydro Carbon Unit (HCU) and Norwegian Petroleum Directorate (NPD) 2003 Survey	19 TCF	42 TCF	64 TCF

Source: Petrobangla

POE stands for Probability of Exceedance. If POE is 95%, it means there is 95% or higher chance of exceeding this level.

In the past domestic exploration of gas field was constrained by lack of funding. To support BAPEX for undertaking seismic survey and exploration works, in 2009 the Government took the initiative to establish the Gas Development Fund (GDF), under which 15 percent of the gas tariff is to be utilized for upstream exploration and development activities. With this fund the BAPEX has resumed survey and exploration efforts and efforts have also focused on strengthening the technical capabilities of BAPEX.

2. Increased Reliance on Coal as Envisaged in the PSMP 2010 and PSMP 2016

Domestic Coal Development: Despite various rounds of deliberations the government has not yet adopted the national Policy for Domestic Coal Development. Bangladesh has large quantities of high quality proven coal reserves; however, without a coal policy, initiatives could not be taken to utilize the domestically available coal for electricity generation purpose. Since the Master plan envisages that 25%-30% of electricity generation in Bangladesh will come from domestic coal supply in the long run, this issue needs to be addressed urgently to complement the PSMP 2016.

Because it will take about 10 years to develop a new coal mine and start production, coal production will begin in 2027 at the earliest even if it is decided now. Therefore, it is necessary to carry out the required preparation from a position of being able to do this now due to as much utilization of the excellent domestic resources as possible. Unfortunately, the production of Barapukuria coal mines in 2015 was 0.68 million tons and did not reach

1 million tons as planned. Nevertheless, the PSMP 2016 assumes that total domestic coal production will be 1.1 million tons by 2020, 5.7 million tons by 2030 and 11.2 million tons by 2041, considering the production scenario in which Dighipara and Kalaspir coalfields have high development possibility, including the Phulbari coalfield. The acquisition of coal mine technology by Bangladesh has also been highlighted in the PSMP 2016 through which Bangladesh can learn/acquire technologies related to mining, ventilation and mine safety for stable production in the Barapukuria coal mine. By acquiring such technology, Bangladesh will be able to develop new coal mines over time.

Coal Import (long term contract) and deep-sea port for coal handling: Because there is no visible movement on domestic coal development, the government has decided to move first on coal-based power generation through imported coal. Coal importation will however entail major investment challenges in the form of developing one or more deep sea ports (including the one in Materbari); long-term contracts with foreign coal mining companies/ operators for supply of coal from abroad; and internal shipment of coal to power plants like Rampal. Large investments will be required on several fronts like development of deep sea ports, large ocean-going vessels to carry coal, and domestic transportation facilities. Progress on all these fronts are quite slow due to various reasons and there is currently no clear indication when Bangladesh will be ready to import coal after completion of necessary infrastructure.

The feasibility study for the CTT (Coal Transshipment Terminal) planned in the Matarbari area has already been completed (Source: Preparatory Survey for the Construction and Operation of Imported Coal Transshipment Terminal Project in Matarbari Area in People's Republic of Bangladesh as a PPP infrastructure project). In this plan, phased development for CTT was recommended to provide sufficient flexibility, i.e., to expand the CTT when the power generation program development and realistic commission operation date (COD) become certain. The first phase of the CTT will commence operation in 2025 (planned amount of coal: 10.4 million t/year); the objective of the second phase will include those power stations that commence operation by 2029 (amount of coal: 25.6 million t/year) and use the CTT.

Cost efficiency of coal based plants: The analysis presented in PSMP 2016—based on five alternative scenarios--shows that as the use of coal spreads in stages, the fuel expense will be slashed, helping curb increases in power generation costs. Thus, the power generation cost is estimated at 9 to 12 US cents/kWh for 2040, depending on the proportion of coal in the primary energy mix. In addition, a comparison of the power generation cost between the five scenarios for energy source ratio (P1 to P5) shows that the power generation cost becomes higher as the ratio of coal to all other energy sources becomes smaller *(Source: JICA Survey Team)*

3. LNG Import to meet the Growing Shortfall in Domestic Natural Gas

Despite the reduction in the excessive dependence on natural gas in recent years and the envisaged further reduction on gas dependence over the long term, gas-based power generation will continue to remain the largest source of primary fuel. In view of the projected outlook for domestic gas output and the growing demand for gas in the domestic economy, LNG import is being considered as a new major source of primary energy in the coming years.

Two large floating storage and re-gasification units (FSRUs) each with capacity of 500 MMCF are currently under construction. The first LNG terminal with capacity of 3.75 million tons per year FSRU is being developed by US-based EXelerate Energy and it is expected to come into operation in April 2018. The second large FSRU, with similar capacity is being developed by Summit Group and expected to be commissioned by October 2018. Both FSRUs will be in Moheshkhali Island in the Bay of Bengal. Separately, Petrobangla is close to finalizing deals on three smaller FSRUs with capacity of 200 MMCF each. The selected firms will be responsible for building the FSRUs, import LNG, re-gasify the LNG, and supply the re-gasified LNG into gas transmission pipelines owned by the state-run Gas Transmission Company Ltd. (GTCL) at their own costs. Petrobangla will only purchase the re-gasified LNG from the contractors under long-term gas purchase agreements.

Table 12: LNG Import Projects Under Implementation and Consderation

Developer Companies	Types of Infrastructure	Anticipated Time of Construction
Excellerate Energy Bangladesh Limited (EEBL)	500 MMCFD, FSRU	March 2018
Summit Corporation Ltd. (SCL)	500 MMCFD, FSRU	July 2018
Reliance Power Ltd. (RPL) India	500 MMCFD, FSRU	2019
China Huanqiu Contracting & Engineering Corp (HQC)	1000 MMCFD	2020
In JV with China CAMC Engineering Company Ltd.	Land Based Terminal	
Hong Kong Shanghai Manjala Power Ltd. (HSMP)	500 MMCFD, FSRU	2019
JV with Global LNG Sdn Bhd, Malaysia		
Petronet LNG Limited (PPL), India	1000 MMCFD, Land Based	2020

Source: GTCL Presentation to Sector Leaders

On the expectation that LNG will be available from April 2018, the government is also planning to replace oil-fired rental power stations with LNG from 2018 onwards. Given Bangladesh's growing shortage of natural gas supply in the coming years, the demand for imported LNG is likely to increase rapidly and a number of other initiatives are also under active consideration for LNG import in the coming years. Accordingly, Petrobangla also plans to set up at least two onshore LNG terminals, each with capacity of 7.5 million tons per year by 2015. Bangladesh has already signed an agreement with Qatar's RasGas to import 2.5 million tons of lean LNG annually for 15 years.

It is difficult to project the distribution of long term supply or gas between domestic and imported (primarily LNG based), given the uncertainty about new discoveries within Bangladesh territories (on shore and off shore). Nevertheless, given the demand outlook for gas and the PSMP 2016 projection that about 38% of domestic power generation would continue to depend on gas even in FY41, investment in LNG terminals and re-gasification plants, and large LNG container ships would be prerequisites for meeting the future primary fuel needs of Bangladesh.

4. Oil Import for Power Generation

Bangladesh began expanding its oil-based power generation capacity in 2010, amid a natural gas deficit caused by depleting upstream reserves and rapid industrialization, bringing almost 40 new oil-fired power plants online by the end of 2016, with an initial tenure of three to five years. As a result, Bangladesh began to import oil for power generation from various Asian and Middle Eastern countries since 2010.

The reduction of oil imports for power generation will be gradual and it is still unclear how much will be displaced as a result of the retirement of the oil-fired power plants. However, over the medium term we should expect further increase in import of fuel oil because several new oil based power plants have been sanctioned recently and more approvals may be on the way (many of which are unsolicited). This development is disturbing because earlier it was expected that no new liquid fuel based power plants would be installed and the existing ones will be phased out over time. This development, which will continue to put pressure on electricity tariff, was perhaps due to long delays experienced in commissioning the coal based power plants and delays in putting in place the infrastructure needed for LNG import.

5. Safe Nuclear Technology

Nuclear power is envisaged to take a bigger role in the power supply mix. The government has put the Nuclear Power Project at Ruppur under its fast track project list for speedy progress on this front. Agreements have been signed with Russian Federation for installing 2400 MW nuclear power project in Bangladesh. The government has already held preliminary discussions with the international nuclear oversight organization on matters related to safety and safe disposal of nuclear waste. Since FY15 budget allocations are also being made for initiating the project (see Section VI.2 for further on nuclear power generation).

6. Energy Conservation & Energy Efficiency Program

The Government also accorded priority to the promotion of Energy Efficiency (EE) and Energy Conservation (EC) programs during the Sixth Plan. The "Energy Efficiency and Conservation Map" and "Energy Efficiency Action Plan" have been prepared, and preparation of "Energy Efficiency and Conservation Master Plan" with support from JICA is under process. Time-bound targets for energy savings have been set and program implementation is well underway. The energy saving targets through the Energy Efficiency Action Plan and specific programs that are being implemented is shown in Box 2. Successful implementation of these initiatives should help conserve resources and will be a positive step in implementing a sound energy strategy in Bangladesh.

Box 2: Energy Conservation Initiatives during the Sixth Plan

A. Energy conservation targets

- 10% of primary and secondary energy saving by 2015
- 15% by the 2021 and
- 20% by 2030

B. Ongoing energy efficiency and savings programs

- Closure of the shopping mall & market after 8 pm
- Holiday staggering program in commercial areas and markets.
- Operation of irrigation pumps from 11 pm to 5 am
- Maintaining the temperature of ACs not below 250 C
- Conversion of Simple Cycle power plant to Combined Cycle Power Plant
- Replacement of inefficient incandescent bulb with energy efficient CFL/ LED bulb.
- Use of CFL/LED in Government & semi-government offices.
- Conventional street lights will be replaced by LED and solar subsequently
- Replacement of single cycle plants by CCGT for base load operation
- Renovation of inefficient and old power plants for capacity & efficiency improvement
- Performance improvement of inefficient power plants
- Introduction of quality pre-paid and smart metering all over the country
- Use of Improved Rice Parboiling System in the rice mills
- Use of Improved Cooking Stoves in the rural areas and Improve gas stoves in the urban areas
- Use of energy saving Intelligent Motor Controller (IMC)
- Reduction of technical and non-technical system loss
- Incorporation of Energy Conservation issues in the academic curriculum of School/Madrasas/Colleges
- Include Energy Conservation and Energy Efficiency issues in the National Building Code

C. Implementation of energy standard & energy star labeling program through BSTI

- Refrigerator
- Ceiling Fan
- Electric motors
- CFL
- Electric Ballast
- AC

The Gas Use Efficiency is one of the critical issues that needs to be introduced. “Cheap gas” will not be available in the future and gas users need to enhance their efficiency to save the country’s indigenous gas resources. Both the Urea Manufacturing Sector and Power Sector are major gas users and have a significant impact on the overall gas consumption. Urea is manufactured from natural gas. The world benchmark efficiency for Urea Manufacturing is 25mcf/ton, while average efficiency in Bangladesh was 44 mcf/ton as of FY14, much higher than that of the international benchmark. Provided that the international benchmark is used in the country, 130 mmscfd of gas would be saved in manufacturing 2,375,000 tons of urea in 2014 and this figure would translate into the power plant equivalent of 1000 MW.

Gas Consumption for the Power Sector (under BPDB) was 337.4 BCF in FY 2014 while Power Generation Capacity was 8,340 MW and Generated Power was 42,200 GWh. From these figures, it is assumed that current power generation efficiency is around 38%. Provided that efficiency can be raised to 45%, which is considered the international benchmark for a gas based power plant, gas consumption in the power sector will be reduced to 285 BCF, and the difference of 52 BCF can be said to be wasted. This is equivalent to 1,300 MW in power plant annual operation.

In addition, it appears that power generation efficiency of Captive Power is not necessarily high enough. Further investigation is necessary but low gas efficiency is waste of resources and some penalty should be imposed. It is necessary to enhance the efficiency to the international level and a supporting legal framework and regulations need to be put in place to provide basic lighting and other services in areas where the grid is unlikely to reach for a long time.

7. Logistical issues relating to transportation of fuel and equipment and storage of fuel

Transportation of Fuel and Equipment: For easy handling of coal and other primary fuel massive infrastructure investment will be needed in the following areas:

- Development of deep sea ports for handling of imported coal. The government has undertaken plans for building two deep sea ports at Materbari and Payra Bandar for handing the massive volumes of coal that would need to be imported to operate the planned and future coal-based power plants.
- Infrastructure Development by Railway and Roads & Highways to handle the distribution of primary fuel across Bangladesh. Completion of the Padma Bridge in 2019 will be a major step in this area, which will then be followed by establishing railway lines to south-western districts of Bangladesh including Payera Bandar.
- Dredging of River Routes by BIWTA will be important for carrying primary fuels in large vessels to coal based power plants (like Rampal), liquid based power plants across Bangladesh, and other processing/distribution facilities for fuel and LPG across Bangladesh.
- Handling capacity building of BPC, Railways, R&H and BIWTA. Massive investment will be needed in all these areas. Major R&H and Railway projects are currently under consideration or under implementation in all these areas.

Infrastructure and logistics for handling coal and LNG

- As discussed earlier, exploration of coal and LNG requires huge investments as well as the use of expensive imported machineries and maintenance equipment. Furthermore, getting licenses for the extraction of such domestically available resources such as coal, oil, gas etc. and ensuring safety mechanism for the flammable liquids from offshore drilling needs infrastructure and logistics development.
- Handling this massive volume of coal import will require huge port, rail transport and coal stocking infrastructure. However, so far there is only one on-going deep-sea port project in Matarbari island which will be able to cater ships having 80,000 tonnes capacity.

8. Human Resources Development

Development of skilled manpower for adopting and operating new technologies will be important for operating and maintaining the new generation mega projects based on coal and nuclear technology. Bangladesh has an acute shortage of skilled manpower for these new types of mega power plants, and operations and maintenance of high voltage transmission lines which will be critically important for carrying out these massive investments, and operations and maintenance of these projects.

In the nuclear technology area, Bangladesh has no prior experience in running and maintaining even small (50-100 MW capacity) and medium-sized (200-600 MW) power plants. But the government is going to build mega-sized nuclear power units with 1200 MW capacity each. The leapfrogging of this scale is unprecedented and will require massive investment in developing a huge pool of experts in different aspects of nuclear power technology. Countries like India, has now developed the capability to maintain large size nuclear power generation units after experimenting with small, medium and larger size plants over the last 70 years. Achieving that kind of level with adequate number of national experts will certainly be a challenge. Bangladesh Government has already sent a large contingent of students to Russia for training/learning in nuclear energy technology, which is just the beginning.

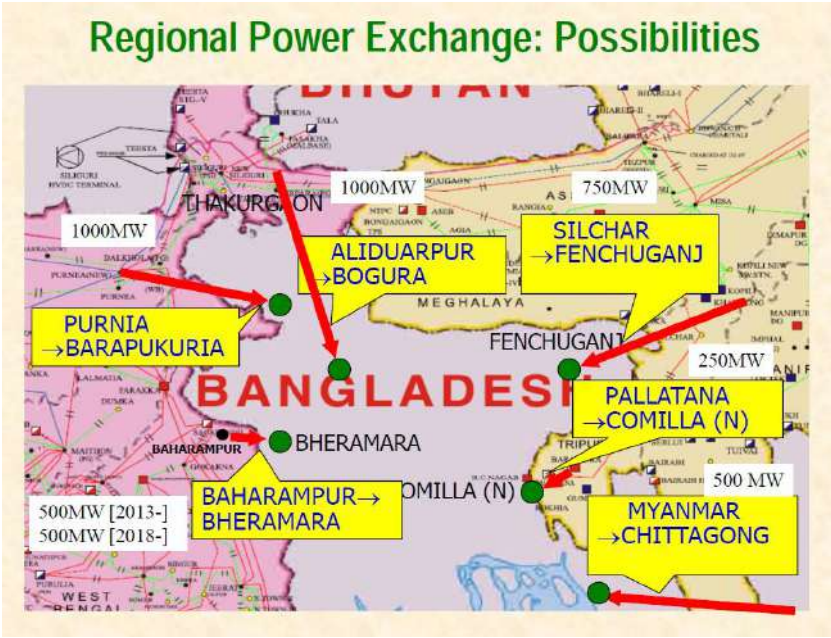
The power sector is already suffering from an acute shortage of skilled manpower for the oil and gas-based small to medium sized power plants. As the large coal-based power plants start being built, the authorities should focus on how to train hundreds of power generation and distribution engineers for employment in these plants and projects.

V. Trade in Electricity—Opportunities and Challenges

Background: Bangladesh is exploring alternative solutions to power generation such as increased electricity imports from the neighboring countries and LNG trade. Initiatives are underway to enhance cross border trade of electricity through bilateral/regional cooperation initiatives with Nepal, Bhutan and Myanmar and India. Trade in power between Canada and the USA is a very good example of trade in electricity between two neighbors. Trade in electricity is also widely practiced in Europe among the European Union economies and beyond. Investment and trade model is also being practiced between Bhutan and India, under which Indian Government and private sector invest in hydro power projects in Bhutan and import the power to India under long-term power purchase contracts.

Electricity trade was already considered to be an element of the PSMP 2010 and Bangladesh is already receiving about 450MW-500MW of power from India under a Government-to-Government deal. As part of the Plan, Bangladesh also expects to receive another 500MW of power from India under private sector to private sector or private sector to Government deals. The interconnector between Baharampur of West Bengal (India) to Bheramara of Bangladesh has already been constructed with ADB financing.

Figure 6: Regional Power Exchange Possibilities



Beyond the 1000MW power trade agreement, there is also the possibility of getting an additional 250MW power from the Indian state of Tripura once the interconnector between Pallatana in Tripura to Comilla in Bangladesh is constructed. The process is currently underway to construct the interconnector between Pallatana and Comilla. A number of other possible interconnectors for increased power import from India and other neighbors like Bhutan are currently under consideration with support from the Indian Government. Some of these other possibilities include Silchar to Fenchuganj for 750MW, Aliduarpur to Bogra 1000MW and Purania to Barapukuria 1000MW. In addition, Bangladesh Government was also discussing with the Government of Myanmar to import 500MW of hydro power from a hydro power project in the Rakhyn state of Myanmar to Chittagong in Bangladesh.

Medium-term initiatives and outlook: All these possibilities mentioned above could only be the beginning of a much broader regional power trade initiative. Beyond the possible initiatives mentioned above, which alone could potentially add 3,000MW of electricity to Bangladesh national grid, there could be other major regional initiatives encompassing Bhutan, Nepal and North-Eastern India which have very large hydro power potentials. Both Nepal and Bhutan are interested to receive long-term investment in their hydropower projects and export their surplus hydropower to Bangladesh. The Government has already actively engaged in economic diplomacy with India for joint venture investments in large hydropower projects in Nepal, Bhutan and North- Eastern India. Although new hydropower projects would take more than one decade to materialize, the lifelong low cost supplies would ensure cheaper and environmentally friendly power for Bangladesh for decades to come. Electricity trade was not appropriately emphasized in PSMP 2010 but has received more attention in PSMP 2016, where it is envisaged that by FY41 at least 5% of domestic power demand will be met through import of power from regional countries.

BIMSTEC Secretariat has finalized a draft deal to set up power grid connections for electricity trade among its seven member countries -- Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand. Bangladesh is also currently negotiating to import at least 3,500 MW more electricity through bilateral, regional and sub-regional joint venture initiatives from India, Myanmar, Nepal and Bhutan by 2030.The BIMSTEC deal is almost similar to SAARC Framework Agreement for Energy Cooperation signed in Kathmandu on November 27, 2014 to set up a South Asian regional grid for cross-border trade of electricity. This covered trans-border power exchange and grid interconnection, hydropower development and energy security of the region. The deal will pave the way for all member countries to buy and sell energy as per their necessity through private or public companies. It will ease power generation, distribution and trading between the BIMSTEC states. The relevant BIMSTEC bodies are responsible for identifying regional and sub-regional projects in the area of power generation, transmission and power trade, including hydropower, natural gas, solar, wind and bio-fuel, and implementing them with top priority to meet the increasing demand for power in the region. The seven member states have the potential of generating around 260,000 MW of hydropower, including 150,000MW by India, 40,000MW by Myanmar, at least 30,000MW by Bhutan and Nepal each, 500MW by Bangladesh and Thailand each and 1,000MW by Sri Lanka.

Trans-national power grid and pricing issues: It has become increasingly difficult for Bangladesh to develop its existing domestic thermal coal mining capacity. This reflects social opposition to the compulsory land acquisition requirements as well as resistance to the inevitable water, particulate and air pollution along with all the associated negative health effects. With rising surplus power capacity in northeast India, an opportunity came up for Bangladesh to relatively quickly increase the importation of cost-competitive coal-fired electricity.

In 2014/15 the cost of imported electricity from India was Tk5.62/kWh, 10% below the Tk6.28/kWh average across the Bangladesh system. India-Bangladesh currently have 600 MW of grid connectivity. According to BPDB, 2634 mkwh of electricity was imported until January 2017. BPDB is working with India to double the capacity of the 500 MW Baharampur-Bheramara lines (commissioned in September 2013) to 1,000 MW by June 2018 at an estimated project cost of US$180 million.

A second expansion plan involves doubling the new 100 MW Tripura-Comilla line capacity (commissioned in March 2016 at a cost of US$26 million by Korean contractor GS Engineering and Construction) to 200 MW. A second Tripura-Comilla upgrade to 500MW is in BPDB's forecasts for 2021. Since 2010, Adani Power Ltd of India has been working on a 1,600 MW coal-fired power plant in Jharkhand with Terms of Reference being finally agreed in August 2016 that paves the way for approval for potentially 100% of this output to be transmitted to Bangladesh by a dedicated power transmission line. Such a buildup of international grid connectivity could be highly beneficial, as it would also facilitate export of India's growing solar-generation capacity as well as providing greater grid flexibility and stability. Greater interconnectivity of electricity grids is likely to be key to the growth of renewables across the sub-region comprising North-Eastern India, Bangladesh, Bhutan, Myanmar and Nepal.

However, challenges Bangladesh faces in trans-national grids appears more in the form technological aspects rather than environmental aspects. These imported powers from India though are assisting to meet the immediate power demand, they also come at a higher cost. GoB has agreed to import electricity from Adani Group at a price Tk. 6.89 (8.61 US cents) per kWh from its 1600 MW mega plant that will be setup in Jharkhand, India. According to Power Division, as per the rate fixed for Adani, the country will have to pay an additional cost of nearly Tk. 300cr to the Indian company over the next 25 years as compared to other coal-based power plants. Total cost of this import is far higher than the price of electricity from the local private coal based plants. The main challenge here lies in importing the power at a competitive rate.

VI. Other Long-Term Challenges and Opportunities in the Power Sector

This Section intends to illustrate the long-term environmental and technological challenges and opportunities that the Bangladesh will face in the areas of Renewable Power Generation, Nuclear Technology, Power Transmission, and Rural Electrification.

1. Renewable Power Generation

Background: The Government has given priority to the implementation of renewable energy, energy efficiency as well as energy conservation programs during the Sixth Plan. The Renewable Energy policy was approved in 2008. Through this policy, the Government is committed to facilitate both public and private sector investment in renewable energy projects to substitute indigenous non- renewable energy supplies and scale up contributions of existing renewable energy based electricity productions. The Policy envisioned 5% of total generation from renewable sources by 2015 and 10 percent of the same by 2020.

Dedicated funding support has also been extended through government financial institutions like Bangladesh Bank and IDCOL as well as through private commercial banks. Moreover, Government has extended fiscal incentives including duty exemption on certain renewable energy products, e.g. solar panel, solar panel manufacturing accessories, LED light, solar operated light and wind power plant. These facilitated a significant success in the area of solar energy that has delivered 150 MW equivalent of power primarily through a highly successful Solar Home Lighting System (SHS) program. Some 4 million SHS units have been delivered by 2016 primarily to households outside the national power grid. However, various environmental and technological challenges are associated with solar power generation and expansion in Bnagladesh.

The potential environmental impact such as land use and habitat loss, water use, and the use of hazardous materials in manufacturing can vary greatly depending on the technology, which includes two broad categories: photovoltaic (PV) solar cells or concentrating solar thermal plants (CSP). Depending on their location, larger utility-scale solar facilities can raise concerns about land degradation and habitat loss. Total land area requirement varies depending on the technology, the topography of the site, and the intensity of the solar resource. Estimates for utility-scale PV systems range from 3.5 to 10 acres per megawatt, while estimates for CSP facilities are between 4 and 16.5 acres per megawatt which, for a densely populated country like Bangladesh is very complicated as it will not only cause habitat loss but also will impact agricultural production since there is less opportunity for solar projects to share land with agricultural uses unlike wind power.

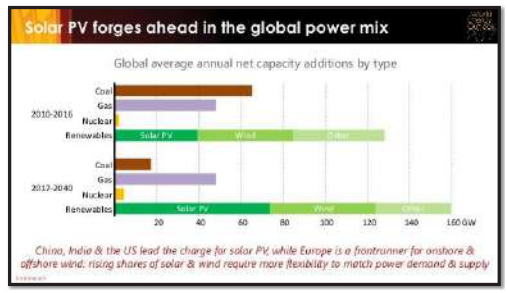
Solar PV cells do not use water for generating electricity. However, as in all manufacturing processes, some water is used to manufacture solar PV components. CSP plants on the other hand, use wet-recirculating technology with cooling towers withdraw between 600 and 650 gallons of water per megawatt-hour of electricity produced. CSP plants with once-through cooling technology have higher levels of water withdrawal.

The PV cell manufacturing process includes a number of hazardous materials, most of which are used to clean and purify the semiconductor surface. These chemicals, similar to those used in the general semiconductor industry, include hydrochloric acid, sulfuric acid, nitric acid, hydrogen fluoride, 1,1,1-trichloroethane, and acetone. The amount and type of chemicals used depends on the type of cell, the amount of cleaning that is needed which exposes the workers to tremendous health hazard. Moreover, thin-film PV cells contain a number of more toxic materials than those used in traditional silicon photovoltaic cells, including gallium arsenide, copper-indium-gallium-diselenide, and cadmium-telluride. If not handled and disposed of properly, these materials could pose serious environmental or public health threats. Furthermore, the cost associated with solar power generation is also much higher compared to other non-renewable sources of power. Considering the lack of availability of land and other technical and environmental challenges, Micro solar projects like rooftop solar projects in small industries and houses in both rural and urban areas that usually require less space and less cost should be encouraged more.

Bangladesh as Renewables Innovator: Vision 2041

Despite the somber assessment regarding the prospects for renewable power in Bangladesh noted above, it must be noted that the Global Renewables Revolution continues to exceed expectations driven by falling production costs for Solar PV and Wind driven energy combined with greater emphasis on Green Growth by governments. As the chart below from the IEA's World Energy Outlook 2017 illustrates, this trend is likely to persist in the coming decades with global energy production capacity addition being dominated by renewables.

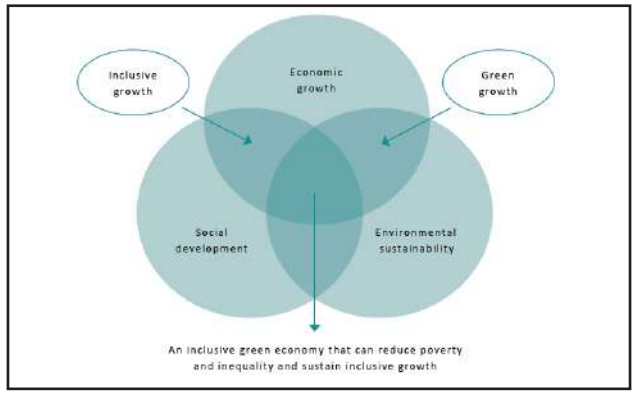
Figure 7: Global Capacity Addition by Primary Energy Sources



Source: IEA World Energy Report 2017

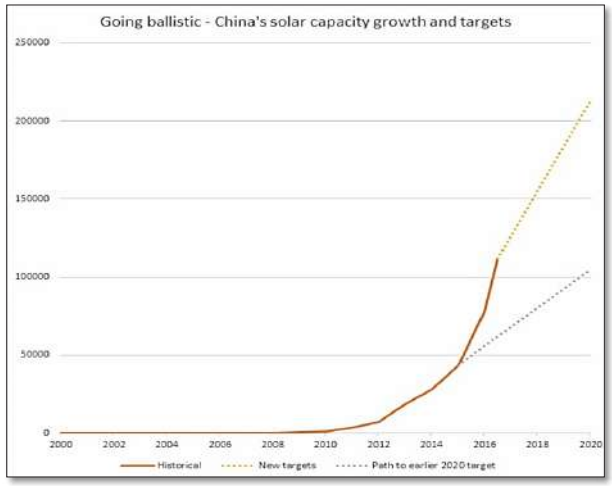
China has been far and away the global leader in renewables. From being one of the biggest casualties of industrial pollution, the Chinese government has made Green growth a central component of its 5-year economic plans. Environmentally sustainable economic growth was made a primary objective including a rapid shift to non-fossil fuel energy production.

Figure 8: Green Growth Encompassing Social Development and Environment



The results have been dramatic as illustrated below which shows explosive growth in solar energy production.

Figure 9: China's Solar Capacity Expansion and Outlook



Like China, we believe Bangladesh can achieve a similar Renewables/Green Growth revolution in the face of pressing necessity. It is the largest MVC (Most Vulnerable Country) to Climate Change given that about 75% of Bangladesh is less than 10 meters above sea level. Dhaka one of the five most vulnerable cities in the world and some estimates have suggested that by 2050 Bangladesh could lose 15% of its land area at a time when the population may increase from 160 million currently to 200 million. The country is particularly vulnerable to flooding from monsoons and sea- level rise. Rising temperatures have already begun to reduce crop yields.

Bangladesh has already been a world leader in one area of solar – namely off grid small Solar Home Systems (SHS). Of the 6 million SHS installed globally Bangladesh accounts for 75% or 4.5 million approximately. Assuming an average of 4.5 dependents in each household, this suggests it has brought electricity to around 20 million people, clearly

a huge social as well as economic impact. However, the total of all the SHS only still amounts to 100 MW. To achieve the government goal of 2000 MW of renewables by 2021, clearly much more needs to be done.

The Government of Bangladesh has issued more than 1000 MW of LOI/PPA for utility or larger scale solar projects in 2016-2017. But there has been little effective implementation in most of these projects. A major issue is land, which is understandable given that Bangladesh is one of the most densely populated countries in the world. Jeff bezos, the founder of Amazon, famously noted that "frugality drives innovation" – in the case of Bangladesh, the "frugality" is defined by the scarcity of land which necessitates a different approach to leveraging new technologies and thinking to spur the next phase of the country's Renewables revolution.

The Table below from the PSMP 2016 shows forecasts for Renewables with Solar energy production dominating.

Table 13: Summary Renewable Energy Technical Potential

Technology	Resource	Capacity (MW)	Annual Generation (GWh)
Solar Parks	Solar	1400*	2,000
Solar Rooftop	Solar	635	860
Solar Home Systems	Solar	100	115
Solar Irrigation	Solar	545	735
Wind Parks	Wind	637**	1250
Biomass	Rice husk	275	1800
Biogas	Animal waste	10	40
Waste to Energy	Municipal Waste	1	6
Small Hydropower Plants	Hydropower	60	200
Mini and Microgrids***	Hybrid	3***	4
	Total	**3,666**	**7,010**

*Case 1 (agricultural land excluded) estimate **Case 1 (flood-prone land excluded) estimate ***Based on planned projects only, not a theoretical maximum potential, because there is potential overlap with off-grid solar systems. Either could be used to serve off-grid demand.

Source: PSMP 2015

We believe that Bangladesh can achieve a much more ambitious target of 5,000 MW of solar within 5 years (by 2023) by emphasizing new innovations and technologies on smaller scale solar projects like the ones discussed below.

Rooftop Solar: We agree with the PSMP 2016 optimism on rooftop solar. The RMG sector is likely to feel increased pressure to shift to renewable energy sources given that H&M, the largest RMG buyer in Bangladesh, has announced a target of being a zero carbon company by 2030 and carbon positive by 2040. Many other RMG buyers are likely to follow which will mean that those RMG factories that stick to conventional power sources will increasingly be at a competitive disadvantage when seeking orders. Solar production of 400-500 MW can be achieved from RMG factory rooftops alone. When this is extended to other industries and the public sector including hospitals, rooftop solar can make an important contribution.

Solar irrigation pumps: Bangladesh has more than 2 million irrigation pumps powered by electricity and diesel. This can be replaced by 300,000 solar powered irrigation pumps. IDCOL is already actively promoting and irrigation pumps and there is currently a 50% grant incentive to switch to solar.

Agri Solar: We believe the greatest potential growth area for renewables is in combing with new innovations in Agri-tech. specifically by embedding solar panels into greenhouses, we believe Bangladesh can benefit from an Agri Solar revolution that will see a significant jump in organic farming with higher yields and a wider variety of potential produce. In a pilot study done in Africa, a 1 MW Agri Solar greenhouse built on 1.8 hectares of land produced 490,000 kg of fresh produce, 1,700 MW hours of power, 83,000 tonnes of CO2 emission savings and 100 new jobs.

Bangladesh can also combine Agri solar and solar irrigation pumps. If we target 10,000 farmers each in all 64 districts of Bangladesh, some 640,000 farmers, with a 10kw solar irrigation pump and greenhouse, that would amount to 6,400 MW of solar power and potentially billions of dollars of new agricultural output providing greater incomes and a new means of livelihood. Moreover, any surplus electricity could be sold either as a mini grid for local consumers of electricity or even back into the national grid.

Economic Zones: In terms of utility scale or larger solar projects, we believe targeting the 100+ new economic zones for solar production could be another area of focus. But in addition, there are there are a number of potential other areas to target where land is not being used effectively. One sector is tea estates where out of the million acres of tea gardens, it is estimated that less than 500,000 acres is used for tea production. The rest is used as rice paddy or fallow land and could be utilized for solar energy production.

Water Bodies: Another potential area, given that Bangladesh is a riverine country with a large number of water bodies, is floating solar projects. Japan was the first country to set up floating solar in 2006 in Chiba province. In 2017, the Chinese city of Huainan, famous for coal production, has launched the largest floating solar plant in the world. The 40-megawatt power plant consists of 120,000 solar panels covering an area of more than 160 American football fields. The $45-million investment could help power 15,000 homes. The ADB has established a Tk. 1 billion fund to finance a floating solar park in Kaptai Lake and this can be a template for a wider range of floating solar power generation projects.

Reclaimed Land: Another potential source of new land for solar is from reclaiming land from dredging. One estimate suggests that if rivers that are currently as much as 15 km wide in Bangladesh are reduced to 1.5-2.5 km optimal width as envisaged the Delta Plan 2100, this could create up to 100,000 acres of new reclaimed land, which could be used for a combination of smart cities/townships, solar parks and Agri solar.

Longer Battery Life: Finally, the collapsing price of Lithium batteries--as a result of the rapid technological development in electric car technology such as Tesla--presents new renewable opportunities for Bangladesh. It may now be economic to get rid of all of the diesel backup generators in Bangladesh and replace with Lithium Ion batteries. These batteries can be charged either from solar energy or even conventional grid power. The potential savings in terms of fossil fuel burning, CO2 emissions and imported fuel costs will be considerable.

2. Nuclear Technology

Current Status and Issues: Gas and oil based thermal power generation, by virtue of its ability to respond quickly and flexibly to ever-changing power demand, supplies middle and peak load. Nuclear power, power import, hydropower, and coal-based thermal power generations are considered as base load energy. This combination of different types of power sources is commonly referred to as the best mix of power sources. In PSMP 2016, nuclear power generation plays an important role in providing a stable base load. The government has put the Nuclear Power Project at Ruppur under its fast track project list for speedy progress on this front. The FY15 budget allocated TK 2,000 crore (about $300 million) for initiating the project. It is assumed that the first unit of 1,200 MW is to start operations by 2024 and the second unit of 1,200 MW by 2025 (PSMP 2016). These figures are preconditioned in the power development planning without alternative cases, which means nuclear power is assumed as one of the Fixed Factors in terms of generation capacity in the simulation, considering the government's nuclear power project planning.

Nuclear safety is a global issue. There are many instruments for achieving high level of nuclear safety on a global basis, such as IAEA safety standards, safety review services provided by the IAEA. The IAEA safety standards provide a system of safety fundamentals, Safety Requirements and Safety Guides for ensuring safety. They reflect an international consensus on what constitutes a high level of safety for protecting people and the environment from harmful effects of ionizing radiation. The IAEA safety standards are applicable throughout the entire lifetime of facilities, to activities (existing and new) utilized for peaceful purposes, and to protective actions to reduce existing radiation risks. For proceeding with the nuclear power project, like most other countries Bangladesh should follow the IAEA safety standards. Greenhouse gas emissions from nuclear fission power are much smaller than those associated with coal, oil and gas, and the routine health risks are much smaller than those associated with coal. However, the potential catastrophic risk arising from overheated fuels melting and releasing large quantities of fission products into the environment could wipe out the benefits and can lead to a near extinction of all the living being of that particular area and areas nearby. The most long-lived radioactive wastes, including spent nuclear fuel, must be contained and isolated from the environment for a long period of time which is a very expensive and a delicate task. The government has already held preliminary discussions with international nuclear oversight organization on matters related to safety and safe disposal of nuclear waste.

Public awareness about nuclear program: Many kinds of programmes, such as meetings and seminars with journalists and local people, have been arranged till now, and Bangladesh has established Nuclear Industry Information Center in 2013. These kinds of activities should be continued and enhanced for the public knowledge which will be the basis for public acceptance. However, in a recent study in 2015 on public acceptance / awareness for nuclear power project it was found that concrete public opinion for nuclear power generation has not yet formed in Bangladesh since accurate information on nuclear generation technology has not became widely and correctly known. Therefore, the government has to do more in supporting enlightenment activities to enhance accurate technical knowledge on nuclear generation including assessment of risks and safety issues.

Legal and implementation framework: All legal and implementation framework shall be established, and even be in an active form before a commissioning of the first nuclear power generation unit at Ruppur. The legal requirements are as follows: (i) Meeting IAEA safety standards; (ii) Establishment of fuel cycle management; (iii) Proper knowledge about nuclear safety and public acceptance; (iv) Participating international framework; and (v) Ratification of the international law and standards.

Long-term plan for nuclear power projects: In total six nuclear power units are envisaged in the PSMP 2016. Out of the six, four units would be in Ruppur and the remaining two units are to be located in a separate place. The first two units at Ruppur are expected to come into operation by 2025 and the other two units at Ruppur are projected to be completed by 2030. Comissioning of the 5th and 6th units are projected to be completed by 2040.

1. Power Transmission Network

Domestic power transmission network: The operating voltages of the Bangladesh power network system are below 230kV and 132kV, except for the 500MW HVDC link to India that began to be operated in 2014 at Bheramara. The 400kV transmission lines and substations have just recently started to be constructed. Many existing power stations have only a capacity of below 100MW, using domestic gas. They are currently distributed across the whole of the nation.

An efficient power network system, including 765kV and 400kV transmission lines, needs to be studied taking into account the plan for large scale power stations, the high density of power demand in and around Dhaka and Chittagong, and the characteristics of Bangladesh's power network system. The rapidly deteriorating and inefficient small-scale power stations with capacity below or around 100MW would need to be phased out in sequence. The future thermal power units will mainly use imported fuel such as coal or LNG. Because the locations where suitable seaports can be constructed to receive large scale ships for imported fuel are limited to south Chittagong and Khulna (Pyra and Patuakhali), the large-scale power stations with a capacity of several thousand MW will be unevenly distributed in those areas. In the case of power transmission from hydro power projects in Nepal and Bhutan through India, HVDC interconnections with a capacity of around 500–2,000MW will be required in the north western part of Bangladesh.

2. Rural Electrification

Rural Electrification Board (REB) is a government owned and operated corporation of Bangladesh and is responsible for rural electrification. It is one of the major power Distribution Company in Bangladesh. The Rural Electrification Board was formed in 1976 to take up efforts at bringing down changes in rural living patterns. Out of the total shops in Bangladesh an estimated 24% are using rural electricity. In agriculture, average yield per acre under electrified pumps is 24% higher than that of diesel operated ones. Electrified pumps contribute one-third of the food self-sufficiency in Bangladesh. REB through its electrified irrigation pumps covers 4.1 million acres of land for HYV Boro and Aman.

REB is supplying power to residential houses, irrigation pumps and charitable organizations-- which together make up 92% of all its consumers--at Tk. 4.62 per KwH

although the cost of that power is Tk. 6.78 per unit. The rest of the consumers, including commercial enterprises and industrial units, pay quite a bit higher tariff rates. The REB purchases electricity from Power Development Board (PDB) and supplies that to the consumers through Palli Bidyut Samity (PBS). There are 80 such associations or PBS in the country. 90% of the REB consumers are residential houses and over half of them are classified as "life-line" who are paying only Tk. 160 for an average consumption of 35 units per month. After the new tariff was announced by the Bangladesh Energy Regulatory Commission (BERC) on September 01, 2015, the REB's net loss stood at Tk. 511 crore in FY16 and Tk. 880 crore in the FY17. In FY18, the loss is expected to rise to around Tk. 1,400 crore. So far, the REB has laid 351,000 kilometers distribution lines and 799 sub-stations with capacity of 9,020 MVA, supplying electricity to 20 million consumers.

It should be noted that REB made a great improvement in grid extension implementation since 2014, when it substantially increased the grid extension speed compared with the past (between 2003 and 2013). If REB keeps the implementation speed as fast as that observed since 2014, it will in theory reach 100% on-grid extension (in other words, 440,000 km distribution line development) by 2021. On the other hand, if REB lowers its grid extension implementation speed to as slow as that between 2003 and 2013, it would end up far below its target.

VII. Next Steps Related to Project Financing in Bangladesh

1. More financing support from the Government of Bangladesh, and Official Multilateral and Bilateral Sources

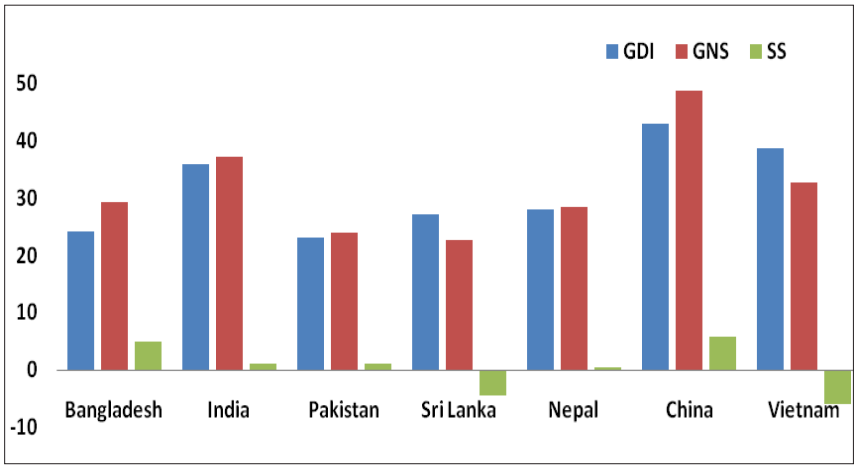
Given the significant funding needs for the PP power sector investment need, the envisaged funding gap and the need to catalyze international commercial bank lending, more multilateral and ECA funding will be required. Partial Risk Guarantee from IDA/ World Bank/ADB for covering risk of the private sector supplying power to less credit-worthy public sector off-takers (BPDB) will be required. Increased funding through budgetary support/ IDCOL and IPFF financing would also be required to make up for shortfall in commercial financing.

2. A Strategy to Increase Domestic Infrastructure Financing Capacity

Over medium to long term, channel national savings into power and other infrastructure investment

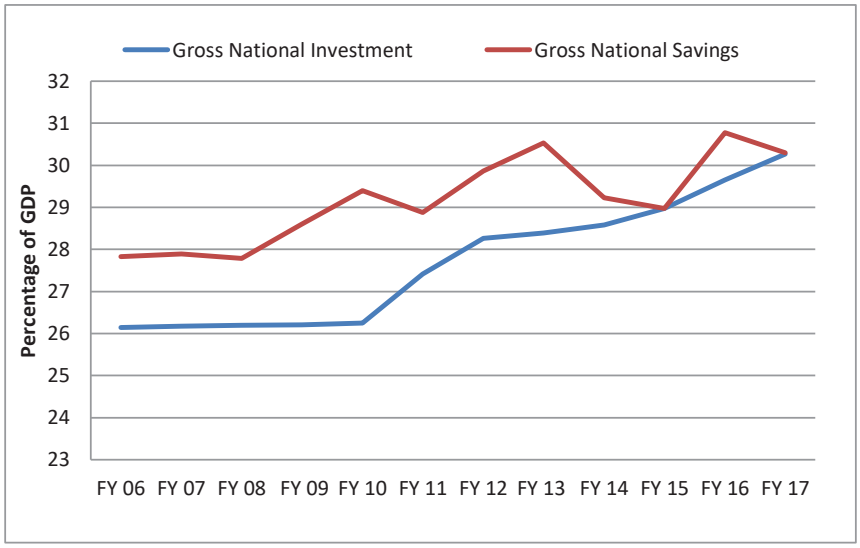
One of the key lessons from the Impact of the Global Financial Crisis on developing economies is the need to have a balance between international and local financing for energy projects. In the case of Bangladesh, gross national savings is generally higher than gross domestic investment, a large part of the financing need for the power and other infrastructure could potentially come from domestic/national sources. A key challenge in addressing Bangladesh's energy crisis is how to channel this domestic private sector capital into infrastructure financing.

Figure 10: Regional Investment and Savings Scenario (In percent of GDP)



Source: Asian Development Bank 2012

Figure 11: Savings and Investment in Bangladesh



Source: Bangladesh National Accounts 2017, Bangladesh Bureau of Statistics (BBS)

A growing number of developing countries have developed their securities markets and long-term savings institutions, allowing them to tap domestic markets while providing infrastructure finance. India, Malaysia and a number of other countries in Asia have made some noteworthy progress in this area, and we believe some lessons are relevant to Bangladesh.

If Bangladesh is to finance the tremendous needs in the power and other infrastructure sector to maintain GDP growth, it will also have to develop the financial institutions and markets necessary to channel domestic savings into infrastructure investment. This would

also call for appropriate regulatory, institutional and policy reforms in the bond and capital markets. While a detailed analysis of a strategy for power sector and other infrastructure financing is beyond the scope of this paper, we believe that the following reforms could be part of the solution:

- Insurance and pension reforms are required to direct long-term savings to infrastructure investments since insurance and pension funds are long term funds, they can be deployed for infrastructure assets, which are also long term.
- Underdeveloped debt market is yet another key constraint to infrastructure financing which needs to be addressed in order to channeling funds to infrastructural investments. Reforms are needed in government bond market, as the yield curve of government bond could serve as a benchmark for corporate bonds.
- An expansion of securitization of infrastructure revenue stream could free up additional financing for further investment in the power sector. Assets backed securities could be issued by the Government and public entities and also by the private sector against expected/projected future income streams. For example, the revenue stream from Jamuna Bridge may be securitized to mobilize funds for Padma Bridge or any other large infrastructure project.
- An instrument to channel Non-Resident Bangladeshi (NRB) capital into helping solve the infrastructure crisis may be developed in the form of Diaspora Infrastructure Bond. This would need focused marketing and appropriate incentives/commissions for financial institutions in key NRB markets in the US, UK, Europe and the Middle East.
- Infrastructure Development Funds (IDFs) can play an important role by investing in securities (debt and equity) issued by a pool of infrastructure projects. Governments in both developed and emerging market economies have supported the development of infrastructure financing through such funds. Such funds can issue bonds to private investors, guaranteed by the government, to raise core capital. The government can also contribute directly through seed money, as already done by the Government of Bangladesh by transferring resources from the budget to Bangladesh Infrastructure Financing Facility.
- Tax incentives have been provided in many recent IPP contracts and similar incentives can be provided to encourage investors to channel funds towards infrastructure.

3. Financing Requirements, Financing Mix, and Role of Banks

Ensuring Power Sector Project Financing for Both Public and Private Sector Projects:

The power sector strategy underpinned in the Seventh Plan is based on efficient power supply through large and medium-sized projects rather than reliance on a multitude of small-scale rental plants. But, so far, much of the additional private electricity supply has come from quick rental power plants that supply electricity to the national grid at a much higher unit cost than from other sources owing to the use of liquid fuel. This is a major issue to be addressed by the government and a quick exit from the liquid fuel based

high cost generation sources must be secured. With continued dependence on quick rental power plants with high generation cost, financial viability of the power sector will not be achieved, power tariffs would not be affordable to consumers, and competitiveness of exporters and other manufacturers' may be lost.

Beyond the medium term, the scale of investment in the power sector would need to be boosted significantly so that the net power generation capacity could be enhanced to the levels envisaged under the PP projections. The two electricity demand projections have been prepared using the baseline GDP growth under the PP, and variations in assumptions related to elasticity of power demand over the long term. Scenario1, which we call the baseline scenario, envisages electricity demand to increase by 10-fold to 92.6 thousand MW by FY41. The elasticity assumption under the baseline scenario is quite realistic starting from 1.5 in the base year and thereafter steadily declining to 0.9 by the end of the PP projection period.

Table 14: Power Demand Forecast

Fiscal Year	FY16	FY20	FY21	FY25	FY26	FY30	FY31	FY35	FY36	FY40	FY41
Real GDP growth (%)	7.1	8	8.1	8.5	8.6	8.9	9	9.4	9.5	9.8	9.9
Elasticity of power w.r.t. real GDP Scenario 1	1.5	1.4	1.35	1.15	1.10	1.5	1	1	0.95	0.95	0.90
Elasticity of power w.r.t real GDP Scenario 2	1	1	1	1	1	0.9	0.9	0.9	0.9	0.9	0.9
Change in Demand (%) Scenario 1	10.65	11.20	10.93	9.77	9.46	8.90	9.00	9.40	9.02	9.31	8.91
Change in Demand (%) Scenario 2	7.1	8	8.1	8.5	8.6	8.9	8.1	8.46	8.55	8.82	8.91
Forecasted Demand (MW) Scenario 1	9229	14054	15591	23012	25189	35371	38554	54924	59881	85047	92625
Forecasted Demand (MW) Scenario 2	8933	11940	12908	17790	19319	27022	29211	40221	43660	60921	66349

Source: PRI staff projection.

We also have prepared a second scenario with extremely low elasticity assumption, starting from 1 currently and coming down to 0.9 by FY41. Electricity demand in Bangladesh has grown by more than 9% in recent years despite compression of demand growth due to generation capacity and transmission and distribution problems. During this period, the real GDP growth was at a healthy pace of more than 6%. Thus, elasticity of 1.5 appears more reasonable given the current state of development in Bangladesh. For a fast- growing economy like Bangladesh, growing out of a very low base, it would be unreasonable to expect that demand for power would be growing at a rate less than the expansion of real per capita real GDP or real income.

The generation requirement of 92.6 thousand MW is much higher than the level of generation projected in PSMP 2016, and reasons for the wide difference is explained in Box 1. Generation cost for this level of power generation, including the high cost Ruppur Nuclear Power project with capacity of 2,400 MW at the cost of $13 billion will take the total investment requirement for power generation alone to more than $100 billion

at current prices or equivalent to 40% of 2017 GDP. In addition to generation, massive amounts of investment will be required for power transmission and distribution, and for ensuring the transportation logistics for coal based power plants with imported coal. Thus, the total power sector investment bill may easily approach $120 billion over the PP projection period in constant 2017 dollar.

Mobilization of such a massive financing requirement will require active and broad based private sector participation of domestic and foreign origins. The financing challenges are massive and have been discussed also in Section III.

Availability of Foreign Currency: Higher levels of foreign currency reserves of the central bank usually enhances the country's ability to finance large infrastructure projects which require external financing. As discussed in the subsequent sections on issues related to project financing, external financing in the form of medium- and long-term equity and debt plays the most important role in financing power sector large projects. External creditors are more assured about Bangladesh's capacity to repay when they take note of its sovereign ratings and the level of foreign exchange reserves. Bangladesh currently has a very comfortable level of foreign exchange reserve, but the challenge is to sustain the growth of foreign exchange reserves in line with the economic expansion. This will require continued macroeconomic stability along with strong balance of payments position over the long term.

a) Financing Requirements, Financing Mix

Plugging the energy gap will require $120 billion of additional investment up to FY41 in terms of generation, transmission and distribution. Bangladesh's power sector will create opportunities for private banks to lend between $20 billion and $30 billion by 2030, as the country struggles to narrow the gap between demand and supply of electricity.

The share of private-sector financing in power projects has already exceeded 50% according to the Power Development Board. Previous large independent power producer (IPP) projects had a debt component of around 60-70 percent, with the rest coming from equity financing. At the initial phase, when new IPP projects were negotiated and efforts were made to secure financing for the IPPs, much of the debt component was obtained through securing of debt from multilateral organizations, GoB guarantee or partial risk guarantee by multilateral organizations. Even for the new IPPs under the PP a similar approach would be needed to ensure financial closure of the projects. Putting together the financing package for IPPs with multiple parties including public, private and multilateral organizations is always a complex and time-consuming process. For example, Summit Power received several contracts for setting up large power projects during 2011-12. However, it was not easy for the firm to put together the financial packages for these projects. In the event, Summit Power could not secure financing for all the projects awarded and had to surrender one or more major project to the government. It also required partial risk guarantee and investment from multilateral organizations like IFC and ADB. Lack of transparency in the bidding process also contributed to initial difficulties and delays in achieving financial closure of the IPP power projects.

Over time, as Bangladesh moves up the income ladder and Bangladesh's track record in implementing larger power plants is well established, a larger part of the debt financing is likely to come from private (foreign and domestic) lending sources, as the country is likely to become more credit worthy from foreign private investors' perspective and as it becomes less eligible for multilateral concessional financing. Private sources could provide up to a maximum of 60 percent of project financing over the medium to long term. If we assume a 60 percent private-sector share over the medium term, this suggests that $72 billion of the additional investment required for power projects up to FY41 must come from private sources. On this basis, the analysis sees minimum potential for bank financing of power projects until FY40 at about $20 billion and the maximum potential at $30 billion.

Private commercial banks have already stepped in. Recently, Standard Chartered Bank raised US$190 million from international lenders for the 335 MW electricity plant of Summit Meghnaghat Power Company Ltd in a single largest funding for any private power company in the country. The British bank itself has contributed US$40 million to the fund. The unique feature of the project is that international lenders have come forward with long-term financing for a local project with a local firm. Total project cost was US$ 318 million, of which the US$ 190 million will be long-term debt with 12-year tenure with 18 month grace period. A good part of the loan will be used to repay loans borrowed from the local consortium of banks. The local banks which provided initial short-term financing for the Meghnaghat Power Company include BRAC bank; Dhaka Bank; Dutch Bangla Bank; First Security Islami Bank; ICB; Mutual Trust Bank; Standard Chartered Bank; One Bank; Southeast Bank; Shahjalal Islami Bank; and Trust Bank. Non-resident Bangladeshis and domestic Mutual Funds also participated in the initial financing of the project. This example highlights that local banks have a significant role to play in financing power sector projects.

b) Infrastructure Project Financing Facility (IPFF)

Government has taken the Investment Promotion and Financing Facility (IPFF) Project to make available partial debt financing through private sector financial intermediaries for eligible, government-endorsed infrastructure projects, to be developed by the private sector. Projects developed solely by the private sector but identified by the Government to be in the public interest will also be eligible for financing. The objectives of the project are to: a) supplement the resources of the financial markets of Bangladesh to provide term finance for infrastructure investment projects; and b) promote the role of private sector entrepreneurs in the development of infrastructure. Although legally IPFF belongs to the Ministry of Finance, since it is a financial institution, its operations are managed by Bangladesh Bank and it is also physically located in the Bangladesh Bank premise.

The World Bank has scaled up its support for the IPFF for infrastructure development and diversification through leveraging private recourses. The project also helps to build the capacity of the local financial sector for longer term financing to the much needed private-public partnership (PPP) ventures in infrastructure. The project is working in close collaboration with PPP Office and relevant line ministries to develop a pipeline of projects belonging to diversified sectors. The PPP Office, fully operational from January 2012, took the lead in developing the project pipeline. IPFF has successfully completed first phase of its operation by disbursing 100% of its credit line (on-lending component) to seven small power plants through different banks and financial institutions, contributing 178 MW of electricity to national grid.

Considering the continuing demand of IPFF loan, a follow-on project titled "IPFF II Project" has been taken up by Government of Bangladesh (with financial support of the World Bank) with a view to creating sustainable platform for long-term financing in infrastructure and further strengthening skills and abilities of the private sector to fill the substantial infrastructure gap in Bangladesh. The IPFF Project Cell of Bangladesh Bank will continue as the Project Implementation Unit (PIU) for IPFF II. The estimated cost of IPFF II project is US$ 416.70 million. The proposed tenure of IPFF II Project is 5 years, i.e. from July 2017 to June 2022. As of now, IPFF has provided $226.31 million to improve the power capacity of this country adding 589 MW (including Phase I and II). The list of successful IPFF projects in the power sector is shown below:

Table 15: Successful Projects in Power Sector under IPFF Financing

SL no.	Name of	Participating	Capacity	Financing From IPFF
				In USD (millions)
1	Doreen Power Generations and Systems Ltd. At tangail, Feni and Naesingdhi	NCCBL	66 MW (22*3)	24.6
2	Doreen Power House and Technologies Ltd. At Feni	DBL, EBL & IIDFC	11 MW	2.61
3	Regent Power Ltd. At Barabikunda, Chittagong	EBL, IDLC & UFIL	22 MW	7.96
4	United Power Generation & Dist. Co. Ltd. At Chittagong EPZ	DBBL	44 MW	15.45
5	United Power Generation & Dist. Co. Ltd. At Dhaka EPZ	DBL, EBL & IIDFC	35 MW	13.2
6	Baraka Patenga Power Limited	UCBL & TBL	50 MW	28.97
7	Dhaka Southern Power Generations Ltd	NCCBL	55 MW	26.9
8	Midland Power Company Ltd	EBL, MTBL & TBL	51 MW	19.15
9	United Ashuganj Energy Limited	DBL,TBL & MTBL	200 MW	58.5
10	Dhaka Northern Power Generations Ltd	TBL	55 MW	28.97
TOTAL			**589 MW**	**226.31**

Source Bangladesh Bank

Despite a sharp rise in lending in the second phase, the overall lending portfolio under IPFF is rather disappointing compared to what was initially expected. Total lending in the power sector as of now is $226.3 million which is substantially better than the portfolio under phase one. However, it is very small compared with the rapidly growing infrastructure needs of the country. It has not succeeded to tap domestic and international markets for mobilizing long-term financing for infrastructure projects in Bangladesh. It depends solely on official multilateral financing (particularly from the World Bank) for its funding. It has remained as an adjunct institution of Bangladesh Bank and could not establish itself as a strong institution for mobilizing long-term resources for infrastructure financing. If this institution can be strengthened, domestic banking system should be able to depend on it for on-lending to large private and PPP based power and other infrastructure projects in Bangladesh.

c) Infrastructure Development Company Limited (IDCOL)

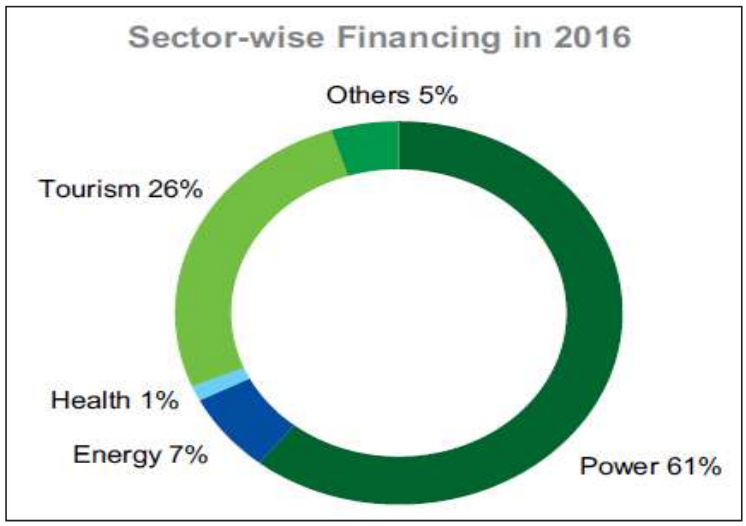
Infrastructure Development Company Limited (IDCOL) was established in 1997 by the Government of Bangladesh with financial support from international multilateral organizations. The Company was licensed by the Bangladesh Bank as a non-bank financial institution (NBFI) in January 1998. Since its inception, IDCOL is playing its role in bridging the financing gap for developing medium to large-scale infrastructure and renewable energy projects in Bangladesh. The company now stands as the market leader in private sector energy and infrastructure financing in Bangladesh.

IDCOL's mission is to catalyze and optimize private sector participation in promotion, development, and financing of infrastructure as well as renewable energy, and energy efficient projects in a sustainable manner through public-private-partnership initiatives.

In 2001, IDCOL Financed the first Independent Power Plant (IPP) Project- 450 MW Meghnaghat Power Ltd. IDCOL is the largest local financier in the power sector of Bangladesh and has co-financed Tk. 1.5 billion for installation of more than 1500 MW of power plants. Following are the major projects financed/approved by IDCOL:

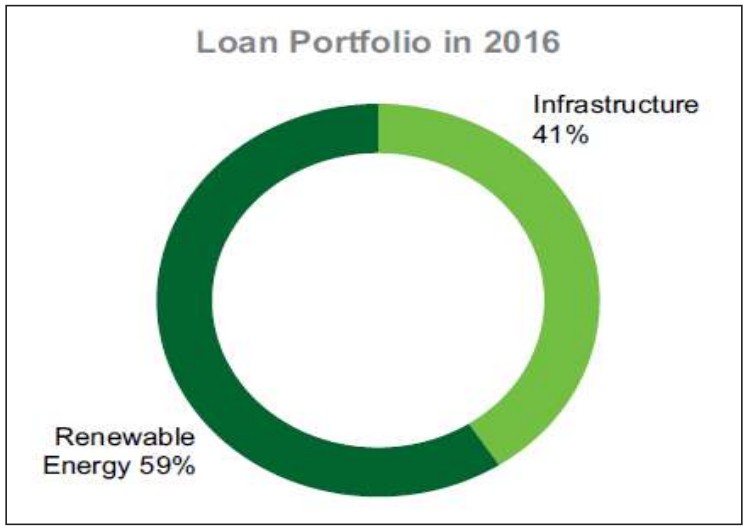
IDCOL is implementing and financing several renewable energy programs which include Solar Home System (SHS) Program, Biogas Program, Improved Cookstoves (ICS) Program and other renewable energy projects such as solar irrigation pump, solar minigrid, biogas/biomass based power plant etc. By 2016, 4.1 million Solar Home Systems (SHS) were installed under IDCOL SHS program providing clean electricity solution to 18 million rural people living in the off-grid areas of Bangladesh and expects to create a green revolution in the agricultural sector of the country through its solar irrigation program. The sector wise financing and loan disbursement for FY 16 show the vital role IDCOL plays in the infrastructural development of the power sector and renewable energy projects.

Figure 12: Sector Wise Financing by IDCOL for FY 16



Source: IDCOL Annual Reports

Figure 13: Loan Portfolio of IDCOL for FY2016



Source: IDCOL Annual Reports

VIII. Concluding Observations

Bangladesh has certainly made significant progress in adding power generation capacity to meet the growing demand for power in Bangladesh, despite growing shortage of natural gas supply as the primary fuel. Starting from an initial situation of massive shortage of power due to lack of investment in the sector over a prolonged period, the progress on the generation side has been impressive. Simultaneously, the gains made on access to electricity, per capita consumption of electricity, and reduction of system loss are commendable achievements. If the pace of new electricity connections in recent years is sustained, the government objective of providing electricity to all households across Bangladesh will be realized by FY21. The rapid expansion of the role of private sector in electricity generation and the success in mobilizing financing for the new power generation projects are also praiseworthy.

At the same time, there are important issues that have emerged and need to be addressed in order to sustain the progress that has been made since 2010 and support the ambitious growth targets envisaged under the PP. At a broader level, sustaining the progress and supporting the PP growth objective will require providing quality electricity supply in abundant quantity and at affordable and competitive prices. The key challenges are in the following areas:

- Making electricity available at affordable prices for the business, industry and households and at the same time eliminating subsidies from the budget will require substantial efficiency gains at every level of operation, which will also ensure long-term sustainability of the power sector. The rapid increase in power tariff experienced in recent years cannot continue for long without making Bangladesh industry uncompetitive in the export and domestic markets.

- Achieving the 10-fold increase in generation capacity to more than 90,000 MW by FY41, as envisaged under the PP baseline scenario described above, will face many major challenges in terms of sourcing of primary energy mix, overcoming the shortage of natural gas supply, investing in logistics for handling/import of coal and LNG, cross-country transmission networks and trade in electricity with proper regulatory regimes in place.
- Mobilization of the associated massive amounts of financing for investments in power generation, transmission and distribution, handling of coal and LNG imports will remain a major challenge, despite the recent success in financing many private and public sector power plants.
- Bangladesh lies in the midst of a sub-region that is well endowed with hydropower with huge production potentials in Bhutan, North-Eastern India, and Nepal. Furthermore, there are huge trade potentials for importing power from solar and coal based sources in India at more competitive prices. Long-term investment with the sub-regional partners in power distribution and transmission network, and allowing import of power from government to government (G-to-G), business to business (B-to-B) or business to government (B-to-G) level should be more actively considered to promote trans-boundary power generation and free flow of electricity across the South Asian sub-region through market mechanism.
- Liberalization of domestic power generation, domestic trade/distribution of power, and marketing of electricity power at the retail level with a view to improving efficiency and enhancing competition will require putting in place proper regulatory regimes.

The PSMP 2016 has appropriately identified many of these challenges, but it appears that the government has to go well beyond the generation, transmission, and investment targets established under the PSMP 2016 since the growth objectives under the PP are much more ambitious with a view to transform Bangladesh into a high-income country by FY41. The growth objectives under the PP is almost twice the growth targets assumed under the PSMP 2016, thus essentially entailing huge mismatch in demand and the required generation capacity between what the government aims to achieve under the PSMP 2016 and what would be required under the PP. Since the PSMP 2016 objectives are less ambitious and not compatible with the ambitious PP objectives, in order to ensure compatibility, the PSMP 2016 should be appropriately revised/updated following the approval of Perspective Plan by the Government.

PSMP 2016 envisages a bigger role of the private sector, but the coverage of potential roles for the private sector was limited primarily in terms of investment and ownership of power plants for generation purpose. Private sector risk is mitigated through power purchase agreements (PPA). Under the current system where transmission and distribution are handled by state monopolies, which is perhaps a sensible way to mitigate private sector risk. However, in the process public sector is essentially taking almost all risks on to its shoulder and made private sector investment in the power sector virtually risk free. This modus operandi is fine in the short to medium term, but will be very costly and inappropriate over the long term. In order to foster private sector participation and competition at all or most stages/segments of the power sector, Bangladesh needs to encourage private

sector participation at the retail end, as commonly practiced in European countries. If the private sector can be allowed to participate in all three stages of operation—generation, transmission and distribution at the retail level—public sector cag gradually get out of its monopoly position in the transmission and retail distribution/sale. Such liberalization would increase efficiency through enhanced competition and will enable the business risk sharing by the private sector. Over the long term, the government role should primarily be limited but focused on market regulation with an eye to protecting public/consumer interests and fostering sustained growth by maintaining environment for increased private investment in the power sector.

Part-4

Managing the Urban Transition in a Rapidly Growing and Transformational Economy

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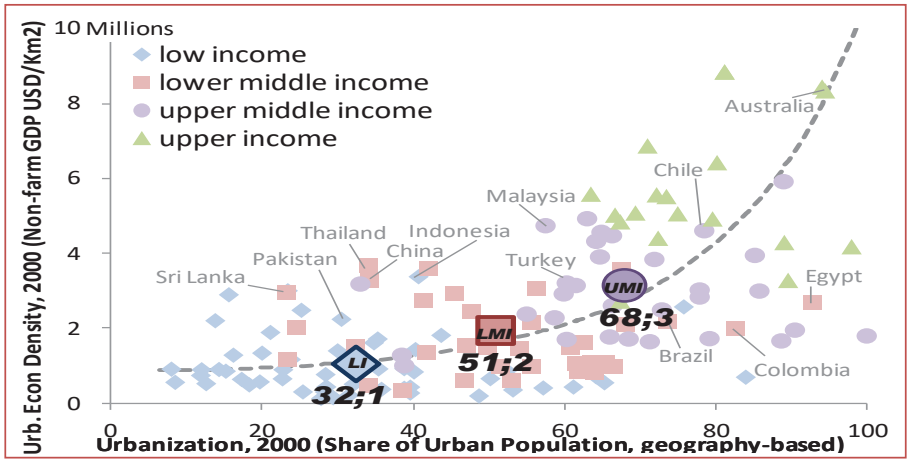
Managing the Urban Transition in a Rapidly Growing and Transformational Economy

1. Urbanisation and Development

Urbanization and development are highly and positively correlated. Cities lead the growth engine owing to high economic density ((value-added per unit of space) and proximity to the factors of production. It is no accident that high- and middle-income countries are more urbanised and their urban areas have higher economic densities than low-income countries (Figure 1). The correlation between urbanisation and GDP is indicative of the productivity advantage of urban areas.

Figure 1: Urbanisation, Urban Economic Density and GDP (2000)

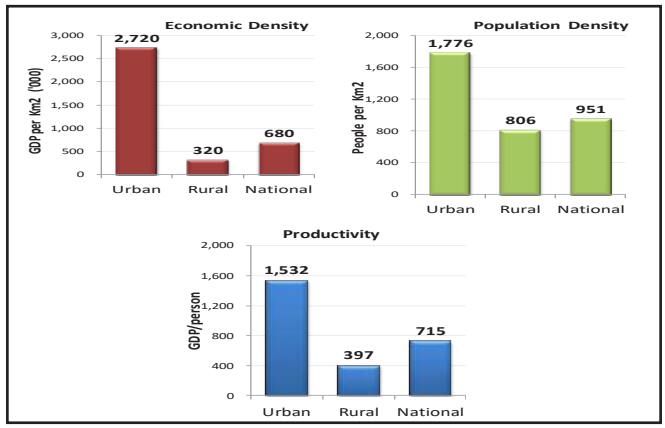


Source: World Bank (2012)

Bangladesh is no exception (Figure 2). The urban-rural value-added and productivity differentials in Bangladesh are larger than the population density differential (World Bank 2012).

- Population density in urban areas (1,800 people per km2) is twice as high as in rural areas (800 people per km2). As compared to this, urban economic density (US$2.7 million per km2) is eight times as high as rural economic density (US$320,000 per km2).
- The average GDP per capita in urban areas (US$1,500) is almost four times as high as in rural areas (US$400).
- It is obvious that urban areas have been the growth centres for Bangladesh

Figure 2: Rural-Urban Density and Productivity Differentials in Bangladesh[6]

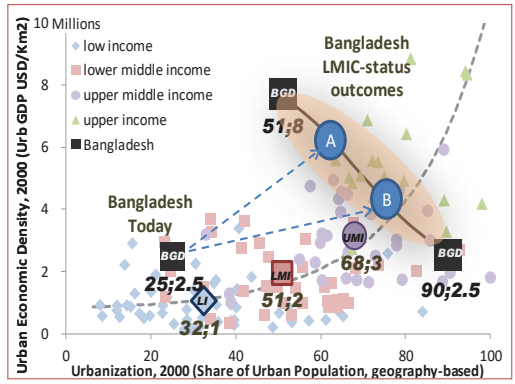


Source: World Bank (2012)

Urbanisation and economic growth will therefore go together in the future as Bangladesh aspires to attain Upper Middle-Income Country (UMIC) status by FY2031 and High-Income Country (HIC) by FY2041. But there are two possible spatial economic paths to UMIC and HIC for Bangladesh (Figure 3). The first entails a shift toward a higher-value-added products and services in the existing urban growth centres (Dhaka and Chittagong). The second calls for higher diversification into non-farm production and employment outside Dhaka and Chittagong. This later strategy results in a more diversified urbanisation with greater economic role of other cities.

While both paths are possible, as exemplified by the experience of several HIC and UMICs, the present chaotic experience with concentrated urbanisation in Bangladesh suggests that path B that entails a more diversified pattern of urbanisation would appear to be a less risky option

Figure 3: Urbanisation Path to UMIC– A Scenario Analysis[7]



Source: World Bank (2012)

6 Based on FY2010 data.

7 The original World Bank analysis was done in 2012 and used 2021 as the reference point for MIC. Bangladesh in 2012 was a low-income country (LIC). Bangladesh achieved lower middle income (LMIC) status in 2015. It now aspires to move to UMIC and HIC. However, the underlying analytical framework for urbanization scenario remains unchanged.

The pattern of urbanisation is an important determinant of the GDP growth rate for many reasons:

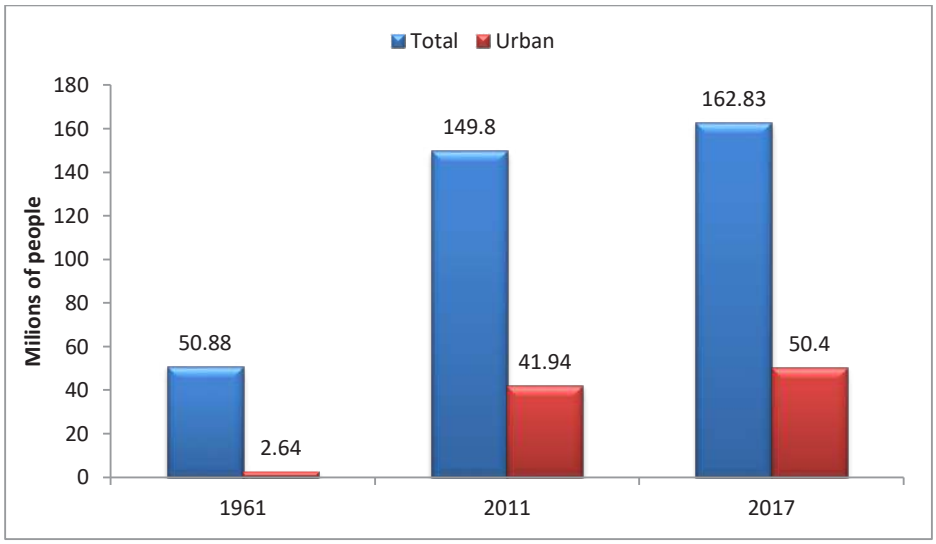
- Private sector investment is necessary to accelerate growth.
- Urban areas are attractive locations for firms because they provide better access to factor and goods markets, infrastructure and proximity to services.
- But urban centres also tend to be costly locations as concentration increase the cost of land and wages.
- If urbanisation is not properly managed, it can lead to congestion, pollution and inefficiencies in service provision. These could choke off the growth engine.

2. Urbanisation Experience in Bangladesh

Rapid growth of urban population

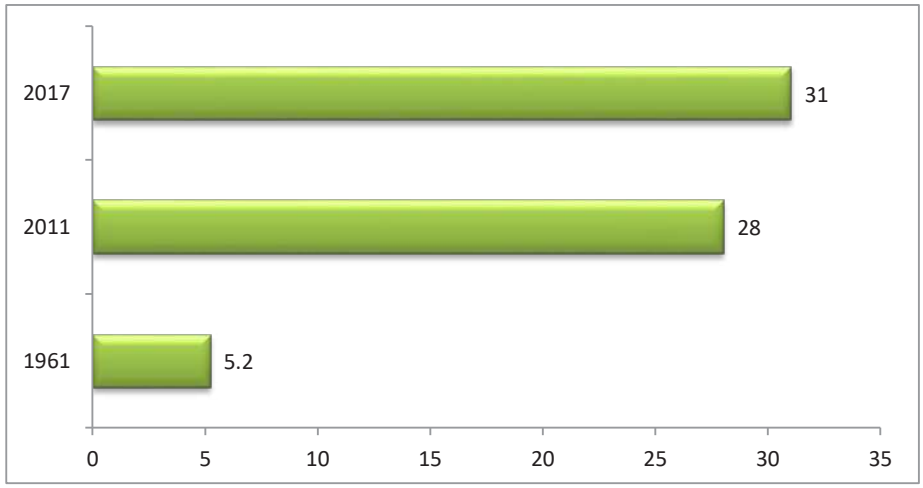
Over the 50 years during 1961-2011, the Bangladeshi population nearly tripled in size, growing from 51 million to 150 million (Figure 4). The urban population increased nearly twenty-fold, galloping from less than 3 million in 1961 to 42 million in 2011 (Figure 4). Owing to these population dynamics, the share of urban population grew from around 5 percent in 1961 to 28 percent in 2011. It is projected to have reached 31 percent in 2017 (Figure 5). The urbanization trend started early from the 1960s and gathered momentum in the 1970s after independence. The growth of urbanization was particularly rapid between1974-1981. Since 2001 the pace has stabilized at around 3%, but still 2.5 times faster than the national population growth (Figure 6).

Figure 4: Urbanization in Bangladesh



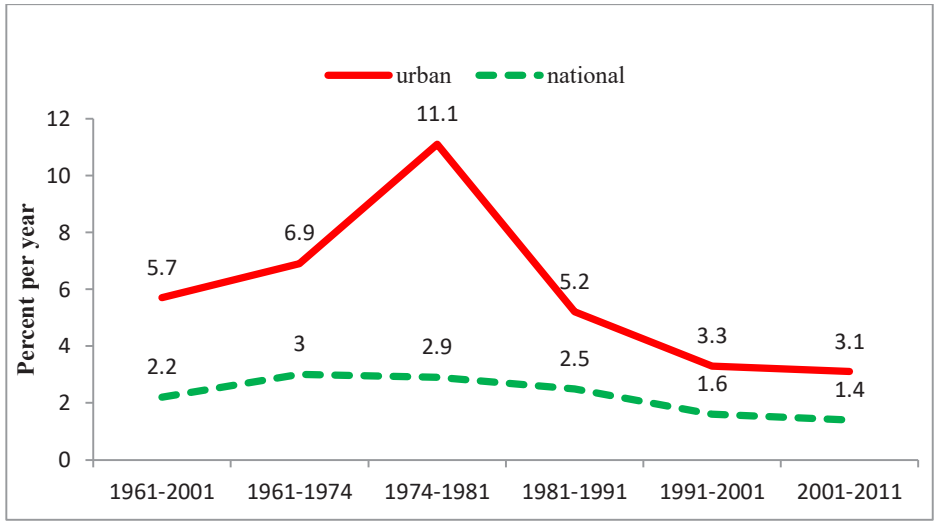
Source: Bangladesh Bureau of Statistics (BBS) 2011

Figure 5: Share of Urban Population (%)



Source: BBS 2011

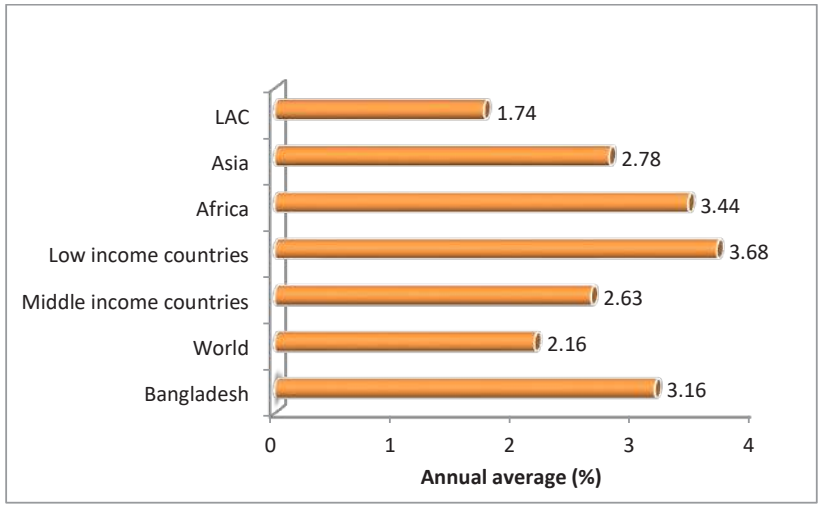
Figure 6: Pattern on Urbanization



Source: BBS 2011

Although the urban growth in the first phase (1961-1991) was very high (6.4% growth rate per year), the urban growth in the recent 20 years has been more in line with the observed international pattern (Figure 7). Nevertheless, Bangladesh continues to urbanize at a faster pace than the averages for Asia, Latin America, the middle-income countries and the world a whole. Africa and low-income countries are urbanizing faster than Bangladesh, but they are more comparable with the first phase of urbanization experience in Bangladesh compared to this more recent phase.

Figure 7: Urban Growth International Comparison 1995-2015

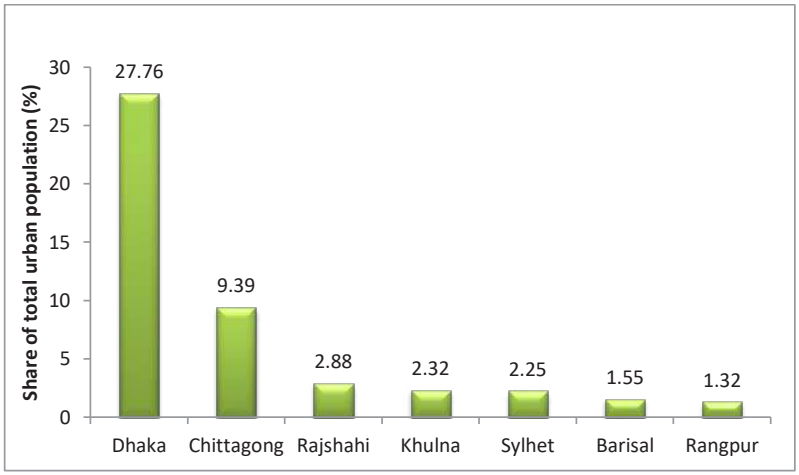


Source: United Nations 2016.

Heavy Urban Concentration: Primacy of Capital City Dhaka

A major characteristic of the ongoing urbanisation experience in Bangladesh is the heavy concentration of urban population in the capital city of Dhaka (Figure 8). Along with population there is also a heavy concentration of economic activities in Dhaka. The next largest city is Chittagong, which is about a third the size of Dhaka. It is a port city and has also attracted considerable private sector interest. Dhaka and Chittagong together have served as the primary growth centres for Bangladesh over the past two decades. The other five divisional city centres, Rajshahi, Khulna, Sylhet, Barisal and Rangpur have failed to take-off as growth centres.

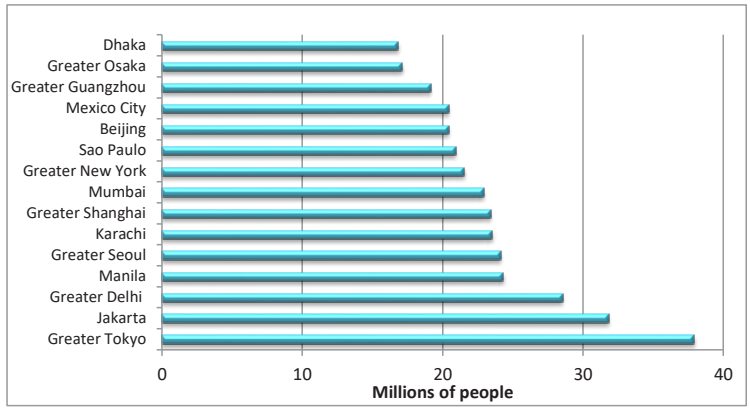
Figure 8: Primacy of Dhaka



Source: BBS 2011

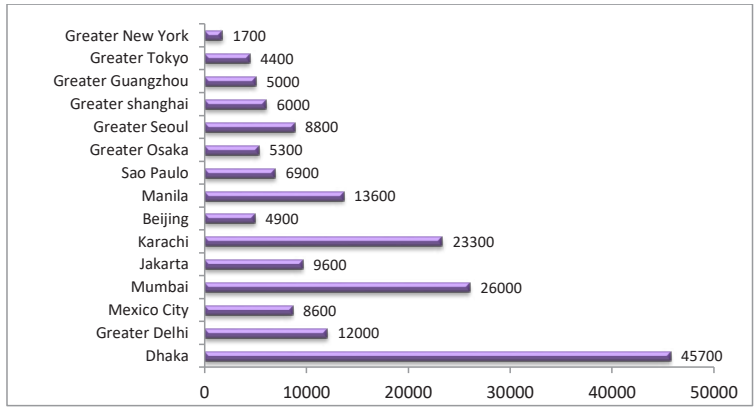
Dhaka Metropolitan City was ranked the15th largest metropolitan city of the world in 2016 by the Demographia 2017 (Figure 9). Projections by the UN suggests that if the present pattern of urbanization persist then by 2030 Dhaka will become the 6th largest metropolitan city in the world (UN 2016). This will pose a tremendous urbanisation challenge. Dhaka is already the most densely populated metropolitan city of the world (Figure 11). For example, the average population density of Dhaka megacity is 27 times more than Metropolitan New York and 10 times more than Metropolitan Tokyo. It is simply incredible to imagine the implications of further increases in the density of Metropolitan Dhaka for city logistics and the livability of the city. The risks of such high urban concentration are obvious. The other major cities of Bangladesh including Chittagong are much less densely populated and can accommodate much more of the urban population than Dhaka. Yet, there is very little indication at present that a more balanced city development spread over to at least the 7 divisional city centers is underway. This is one of the biggest challenges for urban development strategy for Vision 2041. There is a lot that Bangladesh can learn from the experiences of China, Japan, Korea and the USA in managing urbanization.

Figure 9: The World's Mega Metropolitan Cities



Source: Demographia 2017.

Figure 10: Population Densities of Megacities



Source: Demographia 2017.

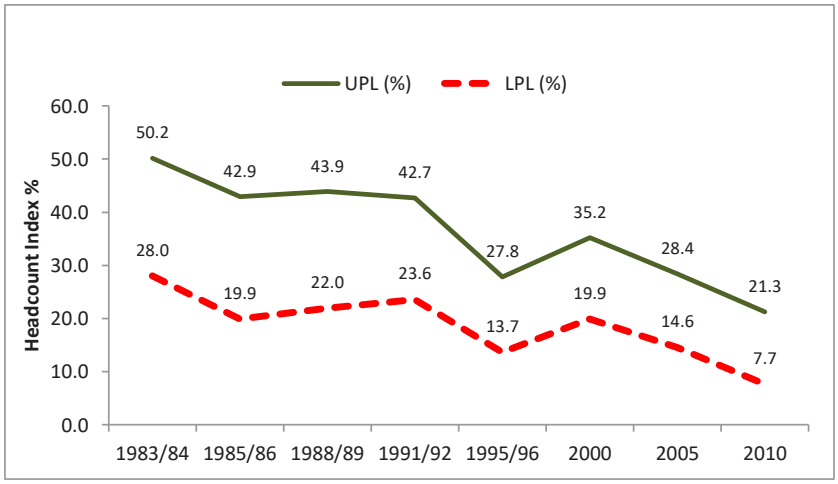
Haphazard Urbanisation

Although the urban areas, especially Dhaka and Chittagong metropolitan cities, have been the leading growth centres of Bangladesh, urbanisation has been haphazard. Some of the characteristics of this disorganized and unplanned urbanization have been particularly worrisome, especially regarding housing, basic urban services and urban natural environment, although progress with urban poverty reduction has been solid.

Urban Poverty

Consistent with national poverty performance, urban poverty has been on a declining trend over the longer term (Figure 11). The poverty reduction progress has been particularly good during 2000 and 2010. Both moderate and extreme poverty fell, but extreme poverty declined at a much faster pace. Urban poverty fell faster than rural poverty despite considerable rural-urban migration and a rising share of urban population in total population. Notwithstanding this progress, the number of moderate urban poor is large – an estimated 9.2 million poor in 2010.

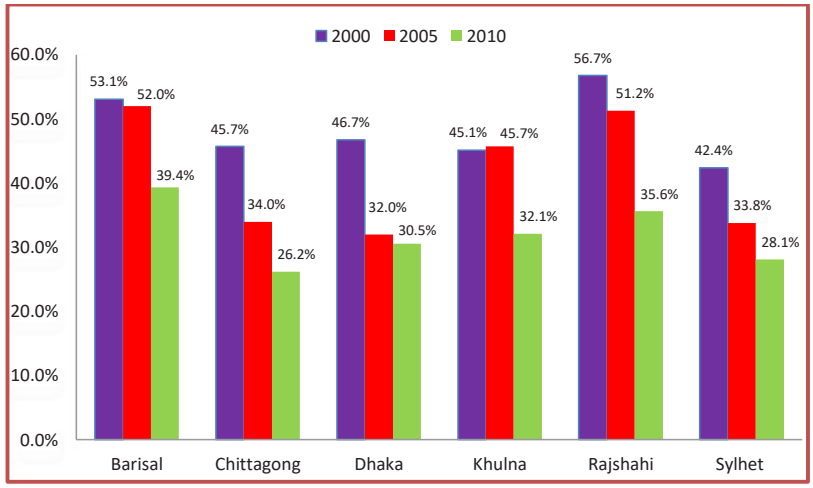
Figure 11: Urban Poverty Trend



Source: BBS HIES Various Years

The spatial distribution of urban poor varies considerably (Figure 12). Well until 2005, urban poverty was a serious problem in Barisal, Khulna and Rajshahi, exceeding 50% in Barisal and Rajshahi and 46% in Khulna. In comparison to this, the urban poverty incidence was in the low 30% range in Chittagong, Dhaka and Sylhet. There was a substantial narrowing of the spatial urban poverty gap between 2005 and 2010. Urban poverty fell much faster in Barisal, Khulna and Rajshahi. Urban poverty progress remained strong in Chittagong and Sylhet, but slowed considerably in Dhaka owing to migration of poor form other divisions, especially Barisal and Khulna. In 2010, Chittagong and Sylhet Divisions exhibited significantly lower urban poverty incidence than Dhaka. Despite this progress in 2010 and continued out-migration, the urban poverty incidence remained high in Barisal and Rajshahi in 2010.

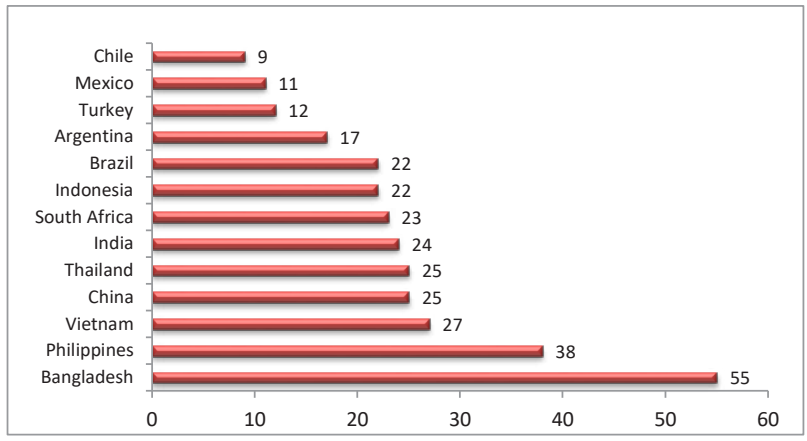
Figure 12: Trend in Divisional Urban Poverty (UPL)



Source: BBS HIES Various Years

The quality of life of the urban poor is particularly bad. Owing to high land and housing prices and high rental costs, most of them cannot afford to rent a proper home forcing them to live in slum areas characterized by sub-human living conditions. An estimated 29.3 million people of Bangladesh (55% of the entire urban population) live in slum areas (UN 2016)[8]. This is amongst the highest percentage of slum dwellers outside Africa and for lower middle-income countries (Figure 13). Much of the slum population lives in Dhaka. As a result, this percentage is even higher for Dhaka city.

Figure 13: Proportion of Urban Population Living in Slums (%)



Source: UN 2016

8 The definition of slum population used by the United Nations Human Settlement Programme is very different from the one used by the Bangladesh Bureau of Statistics. The UN defines the slum population as population living in household that lack either improved water, improved sanitation, sufficient living area (more than three persons per room), or durable housing.

Urban Housing Crisis

- Growing urbanization has put serious pressure on urban land. Consequently, urban land and housing prices have soared. In particular, large concentration of economic activities in Dhaka and Chittagong has put insurmountable pressure on land prices in these metropolitan areas. Availability of urban land in these cities, especially Dhaka, has now become a binding constraint to manufacturing sector growth. For example, land prices in Dhaka grew by almost 100% per year between 1972 and 2012 (Ahmed 2012).
- Owing to the high cost of land, housing for low and even middle-income families has become unaffordable in Dhaka and Chittagong. For example, according to 2011 Population Census (BBS 2011) while 49% of total urban households own their own homes, only 16 % of households in the Dhaka City Corporation jurisdiction and 28% in Chittagong City Corporation jurisdiction have home ownership.
- The quality of housing is a serious concern. In 2011 only 32% of the dwelling was pucca and another 325 was semi-pucca. The remaining 36% was either kutcha or jhupri (BBS 2011)
- The housing crisis seems to have worsened in recent years due to soaring land prices. The fact that some 55% of urban population lived in the slums in 2014 as compared with a poverty incidence of 21% in 2010 suggests that some 34% or more of urban dwellers are above the moderate poverty line. But their income is not adequate to enable them to afford a decent living space. Affordable housing is one of the most important urbanization challenges in Bangladesh.

Traffic Congestion

- Transport congestion has reached nightmare proportions in Dhaka. It takes an average of 1.5 hours to commute to work each way within 7-8-kilometer distance. In some instances when there is a public event, movement of high officials and heavy monsoon rains, traffic movements come to a virtual halt for hours. Traffic pattern in Chittagong, although less congested than Dhaka, can also be very difficult.
- Mass transit options are absent in all cities. Buses, public or private, are over-crowded and environmentally unsafe.
- Human-pulled Rickshaws are environmentally safer, but they add to the traffic congestion and slow-down of traffic movement while also presenting serious safety risks.
- Safe walking options are virtually absent in Dhaka. In addition to health risks from air pollution, standing garbage and overflowing sewerage drains, pedestrians face the risk of being run over by a moving vehicle and/ or becoming a source of traffic accidents.
- Weak zoning laws and poor parking enforcement add to the chaotic urban layout and traffic nightmare.

Poor Urban Services

Many of the basic urban services are heavily constrained. Table 1 shows the access to basic services for the urban population for Bangladesh and compares this with distribution by City Corporations . The main results are:

- Bangladesh has done well to make electricity available to urban areas. The urban households in the City Corporation areas have near universal access to electricity. This is an important milestone. Yet, the average of 86.4% access suggests that a sizeable urban population outside the City Corporation areas did not have electricity as of 2011.
- In terms of basic services, such as access to tap water and proper sanitary toilets, the gap is very serious. In 2011, on average, some 63% of the urban households did not have access to tap water, while 58% of the households did not have access to sanitary toilets with water seal.
- The large service gaps by city corporations and between city corporations as a group and urban households outside city corporations provide a major indication of the weak urban planning in Bangladesh and the bias in favor of Dhaka.
- In almost all the urban centres, except Dhaka, there are no sewers. Even in Dhaka waste water treatment facility is only partial. Consequently, for Bangladesh, most human excrement and waste water ends up untreated in rivers, streams, canals and ditches creating huge water pollution problem.
- Most urban centres face problems with the collection and disposal of solid wastes. The challenge is more serious in larger urban centres where a significant percentage of the total solid waste remains uncollected.
- The drainage system is grossly inadequate in all urban area resulting in frequent flooding and water logging when heavy rain falls, especially in the monsoon season.
- Noise and air pollution have reached stressful proportions.
- The combination of water and air pollution contributes to serious health hazards in urban areas.

Table 1: Access to Basic Urban Services 2011 (Percentage)

Area	Tap water	Sanitary toilets with water seal	Urban Drainage Coverage	Electricity
Bangladesh	*37.4*	*42.0*	*28.0*	*86.4*
Dhaka City Corporation	85.4	59.1	35.0	98.6
Barisal	9.3	43.5	30.0	94.2
Chittagong	56.3	49.2	30.0	97.7
Khulna	5.3	48.7	30.0	95.4
Rajshahi	17.8	65.1	30.0	91.0
Sylhet	51.2	49.8	30.0	98.2

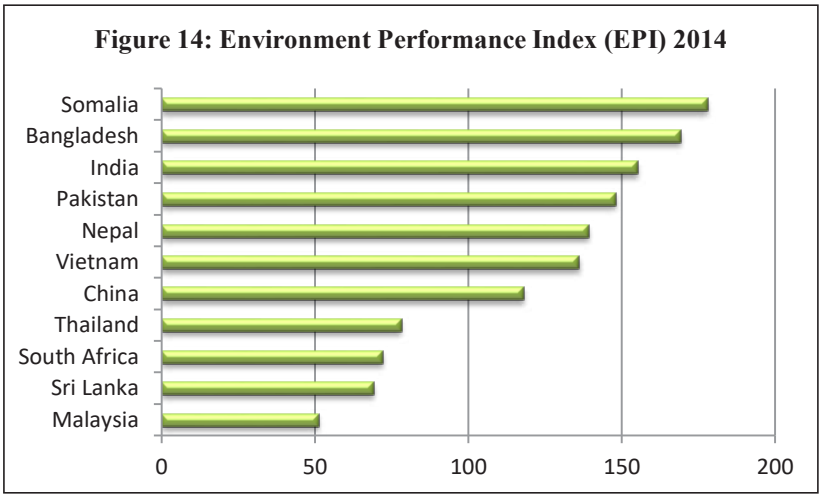
Source: BBS 2011; Urban Drainage Coverage from Government of Bangladesh 2017.

Urban Environmental Hazards

High population density, poor drainage, inadequate sewage and weak management of solid waste all combine to inflict serious damage to the urban environmental condition for Bangladesh cities. Added to that water pollution from industrial activities, especially leather and denim manufacturing enterprises, combined with severe air pollution from unregulated carbon emission of vehicles and brick fields, and emission of a large dose of dust particles from unregulated and heavy construction activities create a very difficult urban environment. The air and water pollution in urban areas, especially Dhaka, is very severe. All urban water bodies are heavily polluted from the dumping of raw sewage from human and industrial waste as well as dumping of solid waste. High population density has severely limited the availability of green space for recreational activities and clean air.

Urban air pollution: Available evidence suggests that the urban air environment in Bangladesh is amongst the most polluted in the world. For example, the 2014 Environment Performance Index (EPI) developed by the Yale Center for Environmental Law and Policy (YCELP) and the Center for International Earth Science Information Network (CIESIN) at Columbia University (YCELP- CIESIN 2014) ranks Bangladesh at 169 among 178 countries (Figure 14). Bangladesh gets a very low score of 25.61 out of 100 as compared with a score of 86.67 for the best performer Switzerland. The ranking for air quality component is even lower, at the bottom of all countries included in the list (178).

Figure 14: Environment Performance Index (EPI) 2014



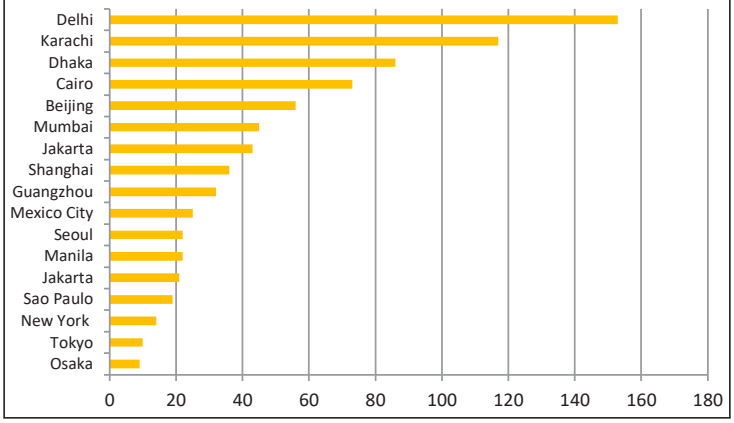
Source: (YCELP- CIESIN 2014)

Independent air quality monitored by the World Health Organization (WHO) similarly ranks Bangladesh as the 4th most air- polluted country out of 202 countries in 2014 when urban pollution is measured in terms of annual mean concentration of fine particulate matter (PM 2.5)[9]. The three countries that have higher urban air pollution are Saudi Arabia, Qatar

9 The WHO sets a standard of annual average of 10 for airborne particulate matter (PM) for particles smaller than 2.5 microns (PM 2.5). The PM 2.5 is considered fine particulate matter as opposed to PM 10 that is labelled as gross particulate matter. The presence of annual mean concentration higher than10 microns per cubic meter (µg/m3) of fine particulate matter (PM 2.5) is considered unsafe. Values of 88 µg/m3 found in Bangladesh urban areas for 2014 is an indication of very high air pollution.

and Egypt. WHO has also compiled data for 1624 cities from 91 countries for the periods 2008 to 2014. Urban air pollution found in Dhaka puts it at the bottom 2% of the cities compared. The comparison of air quality for world's top 15 megacities is shown in Figure 15. Dhaka is the third most polluted city in terms of air pollution when compared with top 15 mega cities; only Delhi and Karachi has worse air pollution than Dhaka.

Figure 15: Air Quality, annual average, µg/m3 PM 2.5



Urban water quality: The major causes of surface water pollution are related to land based activities, including industrial effluents, agrochemical, faecal pollution, and oil and lube spillage. Since the rivers are frequently used as dumps, overall inland surface water quality drops below the permissible limit of Department of Environment (DoE) standards in the dry season although it improves in the wet/monsoon season.

Industrialization has developed near the major rivers due to the availability of water and easy dumping of effluent in the absence of proper regulations. Industrialization got a boom in the early 1980s with the beginning of investment in garments sector. However, most of the industries did not consider the danger created by dumping effluent into rivers without any treatment. This has led to a serious degradation of river water quality over the years and it continues to do so.

Urban area is heavily industrialized with most of the industries located in Dhaka, Narayanganj, Gazipur, Narsingdi, Chittagong, Comilla and Khulna. Buriganga and Turag River are the two major rivers of Dhaka. They are most susceptible to water pollution from industries relating tannery, fabric dying and chemical processing, fabric washing, garments, plastic products etc. located on the banks of these two rivers (CEGIS, 2015). Dumping of untreated effluent has caused major degradation of water quality of these rivers. In many places sewerage lines also end up in these rivers carrying sewage and municipal solid waste.

The parameters that are considered to measure water pollution are: the acidic level of water (pH), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). The typical reference values for unpolluted water are: pH: ≤7; DO: >3.5; BOD5: <1; and COD: >200

The pH of Buriganga river is around 7 (Saifullah et al, 2011) and Turag river is between 6.18 and 7.46 (Mobin et al., 2013). The DO varies along the stream of Buriganga. In wet season DO is around 4.9 mg/L and in dry season around 3.7 mg/L. The BOD5 of Buriganga River is over 25mg/l in most places and it can go up to 38mg/l (Saifullah et al., 2011). Also, the COD level is very low. For Turag river the values are: DO: <1; BOD5: 5-38; and COD: 9-290. Overall, these data suggest that the waters of the two rivers are severely contaminated.

The city of Narayanganj is located along the Sitalakhya River. It is a major industrial belt and a part of Metropolitan Dhaka. The ricer Sitalakhya is heavily polluted owing to the dumping of industrial and human wastes. The pollution indicators are: pH: 6.3-8.8; DO: 0-6.2; BOD5: 2-16; and DO: <200.

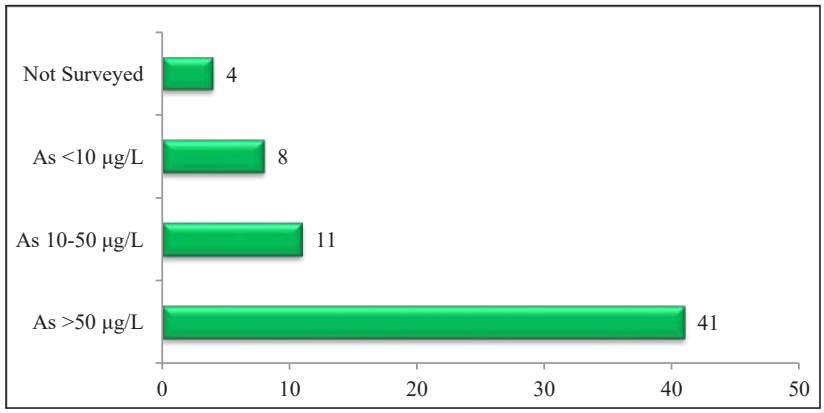
Sylhet is one of the rapidly developing urban areas and is in the hilly portion of the country. Gas based industries have boomed in Sylhet region. Surma and Khushiara are the two main rivers of this region. The urbanization of Sylhet city is a threat for the environmental quality and economic gains of the city dwellers. The pH of river water in this region varies between 6.5 and 8.5, DO value varies between 5.28 mg/L to 6.88 mg/L and BOD ranges from 27.33 mg/L to 44.33 mg/L (Rahman et al., 2013). The water of Surma River is not suitable for drinking purpose.

The main cities of west part of Coastal areas are Kushtia, Jessore, and Khulna. The major rivers of this region are Padma, Madhumati, Chitra, Rupsha, Kaliganga etc. Shrimp culture is the common practice in this area. Usually the water has higher salinity in the areas where shrimp farms are located. The pH of surface water varies from 7.29-7.46 in summer season which is higher than the ground water pH (6.46-6.71). The salinity of the ground water was higher than the surface water both in the summer and in the rainy seasons. The average ground water quality of the area is not good (Haque et al., 2010). Most of the shallow aquifers in this region are found to be saline. Salinity is also a problem for cities located in the central part of Coastal (Barisal, Patuakhali and Bhola). Shrimp culture has intensified salinity at some of the southern districts.

The eastern part of Coastal area is comprised of some of the biggest industrial cities of the country. The major industrialized cities in this region are Chittagong and Comilla. Meghna is one of the major rivers of this region. The other rivers of this region are Gumti, Titas, Haora, Dakatia etc. Ship breaking industry plays a significant role in this region's environmental quality. Ship dismantling is a reason of concern due to its economic values and environmental hazards. Up to 2.2-2.5 M tons of national steel production comes from the ship breaking industry (Talukder et al., 2015). The ship breaking yard has profound effect in its vicinity area. In the perimeter of the ship breaking yard area, DO level is low (1-5 mg/l) at some points.

The ground water of Bangladesh is heavily contaminated with Arsenic. About 25% of the national population is exposed to arsenic level above 0.05 mg/L (NWMP 2001). According to a survey report (Hossain 2006), out of 64 districts comprising 126,134 km2 of Bangladesh are exposed to the arsenic contamination in drinking water (Figure 16).

Figure 16: District wise Incidence of Arsenic Poisoning



Source: Hossain, 2006

Among the hydrologic regions, the south east (SE) and south central (SC) regions are worst affected by arsenic. The ground water of Comilla (0.17 mg/L), Chandpur (0.13 mg/L), Feni (0.1 mg/L) are well above the standard for Bangladesh which is 0.05 mg/L. Among the districts of central part of Coastal area Faridpur (0.16 mg/L), Madaripur (0.12 mg/L), Barisal (0.18 mg/L) are heavily contaminated with arsenic. Though the south west region is in a relatively better state than the other two regions, Khulna has the arsenic contamination of 0.31 mg/L which is the highest in the country. The arsenic contamination in Haor area is in the range between 0.022 mg/L to 0.09 mg/L. Dhaka's ground water has arsenic contamination of around 0.035 mg/L whereas Narayanganj has an overwhelming amount to 0.176 mg/L of arsenic in water. The eastern portion of Coastal area has overall good quality of ground water in terms of arsenic within ranges between 0.013 mg/L to 0.02 mg/L.

As evident, arsenic poisoning presents a serious threat to health for a large segment of the population. A recent study (Flanagan et al. 2012) reports that over the next 20 years arsenic-related mortality in Bangladesh (1 of every 18 deaths) could lead to a loss of US $12.5 billion assuming a steady economic growth and an unchanged population exposure to arsenic contamination.

Urban Flooding, Water Logging and Drainage Problem: The urban centers of Bangladesh are highly vulnerable to economic losses emerging from a host of natural disasters and climate change effects. The most serious threat is flooding due to poor drainage. When economic losses are measured as a share of city GDP, Bangladesh urban areas are most vulnerable in South Asia (World Bank 2016). Many urban centers are highly vulnerable to flooding, but the most damage in terms of economic losses happen to the Dhaka Metropolitan Area. This is not surprising in view of the high population density and huge concentration of physical assets in Dhaka. The challenge posed to urban flood management in Dhaka, and by implication to other urban centers, is illustrated in Box 1.

Box 1: Coping with Urban Flooding in Metropolitan Dhaka

Flooding from intense rainfall is a recurring phenomenon in Metropolitan Dhaka that contributes to substantial loss of assets and productivity and causes immense miseries to the residents. Unplanned and rapid urbanization has intensified the problem by filling up of low-lying flood plains, rivers, canals, and other water bodies, thereby preventing drainage opportunities. The Bangladesh Delta Plan (Government of Bangladesh 2017) notes that the effects of climate change will further aggravate the flooding problem in Bangladesh including Dhaka owing to a more erratic pattern of monsoon. Consequently, urgent actions are needed to cope with this challenge.

A recent study by Dasgupta et. al. (2015) provides estimates of incremental costs of infrastructure adaptation upto the year 2050. It also identifies the vulnerable populations and infrastructure, quantifies outstanding deficits in addressing current climate-related risks, and estimates the adaptation cost of avoiding further damage due to climate change. The main findings of the study are:

- "The cost of meeting Dhaka's current adaptation deficit, even without climate change, would total Tk. 2.7 billion, equivalent to just 0.35 percent of the government's annual development budget expenditure for 2014–15. Of this amount, Central Dhaka would comprise the largest investment, at about Tk. 1.4 billion.
- The added cost of closing the climate change gap would require the other Tk. 1.3 billion.
- Implementing the recommended additional investments can result in significant damage savings for Dhaka, given that the expected damage from flooding would be quite significant for the city overall. For example, if an extreme rainfall event like that of 2004 were to occur in 2050, then, without investment to address the current adaptation deficit, the increased damage caused by climate change would amount to Tk. 2.0 billion; however, it would be reduced significantly (to Tk. 0.9 billion) by investing to close the current adaptation gap.
- Such savings in damage of Tk. 1.1 billion in just one year reveal how quickly the investment of Tk. 2.7 billion in current adaptation deficit can be paid back."

It is important to note that the above values are all in 2014-15 prices. The study correctly observes that these are conservative estimates because first the intensity of future flooding events could be much more damaging and secondly, the assumption that the existing drainage pipes and connections and khals work as per expected design is too optimistic. The study also assessed the total cumulative damage between 2014 and 2050, using random assignments of 1-year to 100-year storms for each year. The cumulative damage savings would amount to Taka 96.8 billion. The potential rate of return to timely investments in urban flood control and proper drainage is indeed very high. The important points of the study are: first, the need to do a full assessment of the flooding risks in major city centers and; second, the need to take timely actions to prevent much bigger longer-term damages.

Source: Dasgupta, et. al. 2015

Poor Quality of Urban Life

The growing list of urbanisation problems in terms of traffic congestion, water and air pollution, urban flooding and water logging, and inadequate basic urban services has lowered the quality of city life, especially in Dhaka (Ahmed et. al. 2007). Several international agencies do systematic surveys on an annual cycle to provide an indication of the quality of life in the cities. The indicators differ by source of the survey and they are perception based and as such are subject to perception biases. Nevertheless, they provide a useful benchmark to compare the livability of cities. The results are:

- Mercer city livability index (Box 2) ranks Dhaka as the most unlivable of the 15 top megacities (Table 2). Indeed, among the total of 231 cities reviewed, Dhaka ranks at 204 (bottom 5% of the cities ranked).

- Economics Intelligence Unit (EIU) city livability rankings are broadly consistent with this, suggesting that the Mercer city livability rankings are not misaligned.
- When comparing the largest metropolitan cities, Tokyo, Osaka, New York, Seoul and Shanghai are rated as better livable cities than others. These mega cities belong to the top 32 % or above of all high-quality cities among the 231 that were ranked. New York and Tokyo are in the top 20%.

Box 2: Mercer City Livability Index

Mercer evaluates local living conditions in more than 450 cities surveyed worldwide. Living conditions are analysed according to 39 factors, grouped in 10 categories:

- *Political and social environment* (political stability, crime, law enforcement, etc.);
- *Economic environment* (currency exchange regulations, banking services);
- *Socio-cultural environment* (media availability and censorship, limitations on personal freedom); *Medical and health considerations* (medical supplies and services, infectious diseases, sewage, waste disposal, air pollution, etc.);
- *Schools and education* (standards and availability of international schools);
- *Public services and transportation* (electricity, water, public transportation, traffic congestion, etc.); *Recreation* (restaurants, theatres, cinemas, sports and leisure, etc.);
- *Consumer goods* (availability of food/daily consumption items, cars, etc.); *Housing* (rental housing, household appliances, furniture, maintenance services);
- *Natural environment* (climate, record of natural disasters).

Source: Mercer 2017.

Table 2: Mercer 2016 City Livability Rankings (231 Cities)

Cities	Rankings
Tokyo	44
Jakarta	143
Seoul	75
Delhi	161
Shanghai	95
Manila	135
Karachi	204
New York	44
Sao Paulo	121
Mexico City	128
Cairo	165
Beijing	119
Osaka	60
Mumbai	154
Gangzhou	121
Dhaka	214

Source Mercer 2017

3. Urbanisation Constraints

Several factors constrain urban development in Bangladesh. These include unclear legal mandate, overlapping functions and accountabilities, weak capacities, poor governance and weak finances.

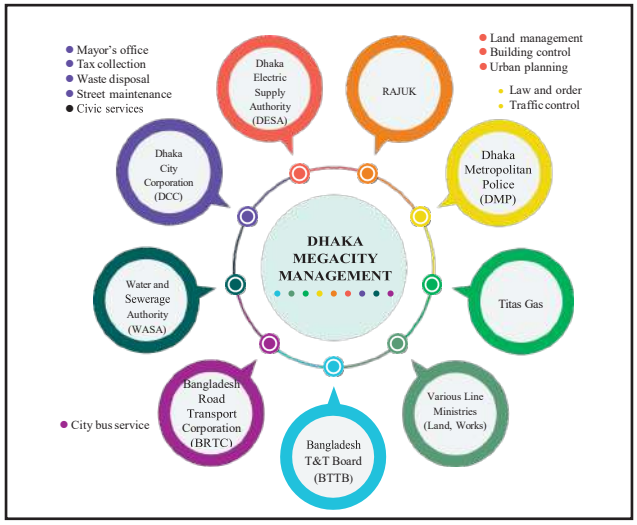
Legal Framework

Historically, the legal framework for local government institutions (LGIs) has evolved in a stop-go fashion. Some more orderly shape emerged only in recent years with five tiers: two concerning urban areas and three relating to rural areas. The two urban LGIs are: municipalities (small towns) and city corporations (large cities). The three rural LGIs are: Zila Parishads (District Councils), Union Parishads (Union Councils) and Thana Parishads (Thana Councils). However, proper allocation of responsibilities and financing has not happened. Only a limited number of functions are assigned to the urban LGIs. Even so, the demarcation of responsibilities is unclear and overlapping with other line Ministries. The governance structure in theory is democratic and is elections based, but in practice LGIs have little autonomy and are controlled by the national government. Resources available to LGIs are very limited. There is very little financial autonomy that creates a huge dependency syndrome on the national government.

Confused Overlapping Mandates

The picture of urban service delivery in Dhaka illustrates the confused and overlapping mandate problem in urban management (Figure 14). There are as many as nine specialised institutions and several line ministries providing urban services with little or no coordination, overlapping mandates, weak capacities and financial limitations. As a result, service delivery is inefficient and accountability is poor.

Figure 14: Service Delivery Arrangements in Dhaka



Source: Ahmed, et. al. (2007)

Weak Capacities

Capacities of city corporations and municipalities are weak primarily due to lack of financial resources. City Corporations tend to be somewhat stronger than the municipalities. But in general inadequacy of resources limits ability to recruit good quality and adequate number of staff. This in turn seriously constrains the quantity and quality of urban services.

Poor Governance

Although urban LGIs are elected local bodies, they have very limited political and administrative authorities (Islam 2013; Nasiruddin 2015). De facto, they basically function as extended arms of national political parties to which they belong. Urban LGIs that belong to the same political party as the national government tend to be favored in terms of resource allocation. As a result, their independence to serve their constituency is often compromised by the need to be loyal to the party higher ups. There is also frequent intervention from the members of parliament. Lack of political autonomy often results in favor distribution in matters of contract awards and selection of staff. At the administrative level, there are coordination problems with national government staff posted at the district level.

Weak Finances and Poor Financial Autonomy

Perhaps the most fundamental constraint is the inadequacy of resources available to urban LGIs and associated poor financial autonomy. Under the Legal Framework, urban LGIs can obtain resources from several sources. These include:

a) property tax;
b) rents from markets owned by urban LGIs;
c) fees from licenses issued to traders and non-motor vehicles;
d) fees from advertisements, cinema and entertainment;
e) sale of property/assets and
f) grants and loans from the government.

However, in practice, the returns are very low and resources are grossly inadequate in comparison with needs. Other than property tax, all other taxes are assigned to the national government. Transfers from national government to LGIs are ad-hoc and are not based on well- defined principles in the context of assigned accountabilities enshrined in the legal framework.

Severity of Urban Financing Constraint

Table 3 summarises the evolution of urban finances in Bangladesh. The highlights are:

- Government transfers account for some 61 percent of total urban LGI resources.
- Charges and fees account for 25 percent.
- Taxes account for only 14 percent.
- There is no market borrowing. The Government budget is responsible for all transfer funding including grants and loans. Since the urban LGIs do not have any capacity for loan servicing, these government loans stay in the books as outstanding dues.

Table 3: Bangladesh Urban Finances (Taka millions)

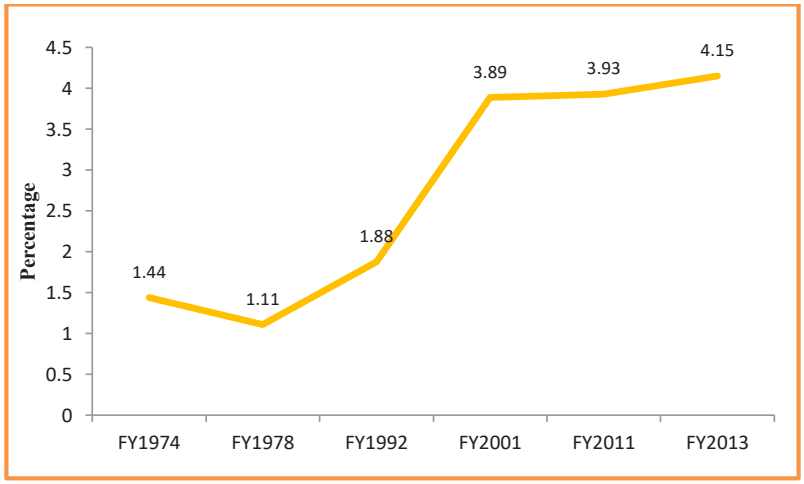
Items	FY1974	FY1978	FY1992	FY2001	FY2011	FY2012	FY2013
Taxes	27	88	995	3027	8154	8784	11177
Charges & fees	57	112	681	2360	15103	16319	19830
Total own resources	84	200	1676	5387	23257	25103	31007
Government transfers	33	58	1319	8909	27802	38068	47608
Total resources	117	258	2995	14296	51059	63171	78615
Total spending	110	261	2984	14296	51059	63171	78615

Source: BBS Statistical Yearbook Various Years

Financial autonomy of urban LGIs: The traditional way of measuring financial autonomy of LGIs is the amount of public spending assigned to them. Financing arrangements tend to vary by countries. While tax collections normally tend to be centralised, many countries assign a significant number of tax instruments to city governments to raise their own resources. Importantly, decentralised countries have a system of transfers that is based on clearly defined principles. These are important elements of a decentralised fiscal system. They provide predictability of resources and support the proper planning and implementation of assigned services by urban LGIs. What is the experience in Bangladesh?

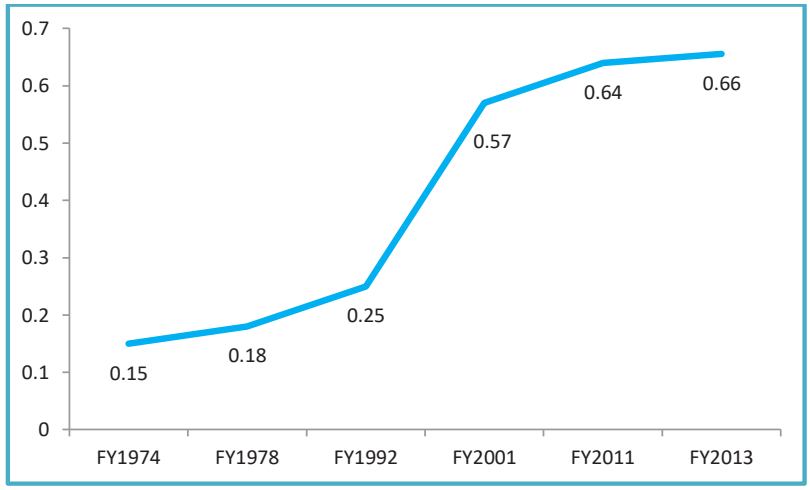
- Figure 15 shows the share of urban LGI in total government spending in Bangladesh. Despite some progress, urban LGIs account for only 4.2 percent of total government spending.
- In terms of GDP, they account for less than 1 percent (Figure 16).
- The powerful government regulator, the Ministry of Local Government, controls and manages most urban and rural development public pending.
- Government transfers are the biggest instrument of resource transfer.

Figure 15: Share of Urban LGI spending in Total Government Spending



Source: BBS Statistical Yearbook Various Years

Figure 16: Urban LGI Spending as Percentage of GDP

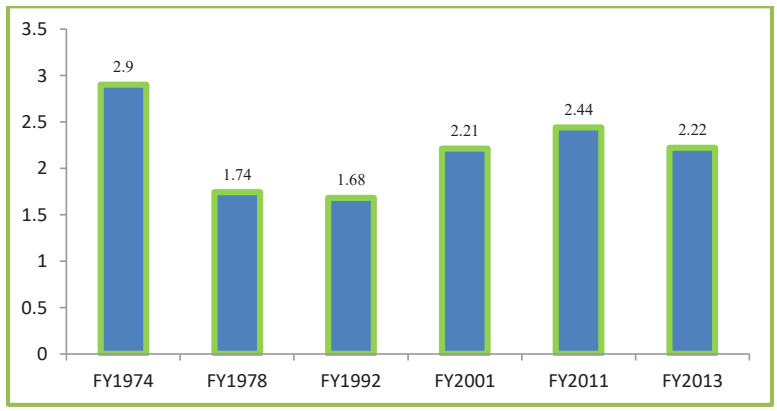


Source: BBS Statistical Yearbook Various Years

Poor predictability of government transfers: As noted, urban LGIs are heavily dependent upon transfers from the national government. This is not unusual as compared with many other developing countries. However, what is different is that there is no formal resource transfer mechanism and there is often little or no correlation between assigned responsibilities and resource transfers. The resource transfers are determined centrally based on political considerations and competing national priorities.

Weak tax handles: Urban LGIs account for less than 3 percent of total government revenues (Figure 17). This is mainly by design as almost all potent sources of revenues are controlled at the national level. The only tax source assigned to urban LGIs is the property tax. Yet, yields are insignificant mostly owing to lack of political will. LGIs cannot decide on their own to change rates or property valuation.

Figure 17: Urban LGI own Revenues as Percentage of Total Government Revenues



Source: BBS Statistical Yearbook Various Years

Fiscal decentralisation--international comparison: A review of international evidence suggests that Bangladesh is fiscally amongst the most centralised countries in the world measured in terms of both expenditures and taxes (Table 4). Data from a sample of 16 developing countries and 26 developed countries shows that spending by all LGIs (urban and rural) account for 19 percent of total government spending in developing countries and 28 percent for industrial countries as compared with only 7 percent in Bangladesh (urban plus rural LGIs). Taxes similarly are heavily centralised in Bangladesh. Thus, sub-national government taxes account for 11.4 percent of total taxes in a sample of 16 developing countries and 22.7 percent in a sample of 24 industrial countries. In Bangladesh, it is only 1.6 percent of total government taxes.

Table 4: Fiscal Decentralisation: International Comparison for the 2000s

	Sub-national government expenditures		Sub-national government taxes	
	% of total government expenditure	% of GDP	% of total taxes	% of GDP
Developing countries	18.8 (n=16)	5.1 (n=20)	11.4 (n=16)	2.3 (n=20)
Industrial countries	27.8 (n=26)	13.9 (n=26)	22.7 (n=24)	6.4 (n=25)
Bangladesh	7.0	1.11	1.6	0.15

Source: Bhal, Linn and Wetzel (2013).

It is no accident that cities of industrial countries tend to have better services and significantly higher fiscal decentralisation. A system of well-defined revenue sharing and resource arrangements not only provides larger funding, the predictability of resources makes it that much easier to plan and provide better services. Good city governance and greater fiscal autonomy tend to be positively correlated and together they enable better urban services.

Consequences of Centralised Fiscal Framework

Poor LGI governance and weak fiscal decentralisation are the most fundamental constraints to better urban growth and service delivery in Bangladesh. Lack of fiscal autonomy and associated resource constraint reduces the ability of urban LGIs to provide adequate services in several ways:

- Weak fiscal decentralisation contributes to grossly inadequate resources that in turn lead to poor capacities of urban LGIs to deliver services.
- Inadequacy of staffing in both quantity and quality is a major bottleneck o urban service delivery.
- Political patronage and centralised decision-making on urban spending results in poor accountability of City Corporations and municipalities.
- Since transfers have no legal basis and are discretionary, there is no predictability of resources. Government control over revenues and spending essentially means that elected urban managers belonging to the opposition political parties have little control over service delivery.

- Even in cities that have managers who belong to the party in power, service delivery is constrained by the inadequacy of resources. Since government resources at the central level are generally constrained by the inadequacy of revenues, this constrains revenue transfers to LGIs.
- The scope for innovative financial solutions at the local level is limited by the weakness of the property tax design and absence of public borrowing by LGIs.

4. 2041 Perspective Plan Vision and Targets for Urbanization

Given the historical positive correlation between urbanization and development, it is natural to expect a major transformation of the Bangladesh urban sector as an essential part of the strategy to transfer to a high-income economy. Consistent with global experience, the urban sector will lead the way to the journey to upper middle country status by FY2031 and eventually to high-income economy by FY2041. The characteristics of urban Bangladesh in 2041 will be like the urban environment found in present day high-income economies.

2041 Vision for Urban Sector

Specifically, the 2041 Perspective Plan Vision for the urban sector is to:

- Have an economy where some 80 percent of the population lives urban areas and enjoys a quality of life that is comparable to those found in the present day high income economies of North America, Europe and Asia.
- An urban physical environment where there is a proper balance between ecology, the natural environment and needs of the urban population. In particular, all cities will be flood free with proper drainage, modern sewerage and proper waste management.
- An urban social structure where there is no incidence of absolute poverty, there are no slums and every household has a basic minimum housing quality.
- An urban service industry that provides quality urban infrastructure and urban services on demand and in good quality.
- An urban governance structure that is elected by the residents, is responsive to the needs of the residents, and is largely self-financing with a healthy and sustainable combination of urban betterment taxes, predictable national government transfers, cost recovery from services provided and responsible borrowings.

Core Objectives and Targets

To translate this Vision into monitorable indicators of progress, the targets for the urban sector are shown in Table 5. The objectives and targets are set in a manner that these are consistent with the urban environment found in high income countries. These targets and objectives are necessary to also ensure the sustainability of the Bangladesh urban environment in terms of urban governance, urban financing, and the urban natural environment.

A careful review of Table 5 will show the large magnitude of the urbanization challenge moving forward. Yet the ability to address the urbanization challenge will also determine the ability to achieve high income target by FY2041. The urbanization agenda and the high-income agenda will need to go hand-in hand.

Table 5: Core Objectives and Targets for the Urban Sector

Objectives / Targets	2017 Base Year Values	FY2041 Values
Share of urban population in total Population (%)	30	80
Number of primary cities	2	7
Share of Dhaka Metropolitan City in total urban population (%)	33	25
Share of 6 other primary cities in total urban population (%)	23	30
Percent of households with electricity	90	100
Percent of households with tap water connectivity	40	100
Percent of households with water-sealed sanitary toilets	42	100
Percentage of households with sewerage connection		100
Incidence of absolute urban poverty (%)	15.7	0
Percent of household living in slums (UN definition)	55	0
Percent of urban centers with modern waste disposal facilities	N/A	100
Percent of urban centers with waste water treatment facilities	N/A	100
Share of urban LGI spending in total government spending (%)	5	25
Urban LGI spending as percentage of GDP	0.7	8
Urban LGI taxes as percentage of total taxes	2.3	20
Urban LGI taxes as a percentage of GDP	0.2	4
Green area Dhaka (square meter per million people)	N/A	5
Green area other 6 major cities (square meter per million people)	N/A	12
Percent of urban water bodies preserved with 100% compliance with water quality standards	0	100
Air quality (annual average, µg/m3 PM 2.5)	86	10
Percent of cities flood free with proper drainage	0	100
Compliance with zoning laws (%)	N/A	100
Compliance with parking laws (%)	N/A	100
Urban streets/ roads with modern traffic signals	N/A	100
Primary cities with mass transit options	0	7

Source: GED Projections

5. Strategy for Urban Reforms

Bangladesh attained low middle- income country (LMIC) status in 2015. It is now aspiring to achieve upper middle- income country (UMIC) status in FY2031 and HIC status by FY2041. GDP growth is on an upward path, exceeding 7 percent mark in FY2017. The government's target is to accelerate growth further to reach 8 percent by the end of the 7FYP in FY2020 (Government of Bangladesh 2015). The government's growth strategy articulated in the 7FYP seeks to further transform the economy into a manufacturing and organised services oriented production structure. This growth strategy will accelerate the urbanisation process, as labour continues to shift from low-income agriculture and rural informal services to urban-based manufacturing and organised services.

Looking beyond the 7FYP, the Perspective plan 2041 will oversee a further transformation of the economy as the share of agriculture in both GDP and employment falls to single digits and the shares of manufacturing and modern services rise. Consistent with the global experience of countries that have moved over to high income economies, the urban sector will take the lead in facilitating this fundamental economic transformation. Therefore, without a major effort to tackle the growing urbanisation challenges, there is a real risk that the growth momentum could be choked off by transport bottlenecks, high land prices, and

the inadequacy of infrastructure and basic urban services including housing, urban water supply and waste management.

The Lessons of International Experience

The Mercer city Livability index and other similar indices suggest that there are good examples of countries that have urbanized well and developed many efficient and high-quality cities. Considerable planning, strategies, institutions and policies have enabled this progress. Bangladesh can learn from these experiences and draw proper lessons in developing its own strategies and reforms for the 2041 Perspective Plan. While there is no one size fits all type template, there are common characteristics of these experiences that can inform urban strategies and reforms in Bangladesh. Some of the basic lessons are as follows;

1) High quality cities are characterised by a governance system that entails democratically elected, strong and accountable city governments. These governments are independent of the political dominance of the national government and are only accountable to the residents of the city.
2) City governments have well defined responsibilities that are enshrined in the legal framework. These responsibilities do not change based on national or local election results. There is no conflict or overlap in delivering with higher levels of government.
3) The coordination mechanisms with higher levels of government in the management of common areas are well defined within the principle that matters that involve exclusively the interest of the city are primarily the responsibility of the city.
4) Financial autonomy of cities is ensured through a legally defined financial framework that involves sharing of taxes, national grants and market borrowing.
5) User charges play a major role in city finances.
6) To protect public interests and provide a common reference point for the country, minimum standards are defined for such issues as environmental protection, water quality and air quality and these standards are monitored by the higher government.
7) To ensure adequate supply of certain merit /public goods, the national grant system is used for co-financing or as incentive payments.
8) Urban planning and strategy is a shared responsibility between city and higher-level governments. At the city level, the planning process is participatory with a well-defined and structured consultation process with the residents.

Given the large magnitude of the urbanization challenge in Bangladesh, it is obvious that some radical thinking is needed and business as usual will not do. It is simply unthinkable that Bangladesh can achieve UMIC without a major transformation of the urban sector. There are a whole host of issues that will need to be tackled. Good practice international experience suggests that on substance there are two major and big picture agenda that will have to be addressed. First is the need to address the urban finances issue. And

second is the need to tackle the urban governance challenge. The two are inter-related and will have to go together. The basic challenge is to establish a system of accountable city government that is publicly elected, enjoys considerable political and administrative autonomy, is responsive to the needs of the residents and not to the national government, and has considerable financial autonomy.

The Urban Reform Law

The implementation of these reforms requires strong political will and proper changes in the legal framework that clearly defines the roles and responsibilities of the urban LGIs in a manner that avoids duplication, especially from competing bodies of the national government as exemplified by the Dhaka city management experience indicated in Figure 14. There is no magic bullet formula for dividing responsibilities between urban LGIs and the national government. The Government could establish a National Task Force of urban experts who could review relevant international experiences and give a recommendation to the Cabinet for review and approval (See Box 3). Once done, this should be become legally binding through an Act of the parliament. The Act should also clarify the degree of political and administrative autonomy granted to urban LGIs and the financing options. The level of fiscal decentralization granted to the urban LGIs should be a critical part of the Act and must clearly define the basis for national transfers to urban LGIs, taxes assigned to them and authority for public borrowing. Again, the National Task Force of experts can provide recommendation by looking at international good practice.

Box 3: Decentralization of Responsibilities to City Governments

International experiences show a wide variety of decentralization of responsibilities to city governments. On average Western Europe, Latin American countries, Australia, New Zealand, Canada and Japan have devolved considerable authorities to city governments. On the other hand, in China and India higher level governments have retained more authority. The United States of America has adopted a middle way. Irrespective, there is a certain minimum level of devolution. By and large all high-performing cities have elected city governments that have well-defined responsibilities that are enshrined in the legal framework. These typically involve: water supply, sewerage, drainage, solid waste management, urban parks and recreation centers, urban water bodies, building permits, urban parking and zoning regulations. Urban planning, housing, health and education are shared responsibilities. In all high-income countries, city traffic management, city road network and city law and order are also assigned to city governments.

For Bangladesh, a two-phased approach might be the way to go. In stage one (FY2018-FY2031), the first-round devolution may involve exclusive assignment of all responsibilities to city governments for water supply, sewerage, drainage, sold waste management, urban parks and recreational centers, urban water bodies, building permits, urban parking and zoning regulations. Urban planning, housing, health and education can be shared responsibilities. In phase 2 (FY203-FY2041), city traffic management, city road network and city law and order can also be assigned to city governments with proper coordination with the national government. The actual outcome should be based on a careful analysis of various experiences, the political economy considerations and implementation capacity considerations. Reform implementation can also start on a pilot basis in Dhaka and can then be adapted and mainstreamed to other cities.

Towards an Urban Financing Strategy

Reforms of urban governance and urban finances are critical for improving urbanisation and urban services in Bangladesh. They will need to go together to get results. Strong political will of the national government is the key. In Bangladesh, the members of Parliament typically tend to oppose decentralisation in all forms (political, administrative or financial)

because of the perception that this will reduce their ability to influence the vote bank at the local level. On the other hand, without a major change in urban finances and management, there are very little prospects for Bangladesh to achieve higher income status. There is no example of a HIC that does not have decentralized strong and accountable urban governments with considerable financial autonomy. Fiscal decentralisation is essential to establishing accounting LGIs at both the urban and rural levels.

The financing needs for urban infrastructure are large. It will be nearly impossible to meet the financing requirements based simply on transfers from the national government. International experience shows that the strategy for urban financing needs to combine taxes, service charges, predictable transfers and responsible borrowing.

Tax reforms and fees: Since at present the tax administrative capacity is generally weak even at the national level, the scope for decentralisation of tax responsibilities to LGIs is very limited in the near future. This is not even necessary at this stage of Bangladesh's development. However, in the property tax, the LGIs have a potentially powerful source of revenue that must be better used. Once the property taxes are well developed and the urban governments gain experience, other options including urban income taxes could be considered.

- The first stage should focus on a major revamping of property taxes. A properly designed property tax could yield 1.0-1.5 percent of GDP equivalent of tax revenues that will revolutionize urban LGI financing. This compares with a mere 0.16 percent of GDP yield presently.
- Technical assistance can be sought from national institutions to help LGIs develop an effective system of property taxes.
- Service fees and charges have grown significantly over time, but they still account for only 0.14 percent of GDP. With better service, urban LGIs should be able to increase resources from this source equivalent to about 0.5 percent of GDP by FY2020 and 1.0% of GDP by FY2031.
- Together, the property tax and the service fee and charges could help jump-start the fiscal autonomy of urban LGIs in a substantial manner.
- Over time, consideration could be given to raising additional income taxes, over and above the national income taxes, as in other advanced economies like the USA.

Reform of government transfers: Government transfers must be reformed to assign greater transparency and predictability of the transfers. The transfers will also need to match assigned responsibilities. The transfer system should also be enshrined within a legal framework to depoliticize the use of national resources to influence local level politics.

- There should be a much better balance between spending by national ministries and LGIs based on a clearly articulated devolution of responsibilities and matching transfers that is enshrined in the legal framework.
- There is a considerable body of international experience that could help with the design of a proper transfer system that will work in the Bangladesh context. Basic principles include factors relating to population, poverty, endowment and

performance. Broadly speaking cities that have a larger share of the population, higher poverty and weaker options for local tax mobilization will receive larger grants. This equity principle is particularly important to facilitate the growth of lagging cities like Khulna, Barisal, Rangpur and Rajshahi

- A two-tier transfer system combining equity and incentives (performance) is also possible. This is important to promote competition among cities. Thus, cities that are innovative and make special effort to improve its efficiency of service delivery might have opportunities to tap special incentive funds from the national government.
- National government may also earmark special-purpose funds to promote national development goals related to health, education, environment, social protection and poverty reduction.

Reform of urban LGI borrowings: International experience shows that responsible borrowing by urban LGIs from the local market can be a major source of funding urban infrastructure (Bahl, Linn and Wetzel 2013). However, borrowing is not risk free and requires careful management with special attention to the debt repayment capacity of the borrowing entity. In the case of Bangladesh, following points are note-worthy:

- Presently, all transfers (grants or loans) come from the national budget. The restriction on local borrowing is understandable in the present environment of weak finances and poor capacities of urban LGIs.
- Over time as urban LGIs gain experience and capacity, the government may want to rethink its policy for their borrowings. Such borrowings could be important for delivering urban infrastructure.
- Again, there is considerable international experience and Bangladesh can learn from those experiences.
- In general, the loan financing should be done responsibly based on well-designed projects and in line with debt servicing capacity of the concerned LGI. International experience shows that strong urban LGIs can attract considerable long-term capital by floating municipal bonds. National government will not underwrite such borrowing and it must be based on full assessment of the creditworthiness of the urban LGI. However, national governments may support such borrowing by credible urban LGIs by offering tax free status to these bonds.
- The borrowing strategy of urban LGIs also needs to be made consistent with national debt management. The Finance Ministry of the national government will need to monitor such borrowing and be ready to take corrective actions to ensure full consistency with the national debt strategy.

Urban Governance Reform

At the heart of the poor functioning urban LGIs in Bangladesh today is the fundamental problem of governance. Public administration in Bangladesh is heavily centralised. Within the civil administration, almost all authority is exercised by the head of the government and the cabinet. Local governments are very weak, with little administrative and financial

authority. There have been attempts in the past to establish a stronger system of local governments. The main success has been the establishment of a system of elected urban and rural LGIs. But beyond that, nothing much has changed. The setting of expenditure priorities, allocation of resources, procurement of goods and services, and the implementation of projects are still largely centralised at the ministry level in the capital city of Dhaka. Even for the limited authority given to the mayors, the control of the central government in terms of policy setting and finances is overwhelming.

The progress on decentralisation has suffered in Bangladesh from a lack of effective political support, even though the rhetoric has been different. At the heart is the contentious issue of division of power between the national legislators and the LGI officials. While similar conflicts arise in other countries as well, in Bangladesh this has become particularly complicated because of the small physical size of the country, the homogenous nature of the people and the relative ease of physical mobility. Consequently, national legislators have tended to argue that they can take care of their constituencies without the need for an intermediary political agent (elected and empowered local governments). Progress can only happen if the lead comes from the top leadership.

The 2041 Perspective Plan provides a unique opportunity to articulate the government's vision for urban management in the context of managing the urban transition in a rapidly growing and transformational economy. As noted, decentralized and autonomous urban governments are a key part of the political and administrative layout underlying a HIC. The main strategy and policy question is how quickly this transition can start along with sustained efforts to carry through this critical institutional reform.

A Strategy for City Reforms

What are the reform options that will lay the basis for the emergence of a well-planned and sound city administration that is responsive to the needs of the residents? The urbanisation experience in Bangladesh and a review of international good practice experience suggest that the management problems of Bangladesh cities cannot be addressed in a piece meal fashion. While massive investment will be needed, given the large backlog of unmet demand, deployment of additional resources alone will not work. Experience shows that corruption, mismanagement and lack of accountability are serious constraints. Unless these are tackled, the effectiveness of additional spending will be limited. As well, given weak fiscal capacity at the national level, much of the new resources will need to come from user fees and greater tax compliance by residents, neither of which will be forthcoming without improved service. So, there is a need to fundamentally and systemically rethink the governance of the cities.

A sound strategy for reforming city management calls for a three-pronged approach: (i) redefining public-private roles with a view to strengthening this partnership for better services; (ii) strengthening capabilities of public urban service institutions; and (iii) establishing an accountable city government.

Public-Private Roles and Partnerships

Capacity constraint to service provision in mega cities is not uncommon. Many cities have found it helpful to redefine its role to provide only those basic services that are public goods and let the private sector handle commercial activities. Thus, services such as housing, electricity, telephone and gas are assigned to private providers with regulatory environment provided by the public sector. For some services, both public and private supply have prevailed allowing consumers choices, thereby improving service quality, while also meeting equity and "merit good" objectives. Examples include: urban transport, health, education, water supply, sanitation, solid waste. More and more experiments with this public-private partnership are now underway in South Asian countries. Thus, in Kolkata, toilet blocks have been handed over to the private sector for operation who charges a nominal fee for the use. Partial privatisation of street lights and flyovers has also been implemented there. In Ahmadabad, the slum networking initiative has brought in the private sector to provide all basic physical and social infrastructure services to the 200 slums in the city. The World Bank's slum improvement project in Mumbai has also been very successful by bringing in participation of local slum dwellers to partially pay for their sanitation facilities.

In Bangladesh, a vibrant private sector has emerged in the delivery of telecommunications, transport, housing, education, health services. There is also a strong partnership between the government and NGOs in the delivery of basic education services, which has contributed to important gains in reducing gender disparity and improved overall access to education. But for other commercial services such as electricity and gas, they remain public monopolies with mixed performance, weak finances and limited investment. For core urban services such as housing, transport, water supply, sewerage and solid waste disposal, the picture is also mixed (Ahmed, et. al. 2007; Jahan and Maniruzzaman 2007; Jahan and Kalam 2013; Jahan 2014). The private housing market is generally buoyant and competitive but it is constrained by high cost of land, inadequacy of long-term housing finance, an inefficient land market and other regulatory problems. More recently, because of progress with banking reforms, long-term financing options are emerging. The private sector is bypassing the regulatory constraints on registration, permits etc. through alleged private payments to concerned public agencies. The main problem though is affordability, primarily due to land scarcity, but also due to inappropriate tax and financial sector policies, the high cost of doing business and inadequate attention to low-cost and innovative housing solutions.

Given the magnitude of the housing challenge facing Bangladesh, a rapid reform of the housing market is essential. It is near impossible for the public sector to address this challenge and the private sector will need to play the dominant role. Yet, the government's role in improving the functioning of the land market, helping develop the long-term mortgage industry, developing urban transport and a policy of tax/subsidy to encourage low-cost housing supply is imperative. Land market reforms include digitization of land records, simplification of land transactions including registration and reduction of financial cost of land transfers. Efficient urban transport can be very helpful in deconcentrating city centers and developing suburban areas for residential purposes. The government can also help ease the housing constraint by releasing government owned land for low-cost housing and relaxing space use restrictions for this type of housing.

Regarding mortgage industry, the main challenge is to develop housing finance programs that provide flexible sources of financing at relatively low rates of interest. The Bangladesh Bank can commission a study that looks at international experience to facilitate this. In high-income countries housing finance is the most attractive business given the safety of the investment and as such the availability of low-cost long-term finance is quite adequate. There is also a secondary market for housing mortgage that allows private investors to the private mortgage companies to leverage their finances.

Fiscal incentives like tax write off for interest payments, low taxation of capital gains from primary residence sale and capital/ interest subsidies for low-cost housing are possible ways to spur home ownership. Finally, policy attention is needed to create incentives for the development of low-cost housing solutions using new technology and environment-friendly construction options. Bangladesh has many civil engineering and architectural talents. The government can support research in new design and technology for low cost housing that is consistent with the natural climate and hazard risks. There is considerable research ongoing in India in the context of its Housing for All by 2022 Initiative[10]. Bangladesh can learn from this experience.

Regarding transport, while the road network infrastructure is provided by the public sector, transport service is largely provided by the private sector along with limited public bus service. The lack of a proper mass transit is a major problem for Dhaka and other large cities. For private buses, inadequate road network, poor traffic management and weak regulations related to service and safety standards have contributed to low service quality. Over-crowding of buses is overwhelming causing serious safety concerns. Moving forward, the highest priority is to establish a system of mass transit for all large cities starting with Dhaka. Considerable improvement is needed in urban traffic management relating to traffic signals, strict enforcement of traffic laws, enforcement of parking restrictions, and time of use of congested traffic corridors. Bangladesh can learn a lot from studying traffic management in advanced economies. A particularly good example is from Singapore. There is adequate scope to improve private supply of private transport options through tax breaks to bus/taxi service providers and regulatory reforms on seating capacities and quality of private transport.

For piped water and modern sewage service, public sector is the only source of service. Autonomous service agencies called Water and Sewerage Authorities (WASA) exist in three major cities of Dhaka, Chittagong and Khulna. All three provide piped water but only DWASA provides limited modern sewage service. In other cities, piped water is provided by the municipalities and concerned city corporations. Private water provision as a commercial activity is absent in the urban areas, although illegal private water markets through control over use of public stand pipes by mastans are known to exist in the slum areas. Private hand tube wells and groundwater extraction through motorised pumps are common sources of water supply for areas not served by municipalities or where this supply is unreliable. Since a modern sewage system whereby the human waste is treated before release to water bodies does not exist in most urban centers of Bangladesh including Dhaka, much of the human excreta goes into underground pits or in portable containers. These are mostly serviced by private service providers. Garbage disposal is also primarily

10 "The Housing for All By 2022" Initiative was launched by the Government of India in 2015.

provided by the city corporations/ municipality. An organised private service delivery does not exist, although small-scale and informal private services of garbage disposal prevail in areas not served by public service providers or as an added community initiative to keep the neighborhood clean.

The lack of private supply of water and garbage disposal is a major constraint to the adequate provision and quality of urban services in Dhaka. This tends to exacerbate the problems resulting from poor service supply from the public providers. A strategy for encouraging more private investment in these areas involves proper regulations and appropriate cost recovery policy. Proper regulation on waste/ sewage disposal and coordination with public waste /sewage treatment facilities is essential.

Strengthening Public Urban Service Agencies

While private participation in water supply and disposal of solid waste will be helpful, a top priority is to institute adequate supply of modern sewage facilities in all cities. The serious health risk from water pollution due to inadequate management of sewage and solid waste is unacceptable and must be addressed on a war footing. Sewage disposal and its proper treatment is a prime example of a public good and it is best provided by the public sector. All City Corporations and Municipalities must be equipped with WASA type institutions that will have accountability for piped water supply and sewage disposal. Existing WASAs should be re-assigned to the respective City Corporations where they provide service. This is necessary to strengthen the accountability of the urban LGIs and make them responsive to the needs of the residents they oversee. Cost recovery policies must be strengthened to improve the financial viability and service delivery capacity of these service agencies.

Proper disposal of sewage and sold waste requires modern waste treatment facilities. There is considerable global progress in this area and Bangladesh can learn from these experiences. Coordination between the Ministries of LGRD and Environment and urban LGIs in the matter of standards and waste disposal channels is essential.

In urban transport, the highest priority is to establish efficient mass transit systems. This can be based on surface high-speed urban rails or underground rail system. These high-priority urban investments need to fast-tracked starting with Dhaka but extended to all the 9 divisional city headquarters. Since these are highly capital-intensive enterprises, the funding will come from the ADP. However, pricing policies for services must provide for coverage of all O&M costs to ensure their sustainability.

Towards An Accountable City Government

The third and most fundamental leg of the reform strategy is improved city governance. The reform strategy must seek to address the key constraints to the effective functioning of the city government: unclear mandate and service responsibilities; lack of accountability; weak finances and financial autonomy; proliferation of service agencies with poor coordination and control; and weak management. These problems cannot be resolved by tinkering at the margin; they clearly call for a major rethinking and wholesale change in city management and its enabling environment. Fundamentally, key functions will need to be devolved to city governments and, in turn, city governments should be organised

to best manage these functions -- a two-step process that will need to be sequenced and managed jointly between national and city governments in a strategic way. Embedded in this approach is the assumption that strengthening voice – the ability of citizens to reveal their preferences and hold their government to account -- will be essential in sustaining city reforms.

The other critical assumption is the devolution of financial autonomy. City government's finances must be well defined based on assigned responsibilities and a proper balance of assigned taxes (principally the property tax), block grants from the national budget, user charges and city government bonds.

Devolving authority to the city level raises the important question of how to organise a city government to manage those responsibilities. Based on international experience, the options range from some form of non-metropolitan government to various forms of metropolitan governments with economic decentralisation as the guiding principle. In a non-metropolitan model, one option is that Dhaka can be arranged as a series of contiguous municipalities, each with its own set of devolved responsibilities, services, tax bases and management system. For example, Gulshan, Dhanmondi, Dhaka central, and Uttara can be self-contained municipalities, each with its own mayor and council. Washington DC and its surrounding suburbs that are municipalities in their own rights is an example of how a contiguous set of municipalities can loosely form a broader metropolitan area.

An alternative model is to formally and legally merge all municipalities into one jurisdiction -- a centralised metropolitan government where the residents of the urban area would directly elect a mayor and a council of city members. All urban functions would be managed by this one city government. The cities of Toronto in Canada and Johannesburg in South Africa have adopted a version of this model.

In a centralised metropolitan model based on economic decentralisation, the city government is structured as a metropolitan government, but it does not organise its systems of service delivery in the form of traditional line departments. Instead, the city establishes service delivery under formal corporations owned by the city. Water distribution in Johannesburg, for example, was transformed into a water corporation along the principles of the Companies Act, owned by the city, but managed by an independent board and CEO on behalf of the city. Solid waste was also formed into a corporation, owned by the city but contracting the management to a private firm. While water and solid waste represent services with user charges – more akin to private goods -- which enabled a corporation structure to be formed, Johannesburg also innovated in services that are dependent on local taxes. For example, road construction, traditionally more suited to a line department organisation, was also structured to mimic a corporate system. Formal contracts were given to teams within the department with delegated budgets and their outcomes were measured against indicators based on performance of private contractors. In sum, the city became a policy maker and a regulator with service management delegated to corporations or line departments set up as corporate entities or structures that were proxies of corporations.

Under a decentralised metropolitan system, metropolitan governments are structured in two tiers: a metropolitan tier overseeing a series of separate municipalities. The metro tier and the municipalities jointly form the metropolitan government. Functions can be separated

between the two tiers depending on principles of public finance with services that require economies of scale -- e.g. network systems -- placed at the metropolitan level. Services that do not exhibit scale economies, such as solid waste collection, could then be placed efficiently at the level of municipalities. Landfills, which have scale economies, on the other hand, could be placed at the metro level. Similarly, tax instruments can be allocated between the two tiers based on spatial incidence. For example, personal property taxes could be delegated to municipalities while commercial property taxes whose incidence is beyond narrow municipal boundaries are better placed at a broader, metropolitan level. Minneapolis-St. Paul, the twin cities in Minneapolis, is structured as a two- tier system with the metro tier playing the function of a pure redistributive tier.

While there is no one size fits all approach to city governments, the idea of organising Dhaka city a centralised metropolitan model with economic decentralisation is the recommended approach. This avoids the emergence of too many competing city governments that could create enormous capacity and coordination constraints. In this model, the metropolitan government will be responsible for overall planning, budgeting, regulations. Other city services such as, water, housing, urban transport and sanitation will be provided by some combination of private providers and corporate public entities that are city-owned but run by private managers. The bulk of city finances for day-to-day operations will come from property taxes and user charges. Capital spending will require government block grants and city government bonds.

The implementation of a city government model will present political challenges, especially for the capital city of Dhaka and commercial city of Chittagong. The national government might feel that with proper decentralisation, the city governments will become too powerful and thereby weaken the authority of national cabinet. To overcome this perception risk, a phased approach is suggested. The most contentious issue is the devolution of law and order and urban traffic responsibilities to the city governments. This may not be devolved now. Instead the focus may shift to the delivery of certain well-defined services such as city transport, city zoning laws, building permits, water supply and sewerage, waste management, parks, lakes and recreation services, and slum upgrading. Other functions like health and education might be devolved partially as a shared responsibility between the national and LGIs (both urban and rural). There is no magic rule here. It should be tailored to the political comfort zone of the national leadership and capabilities of the LGIs. A phased, long-term approach with well-defined steps might also work provided there is enough steam to start with. What is clear though is that the present status-quo is a path to urban disaster and must change.

Coordination of City Agenda with the National Agenda

While the system of devolution will need to ensure that there is no conflict between the city agenda and the national agenda, there will be common areas where coordination is necessary. These typically involve setting of standards for environmental protection, water quality, air quality, zoning laws, and safety standards. For all matters relating to national interests, the national laws and regulations will prevail and all cities will be required to comply with them. But implementation of these laws, regulations and standards will often require proper dialogue and consultation. The concerned line Ministries will take the lead on these matters with participation by city governments.

Planning and Monitoring

Presently the Ministry of Local Government takes the lead in planning and investment of major urban projects. It allocates funds to all local governments and supervises major service institutions like the Water and Sewerage Authorities (WASAs). Under the envisaged reforms the Ministry's role will change drastically. With devolution to the city governments most of the budget allocation and investment financing roles of the Ministry will disappear. The WASAs will devolve to city governments. Similarly, RAJUK in its present form will cease to exist. For all cities, the city planning will become an integral part of the city government.

The major role of the Ministry will be planning of the entire urban scenario, policy making to facilitate urban development based on the approved national scenario and monitoring the sound implementation of urban development. The Ministry will take the lead in defining and designing the national urban priorities and related urban reforms and ensuring their proper implementation in close consultation and coordination with the city governments. It will monitor progress with urbanization, identify emerging issues and challenges and seek to resolve them in consultation with the concerned city governments.

On the financing side, there will be a more limited but strategic role. This will involve the administration of two types of funds: the incentives fund and the special programs funds. The incentives funds will seek to encourage competition among cities in innovating in service delivery and taking risks. The special programs funds will involve providing matching grants to cities to adopt and implement programs identified as priorities by the national government.

The precise roles and coordination mechanisms on urban planning and monitoring will emerge from a careful review of relevant international experiences. There is no one size fits all template available. Social and political realities and implementation capabilities will play important roles in evolving the devolution of planning functions. What is important is to define clear responsibilities and accountabilities along with proper coordination mechanisms with different levels of government. Involvement of citizens in the planning process is equally important.

6. Financing Requirements and Options

The funding needs of the urban sector are large. The quality of urban infrastructure is low and there is a huge unmet demand for urban services (Table 5). However, the proposed governance and financing reforms suggested by the 2041 Perspective Plan Strategy in Section 5 should provide a solid foundation.

Presently, the only source of public investment spending on urban infrastructure is the national government through the Annual Development Programme (ADP). The total investment on urban infrastructure (housing, water, sewerage, and city corporation/ municipality services) amounts to about 1.2% of GDP. The urban LGIs cannot even meet their operational funding requirements from their own resources and there is no investible surplus from own resources. Private urban services mainly involve housing and urban transport services (private buses, CNG three wheelers and rickshaws). The absence of a well-thought-out strategy is obviously reflected by the low levels of financing.

Reflecting the financing needs of the urbanization agenda, the 2041 Perspective Plan projects that the investment programme for the urban sector to grow from 2.4% of GDP now to 5.0% of GDP by FY2031 and 7.0% of GDP by FY2041 (Figure 6). This is a huge increase and the ADP alone cannot finance this even with the solid progress in tax mobilization. Two other financing strategies will be necessary. The first involves private financing and the second involves a strong cost recovery programme for urban services. Nevertheless, the ADP funding of urban sector is expected to increase from 1.2% of GDP in FY2017 to 2.0% in FY2031 and 2.5% in FY2041. Most of these resources will be transferred to city governments as block grants based on legally mandated formulae. A small percent will be transferred as incentive funds.

Private Provision of Urban Services

Presently, the housing services are mostly provided by the private sector. The private sector also provides urban transport services. The investment for private sector is estimated at 1.2% of GDP in FF2017. For the future, this should grow substantially to provide the growing services needs of the modern Bangladesh urban sector. Specifically, private provision of urban services is projected to grow from 1.2% of GDP now to about 2% of GDP by FY2031 and 3% of GDP by FY2041. Much of the additional investment will be in housing. Yet, areas where private provision can prevail include urban transport, urban water supply and solid waste disposal.

Self-Financing and Cost Recovery

Presently, there is zero self-financing of urban infrastructure from own resources of the urban LGIs. The resource mobilization strategy for urban LGIs identified in Section 5 above will play a major role in changing this. As international experience shows, no urban development agenda can be sustained without a strong own resource mobilization effort. Of special mention in this regard is cost recovery. While local government tax resources will help finance operating costs of the city government and spending programs on public goods like local roads, drainage systems, parks and maintenance of water bodies, cost recovery will play a dominant role for such services as water supply, sewerage and solid waste disposal. The cost recovery policy will initially target 100% recovery of operations and maintenance. Over the longer term the cost recovery will also target a substantial recovery of capital costs. As self-financing improves, urban LGIs can also undertake limited borrowing for quality infrastructure projects.

Table 6: Urban Sector Financing Requirements and Options

Funding Sources/Options	FY2017	FY2020	FY2031	FY2041
Annual Development Program (% of GDP)	1.2	1.5	2.0	2.5
Self-Financing (Cost Recovery) (% of GDP)	0.0	0.3	1.0	1.5
Private Investment (% of GDP)	1.2	1.5	2.0	3.0
Total Investment (% of GDP)	2.4	3.3	5.0	7.0
Total Investment (Tk Bl. 2017 Prices)	470	806	3010	10437

Source: GED Projections

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