

Bangladesh Development Series

# **POWER AND INFRASTRUCTURE** **FOR INCLUSIVE GROWTH**





Bangladesh Development Series  
Power and Infrastructure for  
Inclusive Growth





# Introduction

The present Awami League government led by Prime Minister Sheikh Hasina earmarked on a host of mega infrastructural projects to transform the future of the country and to change the course of national progress. To this end, a good number of projects have been put under the Fast-Track scheme, which have been envisaged, introduced and supervised by Honorable Prime Minister Sheikh Hasina herself, resulting in full swing progress being accomplished.

Some major aspects in the transport and power development policy action were considered by the present government for sustainable development in Bangladesh. The goals of transforming to an efficient transport system was linked with fostering economic development, enhancing the quality of the environment, reducing energy consumption, promoting transportation-friendly development patterns and encouraging fair and equitable access and safe mobility to residents of different socioeconomic groups.

From Padma Multipurpose Bridge, to the country's first ever nuclear power plant, and the deep sea port are some of such dream projects, rolled out to boost up the wheel of national progress, seeing substantial progress. On impact, lives in long deprived regions have started to change, horizons for businesses are opening up fast, employment opportunities are being created, and the influx of international investment is rising, adding further impetus to the national growth.

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# POWER & ENERGY

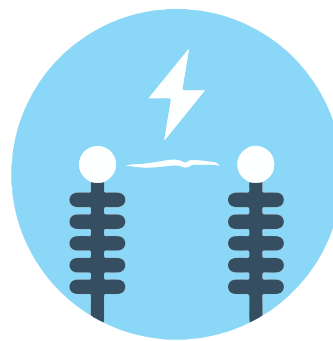
01

Bangladesh is a developing country with the lowest per capita energy consumption. Implementing power and energy project has become a national call for Bangladesh to meet its challenge for future energy demand as well as ensuring national energy security.

In 2009, when the Awami League led government assumed the office, the nation was suffering from chronic power supply crisis. The average power demand at that time was about 6,000 MW while power generation capacity of the country was less than 5000MW. Eight to ten hours' load-shedding in summer days used to cause unbearable miseries. Now the generation capacity has increased more than 16,000 MW in 2018, which is very much at par with the capacity as declared in the ruling party's election manifesto.

The government has set up 28 power plants with a total of capacity 4,086 MW between January 2014 to December 2017 through public and private entrepreneur initiative. At present, 17 government power plants with a total capacity 7,338MW and 23 private power plants with a total capacity 5,564MW are under-construction. The government has successfully brought 26 upazilas (sub-districts) under 100% electricity coverage as part of the 'Electricity for All' programme during this period.

Despite a robust rise in the capacity the current power generation is, to some extent, has been a challenge for the power sector to meet increasing demand. Power plants in Bangladesh generated 9,891 MW of electricity against the total demand for about 10,000 MW. The power sector has also taken a massive capacity expansion plan to add about 11,600 MW generation capacity in next 5 years to achieve 24,000 MW capacity with the aim to provide quality and reliable electricity to all Bangladeshi people and keep pace with the fast growing industrial demand. The number of power connection receivers in Bangladesh have risen to some 26 million in 2017 while the transmission lines rose to 10,436 km while the distribution line to 401,000 km.



## Power Sector Successes

The government of Bangladesh is working relentlessly to materialize the 'Vision 2021' goals of the ruling government. Power Division is committed to providing 100% access to electricity to the people of the country by 2021. In 2009, the access to electricity was 47% which is now 83%. It is expected that 100% electricity coverage would be possible much before 2021. In line with the 'Vision 2021', Power Sector's vision has been set to ensure reliable electricity to all at an affordable price by the year 2021.

The government has taken a comprehensive action plan for the development of power sector. As a result, the rise in economic growth, the growth in the industrial sector, and rapid progress in urbanization has been achieved. The demand for electricity is increasingly snowballing. In the year 2015-2016, 1586 MW of power was added to the National Grid. The progress of electricity generation is also reflected in comparison to the surge in per capita electricity consumption and in the number of subscribers. What was achieved between 1971-2009, has been tripled in the last nine years by the present government.

## Emphasis on Renewable Energy

### Policies

Taking into account the country's future energy security, the government has given due consideration to renewable energy. To expedite the process of integration of renewable energy technology in the country, the government approved the Renewable Energy Policy in 2008. The objectives of the policy are to harness the potential of renewable energy resources and disseminate it to the people, as well as to enable, encourage and facilitate both public and private sector investment. Apart from the Renewable Energy Policy, other acts, policies and regulations also support the promotion of renewable energy in Bangladesh.

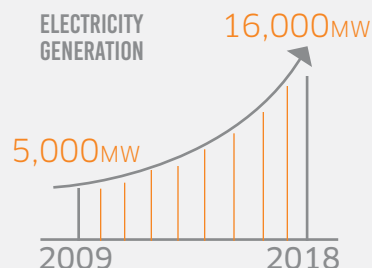
### Institutional Framework for Renewable Energy Development

The Sustainable and Renewable Energy Development Authority (SREDA) Act was passed in December 2012. The objectives of SREDA are promote, develop and coordinate renewable energy and energy efficiency programmes in the country. SREDA has prepared short, medium and

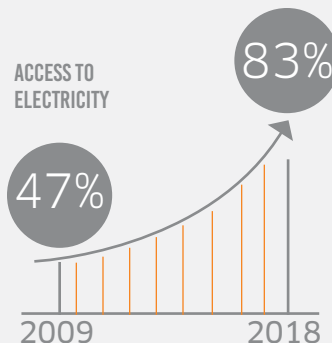
## BANGLADESH POWER DEVELOPMENT BOARD

### BANGLADESH'S ELECTRICITY GENERATION CAPACITY REACHED IN 2018

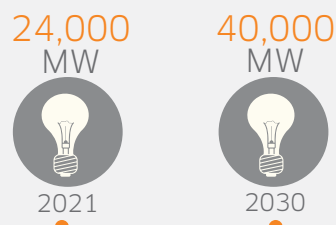
16,000 MW



### ACCESS TO ELECTRICITY



### GOVERNMENT'S FUTURE PLANS



26 Sub-districts brought under 100% electricity in 2017





long-term plans to meet the targets set by the government through its policy. It is monitoring all renewable energy programmes and activities implemented by public and private entities. SREDA innovates financing and incentive mechanisms for renewable energy projects.

## Renewable Energy Resources of Bangladesh

The prospect of renewable energy in Bangladesh is bright particularly for solar. But in the immediate future, renewable energy will remain a supplement to the conventional energy production. Renewable energy will still play an important role in reaching consumers outside the national grid or in places where grid connection is delayed. Major sources of renewable energy in Bangladesh are as follows:

### Wind Energy

Bangladesh has a 700 km coastline, and there are several islands in the Bay of Bengal. The strong south/south-westerly monsoon wind coming from the Indian Ocean can be utilized to generate electricity from wind farms. Bangladesh has the potential to produce wind energy in the coastal areas and on its islands. The government has a plan to generate electricity from wind power under public and private initiatives. Wind resource mapping projects have been taken up

by the government. At present, several wind resource assessment programmes are ongoing in the country.

### Biomass

Energy from biomass has prospects in the rural as well as urban areas. Apart from cow dung, other biomass such as wood, forest residue, municipal solid waste and poultry litter are popular sources of biomass energy.

### Mini Hydro and Micro Hydro Projects

The land in Bangladesh is flat aside from some elevated areas in the Chittagong Hill Tracts. The gradient is not significant enough to offer the prospect for hydroelectricity except in the Chittagong Hill Tracts, where the only hydropower plant (230 MW) operates in Kaptai. Some small plants can be envisaged only in this area.

### Progress in the Renewable Energy Sector

Commendable progress has been made in the renewable energy sector in the last few years. At present, about 404 MW is being generated from renewable energy sources. Solar Home System (SHS) is a success story in Bangladesh. It has been hugely popular in the rural areas, especially in the off-grid regions.





### Power Generation Targets from Renewable Energy

In line with the Government's Renewable Energy Policy targets, a plan is in place to develop at least 800 MW of power from renewable energy. Expected power generation from renewable energy under public and private sector initiatives will be:

### Solar Energy

Bangladesh, being located between 20°30' and 26°45' north latitude, has an average of 5 kWh/m<sup>2</sup> of solar radiation falling over 300 days per annum. Daily sunlight in Bangladesh ranges from 7 to 10 hours. This abundant solar energy has a great potential in various sectors in Bangladesh, and its usage will contribute to reducing the traditional fossil fuel-based power consumption, while ensuring a green environment for future generations.

### Solar Home System (SHS) Programme

Infrastructure Development Company Limited (IDCOL) promotes and disseminates the Solar Home System (SHS) in remote, rural areas

through its Solar Energy Programme with financial support from the World Bank, Global Environment Facility (GEF), KfW Development Bank, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the Asian Development Bank and the Islamic Development Bank. IDCOL started the programme in January 2003 and by July 2015 it successfully financed more than 3.5 million SHSs with a capacity of about 150 MW. IDCOL has financed 6 million SHSs by 2016.

### Grid Tied Solar Power

The first grid-tied solar power plant in Bangladesh had been installed at Sarishabari, Jamalpur with a capacity of 3MW. It is the largest solar mini grid project in the country and one of the largest solar mini grids in the world has been installed in Sunamganj District. The project is providing power to the marginalized rural population of the remote haor areas in Sunamganj district covering around 1000 households providing grid quality electricity from Solar Power. As part of off-grid electrification, distribution of solar home system, solar mini grid, micro grid programs have been taken by the government. So far, 45

million Solar Home System (SHS), 10 solar mini grids have been installed in off-grid rural areas. government has a plan to install 60 million solar home system and 50 solar mini-grid system by 2018 to cover about 10% of total population.

### Solar Rooftop Programme in Government and Semi-Government Offices

To meet the increasing demand of electricity, government and semi-government offices have started to install rooftop solar systems to meet their light and fan loads. So far they have installed rooftop solar systems of 3 MW capacities.

### Solar Irrigation

Bangladesh is predominantly an agrarian country with 7.56 million hectares of irrigable land. Large quantities of water is required for irrigation during the dry seasons (from January to April). About 1.42 million diesel-operated irrigation pumps are in use requiring about 1 million MT of imported diesel per year. On the other hand, the electricity demands for 0.33 million electric irrigation pumps are about 1,700 MW. In this context, the application of solar irrigation pumps has tremendous potential. A programme has been introduced by the Government to replace 18,700 diesel-based irrigation pumps with solar irrigation pumps. Under this programme about 150 MW of electricity will be generated.

### Grid-Tied Solar Park

Electricity from solar mini-grids is expensive for rural people when the grids are installed under private entrepreneurship. Therefore, government has taken up different grid-tied solar park projects with a total capacity of 793 MW. These will be implemented by government-owned utility companies or through private entrepreneurship. These programmes are at different stages of implementation.

### Biomass

In Bangladesh, the majority of the population relies on biomass for cooking and heating. About 90% of the energy required to meet household cooking demand comes from biomass sources. There are an estimated 30 million households in Bangladesh, the majority of which are rural. Few are aware that the toxic fumes produced by cooking can pose a serious risk to health—especially to that of women and young children. It is estimated that more than 24 million rural and nearly 6 million urban Bangladeshis are exposed to household air pollution due to solid fuel use. The pollutants released by burning solid biomass also contribute to climate change.

Households in Bangladesh generally use traditional stoves for cooking purposes. These stoves have low efficiency due to significant







loss of heat and the dissipation of black smoke. Improved Cookstoves (ICSs) are traditional stoves which have been modified to provide higher thermal efficiencies and reduce emissions of pollutants. The Institute of Fuel Research and Development (IFRD) of the Bangladesh Council of Scientific and Industrial Research (BCSIR) has been carrying out different pilot projects on biomass and ICS since 1973.

The government, with the help of donor agencies, has devised a programme to popularize ICSs in rural areas. A nation-wide action plan was launched in 2013. Under different financial mechanisms, various donor agencies such as GIZ, SNV Netherlands, the USAID Catalyzing Clean Energy in Bangladesh (CCEB) and the Global Alliance for Clean Cookstoves are working in this sector. As of now 500,000 ICSs are in use, and the Government plans to install 30 million ICSs by 2020.

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### Initiatives for Power Efficiency

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**Prepaid Metering System:** Pre-paid metering system has been introduced nationwide aimed at ensuring easier bill payment with hundred percent collection of electricity bill. About 700,000 pre-paid meters have been installed till date and another 27,00,000 meters would be installed within next June 2018. After installation of these pre-paid meters virtually there is no accounts receivable of pre-paid

consumers. Moreover, due to introduction of pre-paid meters, system loss has been reduced significantly and also demand at consumer level reduced.

**High Voltage DC (HVDC):** The first ever 400KV - HVDC line has been established to import 500 MW power from Baharampur, India through Bheramara, Bangladesh Grid Interconnection. The 54.7 ckt-km 1113 MCM double circuit line has been established in 2013 to transmit electricity by converting into high voltage DC from AC and then converted into 230kV AC at the Bheramara station.

**ICT in Power Sector:** In order to establish good governance through increasing the quality of customer service, increasing efficiency, transparency and accountability, the Power Division has taken and implemented digitalization of the sector. In addition to on-line power connections and bill payment systems, and complaints management system have also been introduced. A comprehensive website of the Ministry of Power, Energy and Mineral Resources has been developed, which is playing important role in social communication and promotion.

**Underground System:** Government has decided to develop underground distribution system in major cities of the country. The aim is to provide the facility of modern cities with an advance electricity supply system. The government

owned power distribution companies have adopted several plans to establish underground distribution substations and supply lines to switch to modern-country's practice of having underground power-distribution system.

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## Energy Sharing

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**Public-Private Partnership (PPP) in Transmission:** The government has decided to implement electricity transmission projects under PPP for the first time. It may be worth mentioning here that government initiated PPPs in 1997 during the first term of the present government.

**Cross Border Electricity Trade (CBET):** Power exchange through regional cooperation has been commenced during this period. Import of 660 MW electricity from regional grids from India has started through CBET. By 2021, plan has been taken to further import 3,500 MW of power through regional cooperation.

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## Challenges

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**Domestic Gas Depletion:** Bangladesh was largely dependent on domestic gas for electricity generation while almost 96% generation was from gas in 2009. At the moment domestic sources of gas are becoming increasingly unreliable. Under the proposed Power System Master Plan 2016, 60%-70% of electricity generation will be dependent on imported electricity or imported Liquefied Natural Gas.

**Grid Stability:** Transmission capacity in Bangladesh is not growing fast enough to cope up with power generation, resulting in supply bottlenecks in important commercial corridors (such as Chittagong and Comilla). Unexpected outages, perpetuate concerns about the security and stability of the country's power grid. Power system frequency in Bangladesh varies routinely on normal days between 48.9-51.2 Hz and can go as low as 48.7 Hz and as high as 51.5 Hz under contingency. This is a major impediment to system reliability and also causes a severe economic loss.

**Distribution Bottleneck:** The present capacity of distribution lines in Bangladesh is about 420 thousand kilometres and sub-station capacity is about 20 thousand MVA. Although remarkable success has been achieved during last 9 years, but the present distribution infrastructure is not sufficient to ensure quality, uninterrupted and reliable electricity for all by 2021. Huge number of distribution lines and substations will need to

be constructed to meet the vision 2021 of the government. The project financing, upgradation of existing infrastructure, timely implementation of project, conversion of overhead system into underground system, implementation of smart grid and prepaid metering system are the major challenges.

**Land Availability:** A key constraint in Bangladesh electricity-generation development is land availability, be it for coal mining, thermal power generation, utility-scale solar or hydroelectricity. Bangladesh has one of the highest population densities in the world. The World Bank estimates 59% of Bangladesh's total land is arable, and 11% is forested. With 66% of the population still based in rural areas, this is a key constraint that requires careful management.

**Off-grid Electrification:** The vision of the government is to ensure quality and reliable electricity supply for all by 2021 but the main challenge for achieving this target is the electrification of off-grid areas of Bangladesh, where expansion of national grid is highly expensive and time consuming. To overcome this barrier government has taken initiatives to electrify the off-grid rural areas, remote islands and hill tracts by the development of renewable energy resources.

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## Steps to Overcome the Challenges

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**Fuel Diversification:** Natural gas is the main fuel for power generation in Bangladesh. But the natural gas is depleting day by day. Recognizing the importance of primary fuel for generation of electricity, the government of Bangladesh has diversified the fuel mix for power generation. Government has a plan to gradually use coal, LNG and other available fuel for power generation besides gas. To ensure energy security, government has prepared the Power System Master Plan 2016 considering gas, coal, LNG, liquid fuel, dual fuel, nuclear and renewable energy resources. The government has also taken initiatives to import power from neighbouring countries.

**Augmentation in distribution:** To ensure reliable, quality and uninterrupted electricity for the people of Bangladesh, a strong distribution network is essential. The present capacity of distribution lines and substations are not adequate enough to provide uninterrupted electricity supply to the consumers. Besides, construction of 159km of new lines augmentation and modernization of existing distribution system is required.



# FLAGSHIP POWER PLANT PROJECTS

02

## Rooppur Nuclear Power Plant

Rooppur Nuclear Power Plant is the first nuclear power plant of Bangladesh, currently under construction. The plant with 2.4GW capacity is located in Pabna district of Bangladesh on bank of Padma river. Bangladesh is constructing this plant under financial and technical support from Russia. After its completion, Bangladesh will become third country in South Asia to have civil nuclear facility.

The nuclear power plant (NPP) will include two units namely Rooppur Unit-1 and Rooppur Unit-2 with a capacity of 1.2GW each. The foundation stone for the Rooppur NPP was laid in 2013 and the first concrete for the main construction phase was poured in November 2017. Rooppur Unit-1 is scheduled to commence operations in 2023, while Rooppur Unit-2 is due to come online in 2024.

This project is considered to be a milestone in the development history of the country. Besides generating power, it has the potential to provide benefits for the overall socio-economic development of a nation. Electricity generation from nuclear energy has been planned in Bangladesh since 1961, before the independence of the country, and until 2009, there were no significant achievements in this regard. As per Power system master plan 2010

CAPACITY TO POWER OVER  
**1.14 MILLION**  
(11.4 LAKH) HOUSEHOLDS

ROOPPUR  
POWER PLANT  
TO SUPPLY  
**11.55%**  
NATIONAL  
POWER DEMAND

FIRST **NUCLEAR**  
POWER PLANT OF  
BANGLADESH

Source: Ministry of Power, Energy and  
Mineral Resources



concern, by the year 2020, two nuclear power plants at Rooppur will generate 2000 MW which will supply 11.55% of the total national power demand. By 2030, power demand will grow up to 33,708 MW and nuclear energy share 4,000 MW.

Power generation is expected to start soon after 2020. At present, Bangladesh has a 3 MW TRIGA research reactor for training and collection of medical isotopes.

This nuclear power plant will use cutting-edge technologies and follow the safety guidelines of the International Atomic Energy Agency (IAEA). The project will provide low-cost electricity and create new jobs in Bangladesh. The power production in Bangladesh currently exceeds 4GW a year. The new plant will increase the country's power production and enable it to achieve energy independence. The Rooppur plant is expected to add 2,400MW of electricity to the national grid by 2024, helping the country to meet an increasing demand for electricity.



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### Matarbari Power Project

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The largest coal-fired power project at Matarbari under Moheshkhali Upazila of the district is expected to illuminate the whole country. After its implementation, the power plant is projected to create a large number of employment in the area, providing the local economy with a much needed boost and creating a massive urbanization effect in the area. The construction of 1,200MW coal-fired power plant is going on in full swing at Matarbari in Cox's Bazar and is expected to go into operation by 2023.

The Coal Power Generation Company Bangladesh Limited (CPGCBL) signed an agreement with a consortium of three Japanese companies to build the plant. 600 MW capacity two steam turbines, circulating cooling water stations, 275-meter high chimneys and water purification systems will be installed in the project. For the import of coal, 7 kilometer naval channels will be created and jetties constructed in the river. Coal yard will be built to store of coal. The communication system will be developed as well.

The plant will be built following Ultra Super Critical Technology to prevent environmental pollution. It will emit less carbon dioxide. As a



**1,200MW**  
COAL-FIRED  
POWER PLANT



**MINIMAL**  
ENVIRONMENTAL  
POLLUTION



**\$4.6 BILLION**  
COMPLETE  
POWER HUB



**DEEP SEAPORT FOR**  
COAL  
TRANSPORT

result, negative impact on the environment will be very low. In addition, to prevent the amount of nitrous oxide, burner will be installed. De-sulfurization methods will be used in sea water to prevent emission of sulfur-dioxide.

The government has planned to make Matarbari as a power hub with plans for construction of a deep sea port under the power plant project. The government hopes that once the power plant and deep seaport are built, the Matarbari will turn into an important economic zone. Bangladesh has a huge potential to produce renewable energy by using sea resources like air, wave, organic thermal changes and salinity. There are 475 species of fishes in the Bay of Bengal from where at least 66,00,000 tonnes of fishes can be collected. After the project is implemented, the collection of fishes from the Bay will increase. The fisheries resources, the Bay is rich in various mineral resources like gas, oil, copper, magnesium, nickel and cobalt, etc. Along with electricity and port facilities, employment opportunities will be created in that area.

Around 12 large imported coal fired ultra-Super Critical Technology using Coal Fired Power Plants would be constructed in the greater Cox's Bazar

region with a total capacity of about 15,620 MW would be built in greater Cox's Bazar region. Works have already started for construction of power transmission facilities for evacuation of this power to national grid. As an additional precaution, all the Cox's Bazar coal fired power plants would import high heating value, low sulfur and low ash containing coal and adopt ultra-super critical technology.

**Coal Port and Coal Transfer Terminal:** Coal Power Generation Company Limited is now advancing with the works of coal port construction at Matarbari. The 240-meter-wide 18.6-meter-deep feeder canal construction connecting with the deep sea South of Matarbari would be ready by end 2018 and a coal port of capacity 4 Mt /year would be ready by 2020. This port would be eventually converted to a 30 Mt / year capacity coal transfer terminal by 2041. Coals required for all planned and under construction power plants in Matarbari, Maheshkhali, Pekua Region would be conveyed from this terminal. The port and coal transfer terminal would be operated by private company.





## Moheshkhali floating liquefied natural gas (LNG) terminal

Moheshkhali floating liquefied natural gas (LNG) terminal is being developed offshore, at the Moheshkhali Island in the Bay of Bengal, Bangladesh. It will be the country's first LNG import terminal and is expected to help secure the future provision of energy in the country.

The terminal will cost an estimated \$179.5m and feature a base-load capacity of 500 million standard cubic feet of gas a day (MMscf/d). The project will be jointly developed by Excelerate Energy and Petrobangla on a build, own and operate basis.

The LNG terminal will include a floating storage and regasification unit (FSRU), a subsea buoy system and a subsea pipeline, which will connect the terminal to an onshore pipeline system. The FSRU will have a storage capacity of 138,000m<sup>3</sup> of LNG and a regasification capacity of 500Mscf/d. The terminal's offshore subsea buoy system will be used for mooring and will also serve as a conduit to transfer natural gas onshore.

The new terminal will enable Petrobangla to import LNG from international gas markets and increase natural gas supply in Bangladesh by approximately 20%. It will also diversify

Bangladesh's sources of natural gas and provide the country with access to clean energy. Additionally, the development is expected to provide sufficient natural gas to support power generation of up to 3,000MW, which is essential to promote power reliability, industrial development and the creation of jobs in the country.

In anticipation of LNG terminals delivering natural gas, Petrobangla Company GTCL has taken major initiatives for constructing gas transmission pipelines and spur lines for evacuating the gas to the national gas grid. 90 Kilometer 30 inches' diameter Moheshkhali Anowara gas transmission and terminal stations are now ready for transporting the first ever 500 MMCFD LNG. The Anowara - Chittagong City Ring Mail spur line is also constructed. The pipelines linking Anowara CGS with CUFL, KAFCO and Shikhalbaha Power Stations are also being constructed. The works of three more pipelines - Maheshkhali -Anowara 42 inches OD 90 KM loop line, 42 inches OD 28 KM Anowara -Faujdarhat Pipeline and Faujdarhat -Feni -Bakhrabad Pipeline are also at the advanced stage. It is expected that by the middle of 2019 GTCL will be in a position for evacuating 3500-4000 MMCFD LNG scheduled for import by 2025.





## Payra Power Plant

Prime Minister Sheikh Hasina has undertaken this project in consideration of the people in southern Bangladesh. The first unit of Payra Ultra Super-Critical Coal fired Power Plant is expected to go into operation by June 2019.

Construction of this powerplant is underway on a port on the Payra in the Ramnabad Channel near the power plant. The government also has plans to convert it into a 'deep sea port'. The plant would be an eco-friendly one with clean coal technology and is expected to help achieve excellence in the country's power and energy sector. The plant will have two units. The first unit will be operational in April 2019 and the second one in October the same year.

The units will feature a plan for installing another coal-fired power plant having the same capacity and technology, a 100 MW solar plant, and a 50MW wind power plant. Ultra super-critical technology will be used to build the imported coal-based power plant.

Initiatives have also been taken to prevent possible damage to the environment at Payra and the government is planning to set up a number of coal-fired power plants across the country to generate 20,000MW electricity by 2030. The project is being implemented with



30% national resources of the total costs and mobilizes the remaining 70% from international sources. The cost of generating each unit of electricity is estimated at Tk6.

The government is currently working on three major power generation hubs in the division including at Payra in Patukhali, and Maheshkhali and Matarbari in Cox's Bazar, where several coal and LNG-based power plants will be installed.



## Rampal Power Plant

This 1320 MW coal-fired power station is under construction at Rampal Upazila of Bagerhat District in Khulna, Bangladesh. It is a joint partnership between India's state owned National Thermal Power Corporation and Bangladesh Power Development Board. The joint venture company is known as Bangladesh India Friendship Power Company (BIFPC). The location was selected by Bangladesh Power Development Board after an extensive survey, feasibility study and Environmental Impact Assessment. The plant being located beside Posshur River connected with the Bay of Bengal, was considered ideal for an imported coal based thermal power plant.

During finalization of location, the exclusive zone of such plant from Sundarban Mangrove forest as per Bangladesh Environment law was duly observed. The location is outside the 10km exclusive zone of the mangrove forest meeting such criteria set by Department of Explosive (DOE) in accordance with Bangladesh Environmental law.

**Coal Specification, Technology:** Specified coal to be used for this power plant and technology to be adopted for restricting emissions and pollutions below acceptable threshold limits.

The imported coal based power plant using higher heating value (57,000 kcal), low sulphur

(0.6-0.9%) and less than 10% ash coal will adopt supercritical technology for higher efficiency. Additional measures have been incorporated for emissions of SOX, NOX, HG, particulate matters of ash and also against water pollution from the effluent of the power plant. The coal to the plant would be transported in covered vessels after transshipment from mother vessels anchored at deep sea through covered conveyor system. Two smaller purpose built coal carrying vessels would play every day through the wide channel across the Sundarban to the coal terminal of the plant. There will be a provision of a completely covered coal storage at plant side as a contingency measure for storage of 3 months' requirement equivalent coal. Use of superior quality coal, adoption of supercritical technology and incorporation of additional measures for emission and pollutions restriction will ensure that plant would cause no significant impact on biodiversity and ecosystem of the mangrove forest.

**CO2 Absorption:** Trees and plants feed on CO2. As such CO2 emission is not going to harm Sundarban mangrove forest in any way. Still, for restricting CO2 emissions spreading outside the plant area deep afforestation programs have already been initiated with the collaboration of Bangladesh Forest department. By the time the plant comes into commercial operation in late 2021, the area around the plant will have mini forest outlook.

**Flue Gas Desulphurization Plant:** The condition while approving the EIA, the plant design has incorporated Flue Gas Desulphurization Plant (FGD) which using wet limestone, forced oxidation process and using double flow contact scrubber would extract 96% of the Sulphur from the coal obliging to Bangladesh Department of Environment (DOE). This will eliminate the possibility of SOX emission above the acceptable limit.

**Low KNOX Burner:** Low knock burners have been included to restrict knock emissions. Closed coupled overflow air (CCOFA) low knock tangential firing system of the boiler would reduce NOX emission below 510mg/Normal Cubic Meter.

**Particulate Materials Control:** The plant design mandates incorporation of Electrostatic Precipitator (ESP) and ash from the burnt coal will be collected by dry ash collection method. This will restrict as emission to below 50 mg per cubic meter while the internationally acceptable limit is 150 mg per cubic meter

**Mercury Removal:** Wet limestone used in FGD will take out most of the mercury along with sulphur. Some Mercury will also be absorbed with dry ash.

**Ash Control:** 100% of the fly ash and bottom ash will be collected using dry ash collection system. BIFCPL has already been approached by cement factories in the area for collecting all the ashes.

On top of that as contingency measure using High Concentration Slurry Disposal System (HCDS) ash can be temporarily stored in ash pond. The Ash pond will have high walls higher above the highest flood level to arrest escaping of any ash to surface and sub-surface water. HCDS will practically convert ash to ash stone.

**Water and Effluent Quality Control:** Multi-stage closed loop water recycling system and adoption of dry ash collection system would ensure limited use of water in the process. Only about 0.05% of the water flowing in Posshur River will be used in the plant as makeup water. Central Effluent Treatment Plant will treat effluent to pH7 level before this is released to stream. IFC standard of effluent release differential temperature below 2 degrees celsius would be ensured.

**Chimney:** A very tall 275-meter chimney has been incorporated in the design obliging to DOE condition of EIA approval. Such a tall chimney will ensure that most of the residual entrained particles would drop down and velocity of emission would become negligible as it leaves the top of the chimney. Moreover, a survey has suggested that air from the plant blows towards the Sundarban for only 90 -100 days every year. Continuous Emission Monitoring System (CEMS) would monitor Flue Gas Temperature along with SOX, NOX, O<sub>2</sub> and oxide of carbon emissions. Ambient Air Quality Monitoring System (AAQMS) will monitor air quality around the plant.





# INFRASTRUCTURE FOR INCLUSIVE GROWTH

A well-developed transport network—roads, bridges, ports, railways, and inland water transport can integrate the economy by linking the rural and urban areas, connecting cities, and enabling easier access to jobs and markets. It can also promote domestic, regional, and global trade, and help diversify the economy.

Ever since taking office in 2009, the ruling government has placed high importance on building a well-developed transport network—roads, bridges, ports, railways, and inland water transport— that can integrate the economy by linking the rural and urban areas, connecting cities, and enabling easier access to jobs and markets. It can also promote domestic, regional, and global trade, and help diversify the economy. Transport infrastructure needs in Bangladesh is constantly increasing, which why the government developed a strong programme in all areas of transport: roads, bridges, railways and ports.

The annual budget provided adequate resources, reflecting the priority attached to important transport infrastructure projects. Some important road network projects, including projects to ease urban congestion, were completed and many new projects initiated. The most notable is the initiation of the Padma Bridge Project. The Chittagong seaport and airport are performing well. However, the government recognizes that the transport infrastructure challenge is enormous.

## Padma Multipurpose Bridge

Construction of Padma Bridge is expected to generate welfare to the people of Bangladesh in general and the 30 million people of South West in particular. The benefits are expected to arise from the greater integration of regional markets within the Bangladeshi national economy. Moreover, given the interdependence of economic activities and sectors, the direct impacts of the Padma Bridge on individual sectors are likely to induce a chain of changes in the rest of the sectors of the economy. Using an economy-wide multiplier model, a

### PADMA BRIDGE

- 6.15KM-LONG VIADUCT WITH PIERS AT 150M SPAN
- EACH PIER HAS SIX STEEL TUBULAR DRIVEN PILES
- FOUR-LANE HIGHWAY ON UPPER LEVEL
- SINGLE TRACK FREIGHT RAILWAY ON LOWER LEVEL

study found that, the injection of \$2.1 billion into the economy produces economy wide benefits in terms of value added of Tk 453,670 million (\$6,481 million) over a period of 31 years. This would give an annualized growth rate of 0.33% of national base GDP. Using the Traffic model, road users benefit is found to be million Tk 1,295,840 (\$18,512 million). Thus, the total project benefit is estimated to be Tk 1,749,510 million or \$24,993 million. This implies that total project benefit is 39% relative to the base national income. Assuming the 31-year full realization time frame, total project benefit per year is then 1.26% relative to the base national income.

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### Importance of Padma Bridge

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Crossing Bangladesh's Padma River, the world's third largest, has always been a challenge. Often a tiring and sometimes dangerous journey due to unreliable and limited ferry connections, there are regularly long waits for overcrowded boats and ferries. The southern region of Bangladesh does not have enough rail networks. The Padma Bridge will provide the missing but essential rail infrastructure to effectively connect this region on rails. There will be connecting railways on both sides of the bridge. The existing Dhaka-Mawa two-lane road has been expanded further at the later stage of the project.

The districts that can reap economic benefits from the bridge are spread across three divisions. They are Khulna, Bagerhat, Jessore, Satkhira, Narail, Kushtia, Meherpur, Chuadanga, Jhenaidah, Magura under the Khulna Division; Barisal, Pirojpur, Bhola, Patuakhali, Barguna and

Jhalokati under the Barisal Division; and Gopalganj, Faridpur, Madaripur, Shariatpur and Rajbari under the Dhaka Division.

The region is expected to witness a breakthrough in development following the completion of Padma Bridge. Investment and employment in the region will go up significantly, and income inequality will come down. Previously, the lack of connectivity has prevented timely and effective access to medical care, education, and has also hindered mobility and economic activity in the past. The proportion of the population below the poverty line in the southwest region is about 5% higher than the national average. Primarily due to lack of connectivity, the region economically lagged behind the rest of the country.

The southern region is expected to become the country's biggest economic zone after the opening of the Padma Bridge, provided that the zone receives the gas supply it needs. It is a guarantee of an improved road network to the rest of the country which will reduce both the required time and cost associated with transportation.

The Padma Bridge would help increase the profit earned by exporting frozen fish and jute products, which are the main exports in Khulna division. The bridge will further improve domestic transportation of goods and passengers through the integrated railway system, while finally connecting Bangladesh to the Asian Highway Network. In order to fully reap its benefits, the government has already started strengthening other essential infrastructure ahead of the bridge's completion.






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## Deep Sea Ports

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### Bangladesh Port Facilities

**Chittagong Port:** Built in 1887 near the Karnaphuli River, 16 Km upstream of the Bay of Bengal, Chittagong Port is an integral part of the sub-regional transport and logistics chain. This port plays a pivotal role in achieving sustainable economic growth through facilitating international trade.

The average size of container vessels serving the Chittagong Port is 2500 TEUs to 3000 TEUs having draft of 9.1 metres (more modernised sea ports are found handling container vessels of 5000-18,000 TEUs). In 2016, Chittagong Port handled 2.346 million twenty-foot equivalent units (TEUs) of containers having 51.38 million tons (MT) of cargo and in 2015, 2.024 million TEUs of containers having more than 50 million tons of cargo. It is apprehended that there will be three-fold rise in container traffic in the next 15 years. The expected figures are 2.7 million TEUs in 2020 and 5.4 million TEUs in 2040. This rapid growth of international trade would necessitate the establishment of a deep sea port at a suitable location in the Bay of Bengal to handle high-draft larger vessels for transportation of goods directly to different countries.

**Bay Terminal:** It has been envisaged to construction a 'Bay Terminal' at Patenga coast on an area of 900 acres of land behind the Chittagong Export Processing Zone (CEPZ). This would allow big ships, which are longer than 190 meters and have draft of more than 9.5 meters, to berth and carry out other activities. Mother vessels with up to 5000 TEUs will be able to anchor there. The construction of the 600-metre long Patenga container terminal, which is expected to take the pressure off the Chittagong port, will be complete by the end of 2019.

**Mongla Port:** It is situated about 69 nautical miles from the Pashur river mouth. The maximum permissible draft of the vessels that can enter the port jetties varies between 7.0m and 8.5m depending on the tide and weather conditions and there is a length restriction of up to 225m. The deep-draft vessels cannot enter into the Chittagong Port as well as the Mongla Port and are lightered at the outer anchorage in the Bay that causes higher freight rates and low productivity of our sea-borne trade. Mongla Export Processing Zone (EPZ) will become the key centre of economic activities in the southern region of Bangladesh. Mongla EPZ will be able to enjoy the benefits of the Padma Bridge and Asian Highway as well as better and faster road communication system, not to mention a fully functional Payra Port, a



rail link to Mongla Port, and an airport in the area, which has already been proposed.

**Matarbari Port:** Construction of a deep sea port, terminal for liquefied natural gas (LNG), four 600MW coal-fed power plants, along with communication network such as rail lines and, roadways, is underway at Matarbari, about 25 Km from the Sonadia island. The country's first deep sea port - Matarbari will be modelled on the Japanese ports of Kashima and Niigata. The deep sea port will have a draft of 16 metres, where 350-metre-long vessels with a capacity of 8,000 TEU containers will be able to berth which is double the capacity of the Chittagong Port.

#### Payra Deep Sea Port

The construction of the Payra Deep Sea Port is one of the integral part of the government's plan to make a prosperous Bangladesh. Since the southern part of the Bangladesh has been previously neglected, the Payra Port would help tap the huge potentiality of the region. Taking into consideration about the prospect, the government has taken decision to construct the seaport at Payra in Ramnabad. A naval base is also being constructed in Payra and process is progressing to build a cantonment in the area. In

addition, some other projects are being taken for overall development of the area including shipbuilding, ship recycling, economic zone and power plant.

The Payra Port will also be connected with country's rail network; adding that the navigation route of the port would be extended up to Brahmaputra and Karimganj of Indian State of Assam through river dredging, creating trade and business opportunities for Bangladesh and neighbouring countries. The government has set short-term, mid-term and long-term goals for the port. In short-term, this year the government would facilitate outer anchoring of clinkering, fertilizer and other bulk ships. In mid-term, the government would complete building a multipurpose and bulk terminal infrastructure by 2018 at a depth of 10-meter channel through dredging. By 2023, a full deep sea port facility of 16-meter channel will be operational.

The port, once come to full operation, mother vessels with eight to ten meter drafts will be able to anchor helping loading and unloading of goods more quickly than Chittagong port, which now handles country's 92% export and import. The Payra Port has heralded a new era in the country's development with unloading of stones for Padma Bridge.





## Improved Road Networks

### Railway Network

The Bangladesh Railway network has seen as an important agent for extending the coverage of the transport sector and increasing its efficiency. Bridges were built, road networks and urban transport improved, port operations streamlined, and rail infrastructure developed. Bangladesh Railway operations have also become more efficient through policy and institutional reform.

The Chittagong Port Trade Facilitation Project, completed in 2013, improved cargo handling at the port by automating its container terminal management system and installing other facilities. A strategic master plan for the next 30 years was developed.

Besides implementing system reforms, the ongoing Railway Sector Investment Program has financed the installation of 64 km of a double-track railway and a signaling system from Tongi to Bhairab Bazar railway junction along the Dhaka-Chittagong railway corridor, connecting to Chittagong port. Train services have become more reliable and timely, and confidence in the services has risen. More passengers heading for the Chittagong region now use trains instead of buses to avoid traffic congestion and save time. The program has also introduced new accounting

architecture, key performance indicators, and annual tariff adjustments, and corporatized the container business.

### Rural Road Network

In their first full year of operation, the Rural Infrastructure Improvement Project (RIIP) and the Second Road Network Improvement and Maintenance Project both completed in 2013, built or upgraded rural roads (1,425 kilometers [km] and 140 km). RIIP also contributed to a daily vehicle-kilometer average of 2,163,150, and an additional to 442,600.







# 04 RAPID TRANSIT FOR DHAKA COMMUTERS

## Mass Rapid Transit

The government aimed to provide a safe, fast, affordable and modern means of transportation for the city dwellers. The new urban public transport service promises to significantly reduce congestion in the capital and prevent environmental pollution. The Dhaka Mass Rapid Transit Development Project, official name of the metro rail scheme, stretches from Uttara to Motijheel, and involved \$2.5 billion. The mode of transport is expected to see half of the 20 km metro line go open by the end of 2019.

The depot is the foremost component to be in place for building the metro rail service system, as metro trains will be launched on the elevated lines from the depot. The entire metro rail route including all 16 stations will be elevated. Only the depot will be on the ground. A Japanese firm, Tokyo Construction Ltd is carrying out the depot land development work.

With every metro rail train comprising of six air-conditioned spacious cars, a city commuter will travel between Motijheel and north Uttara in 37 minutes and there will be a train every four minutes at each of the 16 stations on the way in both directions. A total of 24 trains will together transfer 60,000 passengers every hour on both directions. The project formalized as Dhaka Mass Rapid Transit, otherwise known as Mass Rapid

Transit (identified as MRT line-6 in the Strategic Transport Plan), is being implemented by the government-owned Dhaka Mass Transit Company Ltd with Dhaka Transport Coordination Authority as the supervisors.

## DHAKA METRO RAIL

SAFE, FAST  
AFFORDABLE  
AND MODERN  
CITY TRANSPORTATION

REDUCED  
CONGESTION &  
POLLUTION

WORTH  
\$2.5 BILLION  
OPENS IN  
2019

WILL CARRY  
OVER 60,000  
PASSENGERS  
PER HOUR



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## Dhaka Metro Rail

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**Line 1:** To be completed in the second phase, this line will set up lines from Dhaka airport to Kamalapur at first, extending eventually to connect Gazipur, Kamalapur Keraniganj's Jhilmil Residential Area and Khilkhet to Purbachal Residential Area. The MRT will reduce the travel time to a mere 23 minutes from Dhaka airport to Kamalapur while going from Purbachal to Kamalapur will take just 39 minutes.

**Line 5:** Going between Bhulta and Badda, the MRT Line 5, stretched up to 35 kilometers, will have stopovers at Mirpur, Gabtoli bus terminal, Dhanmondi, Basundhara city mall and Hatirjheel link road.

**Line 2:** The fourth metro rail the MRT Line 2 will be constructed to connect Ashulia, Savar, Gabtoli, Dhaka University, DSCC Nagar Bhaban and Kamalapur at a length of 40 kilometres which will directly connect Dhaka EPZ to Kamalapur ICD.

**Line 4:** To be set up at a stretch of 16 kilometre, the MRT Line 4 will enclose the route between Kamalapur and Narayanganj. With certain parts to be set up underground, construction work for the fourth and fifth metro rail will be completed by 2035.

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## Dhaka Elevated Expressway

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The Bridges Division is implementing the first Dhaka Elevated Expressway for smooth traffic between the airport and the Dhaka-Chittagong highway. The project will be implemented by 2019. The 21km flyover will have 24km ramps landing at different places in the city. Vehicles will move over the elevated flyover without any level-crossing or intersection.

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## Colour-coded bus service

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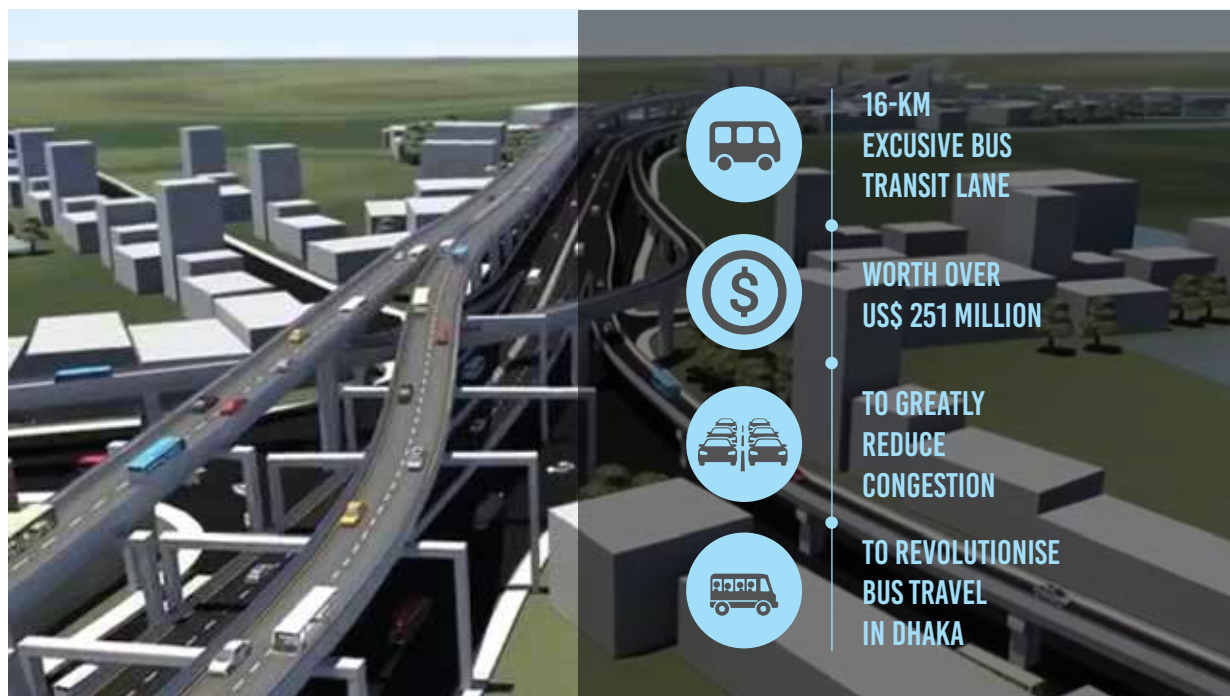
The government will form six transport companies to operate 4,000 new buses on six major routes. Currently, around 4,500 buses run through Dhaka on 165 routes and are owned by nearly 2,000 small businessmen. These buses engage in aggressive competition on the roads, raising the risk of accidents. By incorporating these owners into six companies and reducing the number of routes, the authorities aim to bring order and better service to Dhaka's public transport and cut down on inefficiencies.

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## Bus Rapid Transit (BRT)

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The BRT buses will carry 20,000 people. This will speed up Dhaka's traffic and ensure that





journeys are completed on time. The BRT bus will run through dedicated road corridors without any interruption by other traffic. Once the MRT and BRT begin operating, they are expected to reduce pressure on existing roadways. This project is scheduled to be completed by 2019.

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### Smart card

Passengers will be able to pay their fares through smart cards that will be useable on the metro rail, BRT and water transportation systems. Dhaka Transport Coordination Authority (DTCA) has already started work to introduce a “rapid pass”, a digital fare collection system for commuters. Initially the rapid pass will be introduced on BRTC air-conditioned buses on a pilot basis, and will be finally rolled-out by the beginning of 2019.

The rapid pass will be designated as “One Card for All Transport” and 50,000 cards will be produced at a cost of Tk3.9 billion in the first stage. A commuter will have to pay Tk400 to buy a rapid pass.

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### Digital traffic system

The Dhaka North and South city corporations are implementing a digital signal system. The project is being implemented under the Clean Air and

Sustainable Environment (CASE) project funded by the World Bank. The traffic police will be given remotes to control the lights under the new system and will be able to decide when they change to green or red.

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### Water transport

The government has already started the water taxi service in Hatirjheel linking Moghbazar, Rampura and Gulshan in the capital. The service will be extended to Gulshan 2 and Baridhara. The service has already gained popularity, but people have yet to take it seriously as a means for daily commute.

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### Ride sharing

Multiple private ride sharing companies are now operating in Dhaka since 2016. The Bangladesh Road Transport Authority (BRTA) began drafting a set of guidelines for ride sharing in the country. Authorities have welcomed the businesses and believe they can contribute to reducing congestion in Dhaka.




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### Dhaka Ashulia Elevated Expressway

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The project includes construction of up to 24km elevated expressway from Hazrat Shahjalal International Airport to Ashulia, 3.77km ramp, 710 meter flyover in Nabinagar intersection, upgradation of the existing 15.28km four-lane Ashulia road and construction of drains including two bridges of 27km. These two Expressway Projects are part of the road network improvements proposed in the Dhaka Strategic Transport Plan. The East West Elevated Expressway project will link Chittagong and the southern parts of Bangladesh to the north and west of the country. Eventually the route will form part of a ring road around Dhaka. Dhaka-Ashulia elevated expressway is expected to improve the communication with the northern part of the country. This includes construction of up to 24km elevated expressway from Hazrat Shahjalal International Airport to Ashulia, 3.77km ramp, 710-meter flyover in Nabinagar intersection, upgradation of the existing 15.28km four-lane Ashulia road and construction of drains including two bridges of 27km.

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### Dhaka Chittagong 4 Lane Highway

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With this extended highway opened, distance between two major cities of Bangladesh has been reduced by at least two hours. A drastic change from two-way single lane highway to one-way highway divided by a huge divider will also prevent head to head collisions which was pretty prevalent in this highway. A smoother connection to port city from capital will also help Bangladesh to improve its economy by a huge margin.

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### Dhaka Chittagong Elevated Expressway

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The government has decided to build a 225-km-long elevated expressway between Dhaka and Chittagong at a cost of Tk700 billion (Tk70,000 crore). Once completed, people can travel to Chittagong from Dhaka at over 100 Km/h speed on average and can reach destination within 2 hours. Journey will be completely uninterrupted. No need to bother about pedestrians or illegally parked vehicles. Due to the elevation, goods can be transported through freight trains from 10pm to 5am through the elevated expressway as there will be no passengers' flow at that time.

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### Dhaka Chittagong Express Railway

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This ambitious high speed rail link will reduce further travel time between Dhaka and Chittagong. 200Km+ high speed rail will lessen the dependency on road vehicles. The trains will not have to wait for other trains to pass by as the link between two cities will be completely dedicated.

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### Dhaka Cox's Bazar Railway Link

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Currently there are no way to travel by train to the tourist city of Bangladesh. But this project will establish direct rail connectivity to the tourist city with capital. People will be able to go to enjoy sun set in Cox's Bazar and return to capital on the same day. The project will be implemented at a cost of Tk1.8 billion, of which the Asian Development Bank (ADB) is likely to provide Tk1.2 billion assistance. Construction set to begin in August 2017 and completed by 2022.





## BANGLADESH'S SUB REGIONAL INITIATIVES

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In the process of globalization, the world has experienced surges of regional integration initiatives in the last century. South and South-east Asian countries, however, have lagged behind the rest of the world in the process of regional integration and hence remained relatively isolated from each other for many years.

Located in an advantageous geographical position, Bangladesh can play a crucial and strategic role in connecting South and South-east Asia. Accordingly, Bangladesh has undertaken a wide range of programs to upgrade its highway and transport network to facilitate trades and cross-border movement of vehicles. While the Sixth Five Year Plan of Bangladesh emphasized corridor based road development with a view to accommodating regional as well as international traffic in Bangladesh, the Seventh Five Year Plan of Bangladesh is set to make investment projects along these route alignments.

In the process of promoting regional cooperation and integration, Bangladesh has deeply been involved in several regional initiatives and identified strategic transport routes under the umbrella of UN-ESCAP, SAARC, SASEC, BIMSTEC and BCIM Forum. Bangladesh is located at a very important strategic position in South Asia. It connects the South Asian Association for Regional Cooperation (SAARC) and Association of

Southeast Asian Nations (ASEAN) states. It can reach at the doorstep of half of the world population within 24 hours with a motor vehicle from Bangladesh, meaning direct access to the half of the world market. Asian highway and inter SAARC connectivity can make Bangladesh tomorrow's world business hub between SAARC and ASEAN member states.

Bangladesh has the potential for capturing the opportunity of being a regional economic corridor of the region. Not only in SAARC or ASEAN, Bangladesh could work with the issue in the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) or the Asia-Pacific Trade Agreement (APTA), etc. platforms. All the major players of both the regions are member of APTA. The country's strategic geographical location could help offer the connectivity through land, sea even in the air.

Bangladeshi sea ports especially Mongla Port is very much eligible to offer economic transport facilities to the land-locked Nepal and Bhutan. Bangladesh also offers one stop service facility for both the local and foreign investors to invest here, manufacture products, sale around the SAARC, ASEAN nations even export to the western countries either Europe or America with duty free market access facility.

Movement of vehicles along cross-border corridors is crucial for enhancing connectivity to improve linkages among neighboring countries for increased cross-border trade, tourism and investment. Four geographically contiguous countries inked the Motor Vehicles Agreement for the Regulation of Passenger, Personal and Cargo Vehicular Traffic between Bangladesh, Bhutan, India and Nepal on 15 June 2015. In the process of making the Agreement operational, contracting parties to the Agreement are now finalizing protocols for implementation of the Agreement. This Agreement is also expected to induce investment in transport infrastructure and trade facilitation measures.

## Asian Highway Network

The Asian Highway project was conceived by UN-ESCAP (United Nations Economic and Social Commission for Asia and the Far East) in 1959 with the aim of establishing regional cooperation among the main land countries of Asia, based on road transport linkages. It consists of three pillars: The Asian Highway (AH), the Trans-Asian Railway (TAR), and the Facilitation of land transport projects through intermodal transport terminals (dry ports and inland ports). The Asian Highway follows framework for internationally agreed routes and infrastructural standards. The Asian Highway network currently comprises about 144,630 kilometre of roads, including 15,400 kilometre of potential Asian Highway routes in China, passing through 32 Asian member States with linkages to Europe (UNESCAP 2014).

The Bangladesh Cabinet approved the accession of Bangladesh in Asian Highway Network in 2009 and the Agreement entered into force later that year. In Bangladesh, there are three Asian Highway Routes namely, Asian Highway-1 (AH1), Asian Highway-2 (AH2) and Asian Highway-41 (AH41). Of these three routes, AH41 remains within Bangladesh, but could be extended to neighbouring countries. Total length of the AH routes in Bangladesh is 1771 kilometre.

In Bangladesh, the AH will enter from two directions. One of them will enter at Benapole from Kolkata and will reach Dhaka via Jessore and Bangabandhu Bridge. Another will enter Bangladesh at Bangabandhu from Kathmandu via India and will reach Dhaka via Dinajpur, Bogra and Bangabandhu Bridge. From Dhaka, the AH will again enter India via Sylhet - Tamabil route.

The AH will provide Bangladesh a new opportunity for increased trade within the Asian sub region as well as with the member countries of AH. Bangladesh will also earn foreign currencies by providing transit facilities to the neighbouring and other member countries, as it is becoming a gateway between the South and East Asia. As a result, if the project of AH is implemented then it could bring revolutions to the live of poor as well as it will open up a new horizon in the development



Asian Highway (source - Ministry of Road Transport and Bridges)

## SAARC Highway Corridor

The South Asian Association for Regional Cooperation (SAARC) is an economic and geopolitical union of eight member nations namely, Bangladesh, India, Pakistan, Nepal, Bhutan, Sri Lanka, Maldives and Afghanistan. SAARC countries are committed to enhance regional cooperation among the countries to



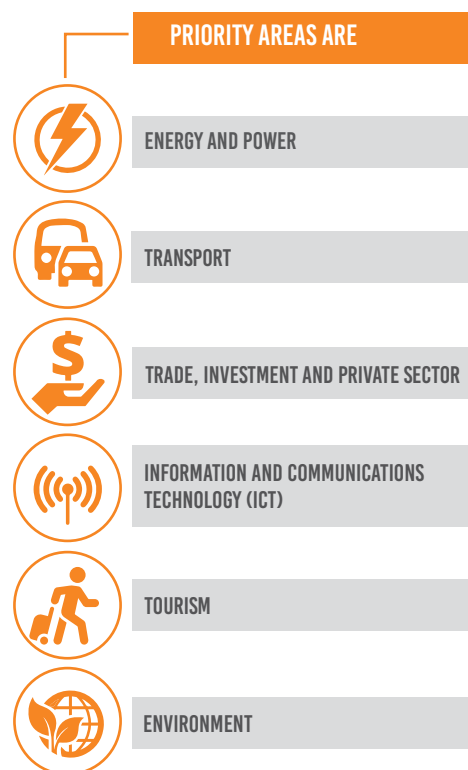
(source - Ministry of Road Transport and Bridges)

promote the welfare and improve the quality of life of the people of the region.

Recognizing the importance of transport integration in South Asia as one of the key elements to promote economic cooperation, the SAARC Summit in 2004 decided to strengthen transport, transit and communication links across the region. It was in pursuance of this decision that initiated the SAARC Regional Multimodal Transport Study (SRMTS) with the main objective of enhancing multimodal transport connectivity among SAARC member states.

SRMTS recommended 10 road corridors for future development based on several criteria namely, volume and trend of traffic, potential to provide direct connectivity, ability to provide access to landlocked countries/states to ports or to major transit transport networks, potential to provide to reducing distance and thereby saving transport costs and revitalizing historical links or provide linkages for meeting socio-political requirements. Out of the 10 SAARC Highway Corridors (SHC), six corridors namely SHC1, SHC4, SHC5, SHC6, SHC8, SHC9 involve Bangladesh.

## SASEC Road Corridor





The South Asia Sub-Regional Economic Cooperation (SASEC) Program brings together Bangladesh, Bhutan, India, the Maldives, Nepal, and Sri Lanka in a project-based partnership that aims to promote regional prosperity, improve economic opportunities, and build a better quality of life for the people of the sub region.

The SASEC Road Connectivity Project, together with cofinancing, will expand and improve a 70 kilometer section of the Dhaka-Northwest corridor-the second busiest arterial route in the country. The narrow two-lane road currently suffers from serious congestion and high accident rates. Expanding the route to four lanes will help ease bottlenecks, reduce crashes, and provide the nearly seven million people living in the area with new business opportunities and better access to markets, schools and other social services.

The initiative will also upgrade land ports at Benapole and Burimari, which handle the bulk of goods transported between Bangladesh and India. These upgradations will boost trade volumes, improve traffic flows and reduce the loss of perishable goods.

Studies show upgrading regional transport corridors in Bangladesh will support the movement of about 18 million tons of freight in Bhutan, India and Nepal, boosting intra-regional trade across South Asia.

The SASEC program will also spur growth and development across the sub-region. Its work covers activities in many sectors including transport, trade, energy, the private sector, tourism and the environment

SASEC countries share a common vision of boosting intraregional trade and cooperation in South Asia, while also connecting to South-east Asia through Myanmar, to the People's Republic of China and the global market. Integration of the transport network of South Asia is particularly crucial to countries such as Nepal and Bhutan and regions such as north-east India. Such integration, on the one hand, could serve to end their landlocked or semi-isolated status by providing shorter transport links to the sea ports and, on the other hand, could benefit Bangladesh through facilitation of trade with these regions.



Saarc (source - Ministry of Road Transport and Bridges)



## BCIM-Economic Corridor

Despite many regional initiatives to enhance regional connectivity, Asian countries have remained relatively disconnected. However, there existed several overland connections that facilitated movement of people and goods in the past. The key concept behind the Bangladesh-China-India-Myanmar Economic Corridor (BCIM-EC) initiative was that by harnessing the comparative advantage in the respective member countries, each nation could significantly benefit through the operationalisation of crucial infrastructure connectivity and BCIM-wide economic co-operation. Bangladesh would enjoy greater market access to the two most powerful Asian economies namely India and China through elimination of non-tariff barriers and investment in infrastructural development.

Preferential access to larger Indian and Chinese markets could make Bangladesh a more attractive destination for foreign direct investment. Given the rising outward Foreign Direct Investment (FDI) flows from India and China, these two economic giants can also be a major source of FDI for Bangladesh. Current FDI inflow from both countries to Bangladesh is dismally low. India can invest in potential sectors such as the electrical machinery and equipment, vegetable, agro processing, automobiles, textiles, etc. in the manufacturing

front and software, pharmaceuticals, hospital and medical equipment, tourism among others in services. China also has highlighted five core areas where it wants to invest - energy exploration, power generation, agriculture, industry, and transportation.

By developing connectivity with China, India, and Myanmar by roads, rail and other ways, Bangladesh can transform itself into a part of an industrial nexus and commercial hub linking up South and Southeast Asia. This could be done through construction of the multimodal Southern Silk Road in the form of shorter and cheaper routes linking India and China through Bangladesh. The China Communications Construction Company Ltd (CCCC) has proposed to build the Bangladesh portion of the silk route that would pass through Dhaka and Chittagong. Indo-Bangladesh connectivity could be strengthened through rail link between Akhaura and Agartala providing a direct railway route between Bangladesh and the North-Eastern States of India thus generating almost 50% savings in travel. Road connectivity between Kolkata and the North-East Indian states would cut the distance by half. This would be a win-win situation for both the countries since India would gain from savings in transport cost and travel time and Bangladesh could tap a new source of earning foreign exchange in the form of transit fee for cargoes and containers.

Maritime transport is hamstrung by inadequate port facilities in Bangladesh and economic co-operation with Myanmar would spell benefits for Bangladesh in many ways. Myanmar is setting up special economic zones offering investment incentives which may allow Bangladeshi firms to exploit the improving investment climate of its neighbours. The recent discovery of gas reserves in Rakhine State has opened up new corridors of industrial development possibilities. Stronger trade, investment, and people-to-people linkages between the two countries could also set the ground for peaceful and sustainable resolution of issues like the Rohingya question.

The BCIM initiative would also open up new avenues of cross border energy trading for Bangladesh. Bangladesh's installed power generation capacity was 16,000 MW in 2018. As there are remaining deficits, Bangladesh has already begun importing power from India and BCIM power co-operation can take this to a new level.

#### BIMSTEC Road Corridor

The Bay of Bengal Initiative for Multi Sectoral Technical and Economic Cooperation (BIMSTEC) is a sub-regional initiative involving a group of countries in South Asia and South East Asia. These are: Bangladesh, India, Myanmar, Sri Lanka, Thailand, Bhutan and Nepal. The main objective of this initiative included in the study was

primarily to help formulate BIMSTEC policy and strategy in relation to specific transport and logistics issues, which are constraining trade or raising transport costs in the various parts of the region.

The BIMSTEC region has huge potential for hydropower in the Himalaya basin and hydrocarbon in the Bay of Bengal. This raises the hope of utilising the huge resources of the area of the Bay of Bengal that Bangladesh has recently acquired. Bangladesh also emphasised the need for developing infrastructures like power plants with electricity corridors throughout BIMSTEC region. BIMSTEC could also help Bangladesh construct a deep-sea port and exploit gas and other resources that exist beneath the waters of the Bay for the benefit of the member countries. BIMSTEC will also bring economic prosperity for the region as energy security, and power plants with electricity corridors will be established through BIMSTEC region along with cross-border transport connectivity. Unlike SAARC and ASEAN the BIMSTEC FTA will allow goods and services to move without tariff and non-tariff barriers as bottlenecks to free trade. Free trade will lead to increasing investment, employment and overall economic prosperity for the people. When the BIMSTEC region is developed and becomes richer, each member country will have much larger markets for its products and services at its door-steps.







## Conclusion

The Awami League lead government continues its policy prioritising the development of the power, energy and transport sectors considering their codependence in the overall development of the country. Furthermore, the government has increased the number of transport infrastructure, power plants and improved its transmission and distribution capacity. Per capita power generation has increased along with national and regional connectivity. The country has the highest rate of solar home system installations in the world. The government entered into a number of international agreements to construct new road, bridges and highways along with more power plants while exploring new energy sources.

Bangladesh can look forward to a continued period of strong economic growth and development in the near future. The power and transport sector will play a critically important role underpinning sustainable development of the country. Thus cost-effective long-term investment programmes are being implemented that prioritizes clean energy, smart grid and energy efficiency. Through successful implementation of the power and transport sector plans, domestic, regional and global connectivity along with reliable energy supply will no longer remain just a dream. These will facilitate achieving the Sustainable Development Goals (SDGs) and also establish Bangladesh as an example for development all over the world. The development of power and transport sector will not only elevate Bangladesh to a higher status but also assist in elevating poverty, reducing inequality and create higher living standards for the people.



Bangladesh Development Series  
**POWER AND INFRASTRUCTURE**  
FOR INCLUSIVE GROWTH



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