SECTOR ASSESSMENT (SUMMARY): ENERGY

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. **Overview.** Rapid economic growth in Bangladesh over the last decade has resulted in an increase in electricity demand as the country industrializes, raises living standards, and reduces poverty. However, the power sector in Bangladesh is characterized by a long-standing shortage of power generating capacity and natural gas supply. The national electricity grid generally covers the entire country, with two interconnections with India. While 80% of the population has access to electricity, providing electricity to the remaining population continues to be a major challenge.[1]

2. **Structure of the power sector.** Bangladesh Power Development Board (BPDB) is the largest institution in the power sector, with 52% of generating capacity (including generation by its subsidiary companies, Ashuganj Power Station Company Limited, Electricity Generation Company of Bangladesh, North-West Power Generation Company Limited, and Rural Power Company). BPDB performs the functions of a single buyer of all generation and bulk supply to distribution utilities and, as of fiscal year (FY) 2016, delivered about 23% of all sales to end-use customers. The remaining generation was from Bangladesh Rural Electrification Board's generation by its *palli bidyut samitis*,[2] independent power producers, short-term independent power producers, and rental power plants. Power Grid Company of Bangladesh is the transmission utility, owning and managing the transmission network and substations at 132-kilovolt (kV), 230 kV, and 400 kV capacity.

3. **Power generation situation.** Bangladesh has chronic power shortages. The reasons are broadly identified as (i) rapid growth in demand for electricity, (ii) insufficient funding to build new power plants in a timely manner, (iii) poor performance and underutilization of existing power plants, and (iii) fuel shortages and inadequate fuel diversification to operate existing power plants. The installed power generation capacity had increased to 12,365 megawatts (MW) by June 2016, which served a peak demand of 9,036 MW against an unconstrained demand of 11,405 MW, indicating that about 2,400 MW of demand was partly met with inefficient captive generation and partly by load shedding.[3] In June 2016, 62% of installed capacity in Bangladesh was natural gas-fired generation. Actual capacity factors of thermal power plants operating on gas, heavy fuel oil, and diesel are considerably lower than their potential capacity factor of 80%, because of poor plant maintenance and gas shortages.

4. **Single fuel dependence and energy security.** Given that over half of the power generating capacity relies on gas as a fuel source, gas supply shortages have a large adverse effect on power generation and resultant load shedding, which both lead to reduced economic output. To address shortages, the government has announced plans to develop plants using dual fuel technology and to facilitate fuel diversification by using both domestic and imported natural gas and imported coal. The government is further committed to increase international power transfers and develop renewable energy. These initiatives are at an advanced stage of implementation.

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[1] Government of Bangladesh; Ministry of Power, Energy and Mineral Resources; Power Division; Power Cell. Bangladesh Power Sector at a Glance. http://www.powercell.gov.bd/site/page/d730f98d-8912-47a2-8a35-382c4935eddc/Power-Sector-at-a-Glance (accessed 1 March 2018).

[2] *Palli bidyut samitis* are community cooperative associations that hold a franchise to distribute electricity in rural area.

[3] BPDB estimates that load shedding at the time of peak demand in 2016 was about 250 MW.

5. **Power generation outlook.** With (i) the growing demand from new customers and existing customers in already electrified areas, (ii) the release of suppressed demand when load shedding and transmission and distribution constraints are eased through new investments, and (iii) demand from new customers as rural electrification expands, the gap between the supply and demand for power generation capacity is likely to remain or grow in the coming years. The power system master plan estimates peak demand will reach 13,300 MW by 2020 and 27,700 MW by 2030.[4] This reflects a demand growth of about 11% per year until 2020, and 6% per year during 2020–2030. Such figures suggest that from 2018 to 2030, about 25,000 MW of new generating capacity is required, with simultaneous investments to replace inefficient and expensive power plants scheduled for retirement.

6. **The transmission network.** Bangladesh's national grid generally covers the entire country. While there is currently no significant overloading on the transmission network, many lines are operating at their thermal capacity, or will reach capacity limits within two years. As gas-fired generation as well as planned gas- and coal-fired generation is largely outside the key load centers in Dhaka, currently generated power is transferred over long distances exceeding 200 kilometers. In the process, transmission losses of up to 2.7% (as reported in FY2016) are seen; this indicates the necessity of additional lines and substations to reliably bring the generation to load centers.

7. **Power distribution.** The distribution and supply of electricity is undertaken by five distribution utilities: (i) BPDB, (ii) Dhaka Power Distribution Company (DPDC), (iii) Dhaka Electric Supply Company (DESCO), (iv) West Zone Power Distribution Company, and (v) Bangladesh Rural Electrification Board (including 79 *palli bidyut samitis*). These five utilities covered 26.7 million customers as of June 2017. Distribution losses of BPDB, DPDC, and DESCO were 25%–35% in the 1990s. As of 2016, system losses of DESCO and DPDC fell below 10%, while those of BPDB and West Zone Power Distribution Company ranged from 10% to 15%. Household consumers account for 52% of all electricity sold in Bangladesh, followed by industries (34%), commercial customers (9%), agriculture sector (farmers) (4%), and others (1%). The annual average growth in sales was 9% during 2005–2015.

8. **Weak institutional capacity.** Technical and financial management of electricity utilities is largely based on traditional practices, with limited use of modern management techniques supported by state-of-the art information management systems, causing resource allocation and reporting to be weak and inefficient. The absence of key operational information causes decision-making to be delayed. Power generation, which accounts for the highest share of electricity costs, needs to be managed by specialists with hands-on training in controlling the process flow in each power plant. The lack of adequate power plant operations simulators in Bangladesh has caused power plant operator training to be limited to classroom sessions and to trainings provided by power plant contractors during commissioning of new power plants.

9. **Sector reforms.** Since 1996, under its National Energy Policy, the government has undertaken a series of reforms to introduce competition, attract foreign direct investment, and increase power supply. Key policies, legislation, and related actions include the following: (i) Private Sector Power Generation Policy of Bangladesh, adopted in 1996; (ii) Policy Guidelines for Small Power Plants in the Private Sector, adopted in 1998; (iii) Guidelines for Remote Area Power Supply Systems, adopted in 2007; (iv) Policy Guidelines for Enhancement of Private Participation in the Power Sector, adopted in 2008; (v) Renewable Energy Policy of Bangladesh, adopted in January 2009; (vi) Bangladesh Energy Regulatory Commission Act, 2003; (vii)

[4] Government of Bangladesh; Ministry of Power, Energy and Mineral Resources; Power Division. 2016. *Power System Master Plan 2016.* Dhaka.

unbundling of generation, transmission, and distribution functions into separate companies under Power Sector Reforms in Bangladesh adopted in 1994; and (viii) Towards Revamping Power and Energy Sector: A Road Map 2010, a policy paper issued by the Ministry of Finance in 2010.[5]

10. **Regulatory framework.** The downstream energy sector is regulated by the Bangladesh Energy Regulatory Commission, fully operational since 2008. The commission's first major regulatory order was issued in late 2008, revising bulk supply tariffs for distribution entities. A further upward revision of bulk supply tariffs and retail tariffs was announced in February 2011. In 2015, the bulk supply tariff, transmission tariffs, and retail tariffs were all revised.

11. **Sector financial performance.** The financial performance of BPDB has been poor, which threatens the financial health of the electricity industry. BPDB has made an operating loss since 2011 because of low levels of tariffs that do not keep pace with the costs of production and delivery of electricity. Funding for investments and to cover cash shortfalls is currently covered through long-term debt and government grants.

2. Government's Sector Strategy

12. **National energy policy.** The government has developed a multifaceted policy to increase power supply through its National Energy Policy 2008,[6] which aims to (i) provide adequate and secure energy resources for all, (ii) support socioeconomic development, (iii) reduce poverty and promote social equity, (iv) provide a sustainable energy mix, (v) promote rational use of energy, (vi) improve sector management and performance, (vii) increase private sector investment, (viii) ensure balanced growth of the east and west grid zones of the country, and (ix) promote regional energy markets.

13. **Vision 2021 and the Seventh Five Year Plan.** The government's near- to medium-term development strategy is described in the Vision 2021[7] statement and further elaborated in the Seventh Five Year Plan.[8] Key goals for the energy sector are to (i) increase electricity generation capacity to 23,000 MW by 2020, (ii) increase electricity coverage to 96% by 2020, (iii) improve per capita electricity consumption from 281 kilowatt-hours in 2016[9] to 514 kilowatt-hours in 2020, and (iv) provide uninterrupted power supply to industries.

14. Power shortages have constrained economic growth in Bangladesh, with power outages estimated to cause losses of up to 0.5% of gross domestic product.[10] This has led to an urgent call for generation expansion. During 2015–2021, 17,334 MW of generation capacity, including 1,900 MW of import capacity, is planned to be added. Of this, 9,661 MW of generation capacity is expected from public sector investments while 5,773 MW is expected from private sector investments. Investments in infrastructure for power imports from neighboring countries will be led by the public sector. Under other initiatives to mitigate the demand-supply gap, procurement has commenced for 100 MW furnace oil-fired power plants in 10 different locations in Bangladesh.

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[5] Government of Bangladesh, Ministry of Finance, Finance Division. 2010. *Towards Revamping Power and Energy Sector: A Road Map*. Dhaka.

[6] Government of Bangladesh; Ministry of Power, Energy and Mineral Resources; Power Division; Power Cell. 2008. *Bangladesh National Energy Policy*. Dhaka.

[7] Government of Bangladesh, Ministry of Planning, Planning Commission, General Economics Division. 2012. *Perspective Plan of Bangladesh, 2010–2021: Making Vision 2021 a Reality.* Dhaka.

[8] Government of Bangladesh, Ministry of Planning, Planning Commission, General Economics Division. 2015. *Seventh Five Year Plan, FY2016–FY2020: Accelerating Growth, Empowering Citizens.* Dhaka.

[9] Government of Bangladesh, BPDB. 2016. *Annual Report, 2015–2016*. Dhaka.

[10] Government of Bangladesh, Ministry of Planning, Planning Commission, General Economics Division. 2011. *Sixth Five Year Plan, 2011–2015: Accelerating Growth and Reducing Poverty; Part 1: Strategic Directions and Policy Framework.* Dhaka.

15. **Sector reforms outlook.** The government has delayed further institutional reforms in the power sector, including converting BPDB into a holding company and establishing a single buyer for purchasing electricity from public sector generation plants and independent power producers, and selling it to power distribution companies. Further liberalization of the industry under the reforms and unbundling are also yet to be implemented.

3. Asian Development Bank Sector Experience and Assistance Program

16. As Bangladesh's lead development partner in the energy sector, the Asian Development Bank (ADB) has provided support in seven broad thematic areas: (i) promoting a commercial orientation for power sector entities, (ii) promoting investments in power generation, (iii) removing transmission constraints, (iv) expanding access to electricity, (v) increasing gas production capacity and mobilizing investments to gas production, (vi) improving the gas transmission and distribution network, and (vii) improving the governance and regulatory framework. ADB has continued its support for power sector reform and has focused on improving governance across the sector and in key sector entities.

17. Under the country partnership strategy for Bangladesh, 2016–2020, ADB's support in the energy sector will build on the progress already made in power sector reforms and address power shortages.[11] This will support energy security and promote green growth by (i) expanding renewable energy and financing instruments to promote cleaner technology; and (ii) providing higher availability, reliability, and enhanced access to power supply.

18. A multitranche financing facility for the Power System Expansion and Efficiency Improvement Investment Program is under implementation from 2012 to improve power system efficiency and boost power generation using cleaner and more efficient generation technologies.[12] In 2013, ADB supported a regional power generation and transmission project that includes interventions to foster improved energy efficiency in major industries and support expanded power trade between Bangladesh and India. The cross-border power system interconnection between India and Bangladesh was commissioned in 2014. In 2017, ADB approved the Bangladesh Power System Enhancement and Efficiency Improvement Project to strengthen the transmission capacity between the southwestern region and Dhaka, improve distribution network management in Dhaka, and rehabilitate and expand the rural electrification network in all the *palli bidyut samitis*.[13]

19. To help with gas infrastructure development, ADB is supporting implementation of the Natural Gas Access Improvement Project, which began in 2010 and is nearing completion.[14] In 2016, ADB approved the Natural Gas Infrastructure and Efficiency Improvement Project to strengthen the gas transmission network by adding compressor stations and constructing new gas pipelines.[15]

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[11] ADB. 2016. *Country Partnership Strategy: Bangladesh, 2016–2020.* Manila.

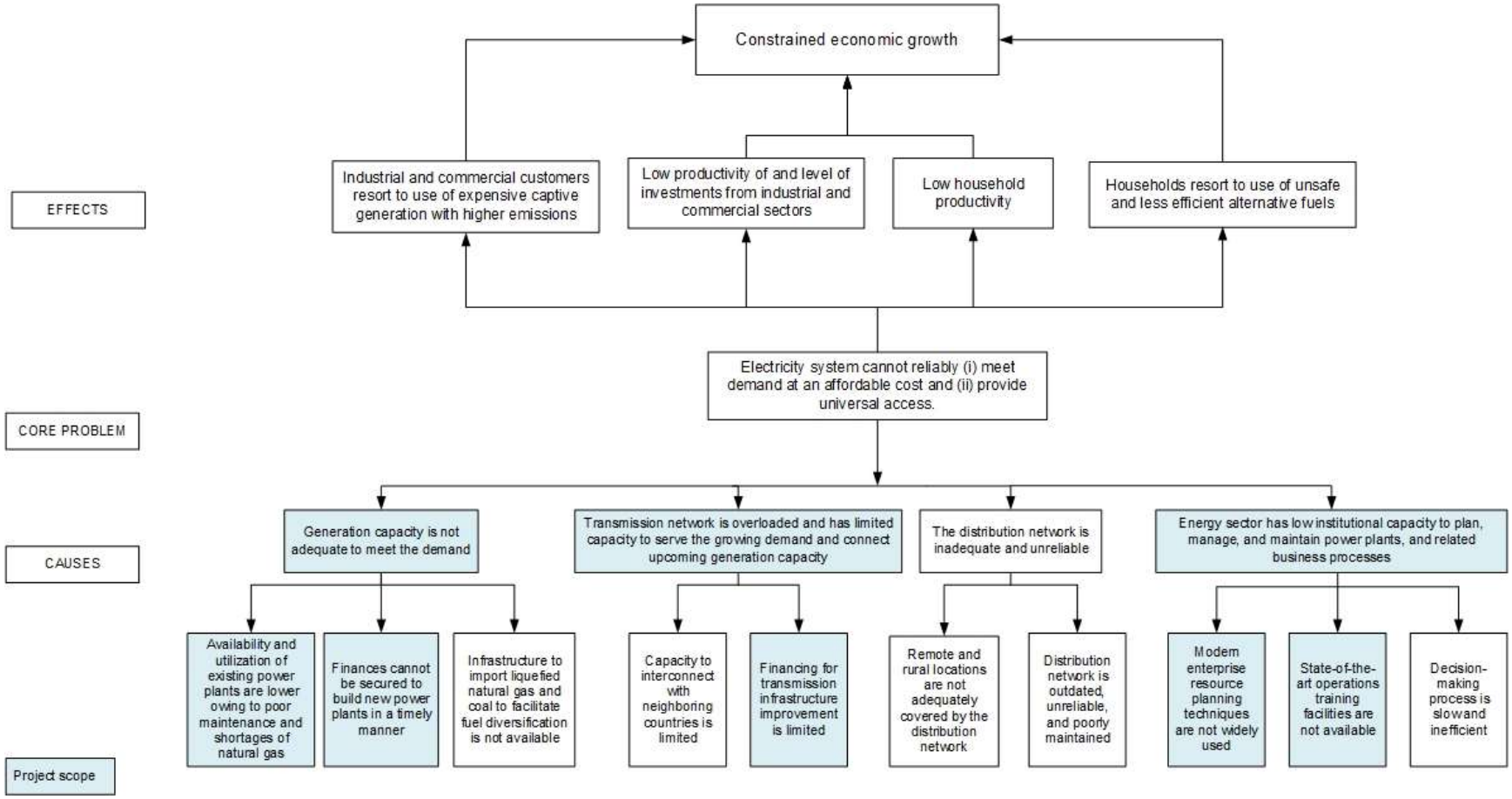
[12] ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility and Administration of Grant to the People's Republic of Bangladesh for the Power System Expansion and Efficiency Improvement Investment Program.* Manila.

[13] ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Administration of Grant to the People's Republic of Bangladesh for the Bangladesh Power System Enhancement and Efficiency Improvement Project.* Manila.

[14] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the People's Republic of Bangladesh for the Natural Gas Access Improvement Project.* Manila.

[15] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Administration of Loan to the People's Republic of Bangladesh for the Natural Gas Infrastructure and Efficiency Improvement Project.* Manila.

Problem Tree for Energy Sector



Source: Asian Development Bank.