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Fixing Bangladesh's Power Sector

A planned power capacity expansion, supported by renewable energy and energy efficiency, is all-important to streamline the sector

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Key Findings

While the Bangladesh Power Development Board's (BPDB) installed power system capacity soared by 125% between June 2016 and October 2024, its financial troubles brewed due to tepid power demand growth, use of expensive fuels, limited success with renewable energy, and unfavourable economic conditions.

During the fiscal year (FY)2019-20 to FY2023-24, the BPDB's total annual expenditure increased 2.6-fold against revenue growth of 1.8 times, prompting the government to allocate a combined subsidy of Bangladeshi Taka (Tk)1,267 billion (US$10.64 billion).

The power sector's reserve margin will likely reach 66.1% by December 2024, which is much higher for a country with limited renewable energy. With IEEFA's assessment showing that Bangladesh's demand may rise to 25,834MW in 2030, a system capacity of 35,239MW will be sufficient, leading to a reserve margin of 36.4% in 2030.

By shifting half of the industrial demand that is met by captive generators, to the grid, adding 3,000MW of renewables, reducing load shedding to 5% from the FY2023-24 level, and limiting transmission and distribution losses to 8%, Bangladesh can reduce its subsidy burden by Tk138 billion (US$1.2 billion) per annum.

Executive Summary

The Bangladesh Power Development Board (BPDB) continues to depend on hefty subsidy support from the government, despite a series of power tariff hikes, highlighting the need for reforms in the electricity sector. IEEFA's proposed roadmap for reform suggests improving power demand forecasting methods by factoring in the role of energy efficiency to reduce overcapacity. It recommends limiting new investments in fossil fuels-based generation while promoting renewable energy deployment. Further, the roadmap suggests modernising Bangladesh's electricity grid to encourage industries to gradually shift to grid power rather than operate gas-based captive plants and minimise load shedding. We find that taking such consistent steps can help reduce the sector's subsidy burden. Besides, a transition to electric systems from gas-driven systems will help increase the use of grid power and bring down the government's subsidy burden to nearly zero.

In recent years, the Bangladesh Power Development Board (BPDB) has registered a hefty revenue shortfall, which eroded its financial strength. During the fiscal year (FY)2019-20 to FY2023-24, the BPDB's total annual expenditure increased 2.6-fold against revenue growth of 1.8 times, prompting the government to allocate a combined subsidy of Bangladeshi Taka (Tk)1,267 billion (US$10.64 billion) to ensure power supply to keep the economy afloat. Yet, the BPDB recorded a cumulative loss of Tk236.42 billion (US$1.99 billion).

Despite a series of power tariff adjustments, the revenue shortfall and subsidy allocation are likely to persist in the foreseeable future. Key problems of the sector, however, lie elsewhere and are often overlooked.

A comparative assessment of the Indian and Vietnamese power sectors substantiates that Bangladesh's power sector has an overcapacity problem. Following the COVID-19 pandemic, the failure to downgrade the power capacity growth rate contributed to the problem. Moreover, industries operate a combined gas-fired captive generation capacity of over 3,000 megawatts (MW) amid an unreliable grid electricity supply. Gas-fired captive generation is economically compelling for industries, saving them between Tk1.3/kilowatt-hour (kWh) (US$0.011/kWh) and Tk3.53/kWh (US$0.03/kWh).

This overcapacity obligates BPDB to pay capacity charges to almost all power plants, excluding those under its ownership and those based on renewable energy, raising its revenue shortfall.

The use of expensive oil-fired plants in meeting peak demand due to limited grid-connected renewable energy capacity has further compounded the sector's financial woes. Available data from July 2023 to May 2024 show that oil-fired plants contributed 10.9% of the total power generation, registering a 32% fuel cost.

The transmission and distribution losses hovering around 10.33% are still higher than the global average of less than 8%. Moreover, BPDB's weak financial health compels it to opt for load-shedding, eventually resulting in capacity payments to idle plants.

The study estimates that Bangladesh's power demand will likely reach 25,834MW in 2030, for which a system capacity of 35,239MW will suffice. This will help BPDB lower its reserve margin from 66.1% (December 2024 level) to 36.4% (including variable renewable energy), making it comparable to other countries. The country may set a combined renewable energy target of 5,500MW, including off-grid systems, by 2030.

On a rough estimate, by installing new grid-connected renewable energy capacities of 3,000MW under a conservative scenario, encouraging industries to shift to the grid for half of the gas-fired captive power capacity, reducing T&D losses to 8% and limiting load shedding to 5% of the FY2023-24 level, the BPDB can save Tk138 billion (US$1.2 billion) annually. However, to further cut the BPDB's subsidy burden of Tk382.89 billion (US$3.22 billion) recorded in FY2023-24, Bangladesh should ensure that industries fully rely on the national grid. Additionally, the country should gradually transition to electric systems from gas-driven appliances like boilers. This will help increase the BPDB's revenue from selling additional energy while reducing capacity payments to idle plants.

The window to make Bangladesh's power sector sustainable is rapidly narrowing, but there is still time to get the sector back on track by following a suitable roadmap. This study proposes a time-bound roadmap through 2030, articulating key areas of concern and chalking out a way to streamline the power sector.

Table 1: Roadmap for the Power Sector's Sustainability

Particulars	Activity	Goal	Timeline
Power Demand	Estimating power demand considering all relevant variables rather than focusing only on GDP growth.	Project the power demand for 2030, keeping the reserve margin within 40% after incorporating renewable energy.	2025
Fossil Fuel-based Plants	Limiting new investment in fossil fuel-based plants.	No investment in new fossil fuel-based plants beyond the under-construction ones to avoid overcapacity and capacity payments	2025-2030
Renewable Energy	Creating a conducive system for renewable energy expansion: i. Assessing the rationale for reducing high import duties for rooftop solar accessories	i. Rationalise the import duties applicable for rooftop solar accessories ii. Benchmark project costs	2025

	ii. Bringing down the cost of renewable energy projects iii. Allowing renewable energy projects under the Corporate Power Purchase Agreement (CPPA)	iii. Make guidelines for reverse auctions to reduce cost iv. Prepare guidelines for CPPA to expedite utility-scale renewable energy	
	Accelerating renewable energy	Install a combined renewable energy capacity of 5,500MW, including grid-connected renewable energy of 4,500MW.	2030
Transmission and Distribution (T&D) Losses	Reducing T&D losses	Bring down T&D losses to 8%.	2030
Demand Shift	(i) Encouraging industries to use grid electricity (ii) Increasing gas tariff for captive power, reflecting the high cost of imported LNG	Shift at least 1,500MW captive power demand of industries to the national grid, starting with 500MW from 2028.	2030
Load Shedding	Minimising load shedding	Reduce load shedding to 5% of the FY2023-24 level	2026
Modernise the Grid	Expediting the ongoing projects and undertaking new projects based on proper assessment	Ensure reliable electricity supply	2030
Energy Efficiency	Enhancing energy efficiency on the demand side	Achieve 1.5% energy efficiency per annum	2025-2030
Oil-fired Plants	Reducing the contribution of oil-fired power plants	Limit the use of oil-fired plants to 5% of total power generation	2030

Source: IEEFA's Analysis

While the proposed roadmap till 2030 shows measures for sustainability, the country must undertake consistent actions to narrow the gap between the sector's cost and revenue, bringing down the subsidy burden close to zero. The success will depend on devising policies, estimating rational power demand by factoring the role of energy efficiency, modernising the grid to encourage industries to use grid power and addressing the challenges with renewable energy.

Bangladesh's Power Sector is in Financial Distress

Bangladesh more than doubled its power generation capacity between June 2016 and October 2024.[1,2] But as capacity soared, financial troubles brewed for the Bangladesh Power Development Board (BPDB).

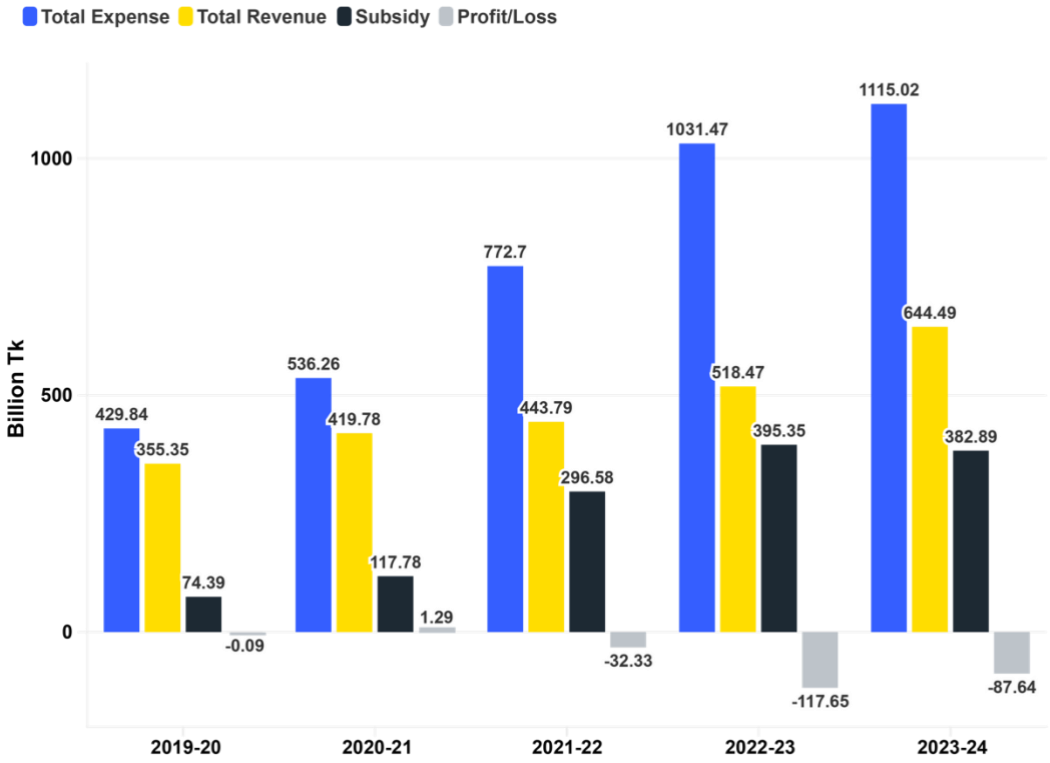
Unfavourable economic conditions, tepid power demand growth, use of expensive fuels, and limited success with renewable energy have led to huge losses at the BPDB. While facing high electricity

[1] BPDB. Annual Report 2015-16. 16 August 2016. Page 9.
[2] BPDB. Key Statistics – October 2024. 22 November 2024.

generation costs, it is unable to pass the same on to consumers. Notably, the difference between expenditure and revenue realised has widened more from the fiscal year (FY) 2019-20.

From FY2019-20 to FY2023-24, BPDB's total expenses increased 2.6 folds, while revenue grew by only 1.8 times (see Figure 1).[3,4,5,6&7]

Figure 1: BPDB's Rising Financial Burden[8]



Sources: BPDB; IEEFA's Analysis.

The Bangladesh government covers the revenue shortfall through subsidies as part of its budgetary support. From FY2019-20 to FY2023-24, the BPDB received a cumulative subsidy of Bangladeshi Taka (Tk) 1,267 billion (US$10.64 billion). The subsidies were insufficient to meet the revenue gap,

[3] BPDB. Annual Report 2019-20. 15 October 2020. Page 94.
[4] BPDB. Annual Report 2020-21. 14 October 2021. Page 94.
[5] BPDB. Annual Report 2021-22. 27 November 2022. Page 101.
[6] BPDB. Annual Report 2022-23. 1 January 2024. Page 103.
[7] MARHK & CO. and MAHFEL HUQ & CO. Independent Auditors' Report and Audited Financial Statements of BPDB as at and for the Year Ended 30 June 2024. 31 October 2024. Page 7.
[8] Total expenses include BPDB's cost of sales, operating expenses, finance costs, loss due to foreign currency fluctuations etc.; Total revenue includes operating revenue and non-operating income but excludes subsidy payment.

and, as a result, the BPDB incurred a combined loss of Tk236.42 billion (US$1.99 billion) over the five fiscal years.[9]

The BPDB's financial distress had far-reaching consequences, leading to frequent hikes in power tariffs. Between January and March 2023, the government raised rates three times, followed by another increase in February 2024. Yet, the BPDB's financials for FY2023-24 only marginally improved compared with the previous year.

The country's increasing reliance on volatile and dollar-denominated imported energy commodities has already affected the economy. The Bangladesh Taka weakened by nearly 28.3% against the US dollar between January 2022 and August 2024.[10]

While Bangladesh's power sector will continue to experience problems, the government must now look beyond the textbook solution of increasing power tariffs. Instead, it should identify key sectoral issues and undertake corrective measures quickly and effectively.

Reasons for Financial Distress in the Power Sector

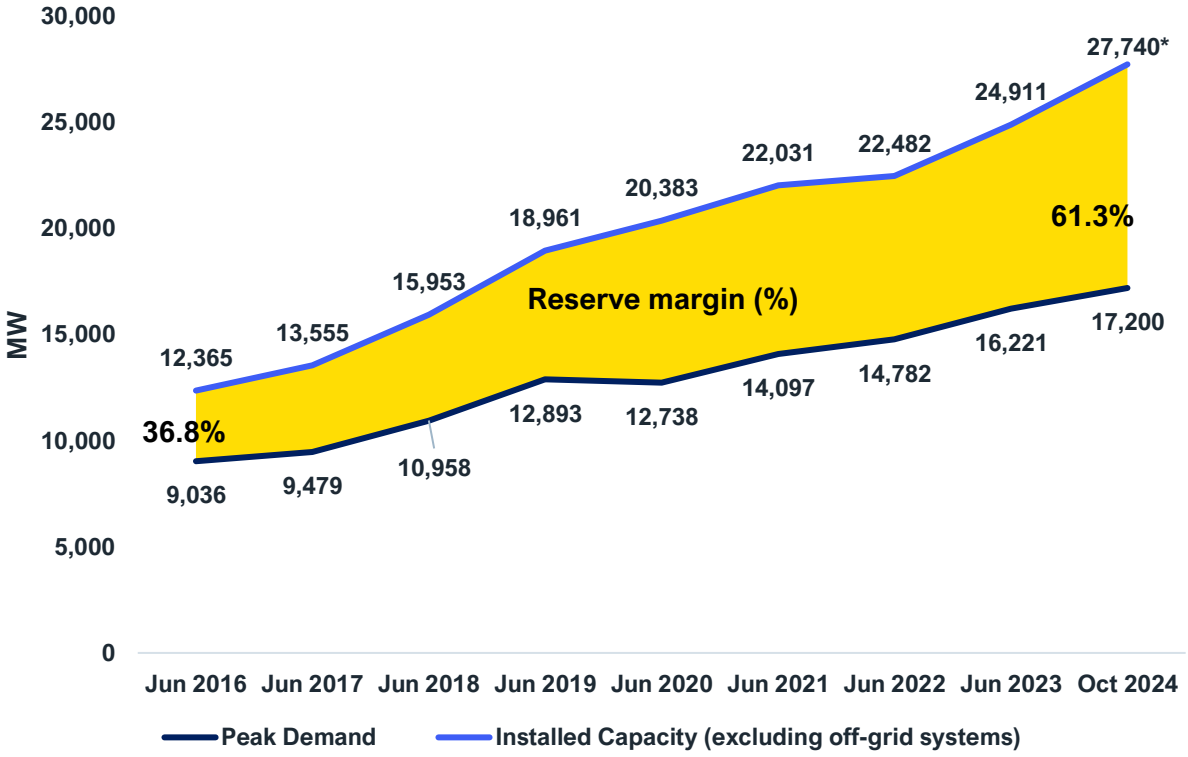
The power sector's overcapacity has soared due to lacklustre demand growth in the last decade amid capacity expansions. Using expensive fuels to meet peak demand has further compounded the sector's woes. Higher transmission and distribution (T&D) losses than the global average also affect the sector.

Overcapacity Problem

The rapid installation of new power plants, stemming from the expectation of high economic growth, transformed the country from being power deficit to become power surplus in the past decade and a half. While power demand increased slowly, the BPDB's revenue shortfall soared amid the burgeoning surplus capacity. A detailed assessment shows that the power sector's installed capacity increased by 125% from June 2016 to October 2024, increasing the reserve from 36.8% to 61.3% (see Figure 2). Even considering the derated capacity (27,086 megawatts (MW)), the reserve margin is 57.5%.

[9] Tk to US$ conversion rate: 1Tk = 0.0084US$
[10] Bangladesh Bank. Exchange Rate of Taka. 14 October 2024.

Figure 2: Grid-based Installed Power Generation Capacity vs Maximum Demand Recorded



*Sources: Power Grid Bangladesh PLC, BPDB Annual Reports & Daily Generation Archive; IEEFA's Analysis. *Rooftop solar capacity is not considered.*

Bangladesh has, by far, a much higher reserve margin based on peak demand to installed capacity (excluding variable renewable energy) than India and Vietnam.

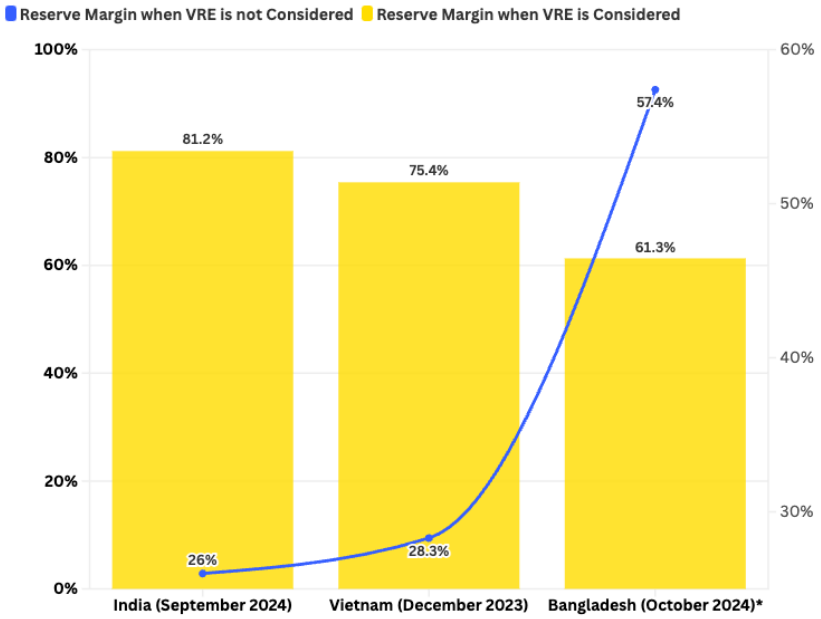
Excluding variable renewable energy (VRE) from India's installed capacity of 453 gigawatts (GW) as of September 2024 and factoring its peak demand of 250GW recorded in May 2024, gives a reserve margin of 26% as against 81.2%, when including the same (see Figure 3).[11,12]

Vietnam's power sector demonstrates a similar pattern as its reserve margin falls to 28.3% from 75.4% upon excluding VRE (based on the country's peak demand in June 2023 and installed capacity in December 2023).[13,14&15]

[11] The Economic Times. India's Peak Power Demand Hits a Record 250GW. 31 May 2024.
[12] NITI Ayog. India Climate & Energy Dashboard. November 2024.
[13] Ministry of Industry and Trade, Vietnam. Vietnam Renewable Energy Development Strategy up to 2030, with an Outlook to 2050 – Progress Report by 2023. March 2024. Page 3-4.
[14] EVN – Vietnam Electricity. Operational Situation in the First 6 Months of 2024; Objectives and Tasks in July and Remaining Months of 2024. 10 July 2024.
[15] As the peak demand grew by 7.87% and reached 49,533MW in June 2024, the peak demand for June 2023 is calculated as: 49,533/1.0787 = 45,919MW.

On the contrary, under similar circumstances, Bangladesh's reserve margin only decreases to 57.4% from 61.3% when considering its peak demand and installed capacity until October 2024 (see Annexure 1 for details). This underscores the country's significant power generation overcapacity. The surplus is a principal factor in the BPDB's woes, as it pays capacity charges to idle power plants, which increases average power generation costs.

Figure 3: Comparison of Reserve Margins of Selected Countries



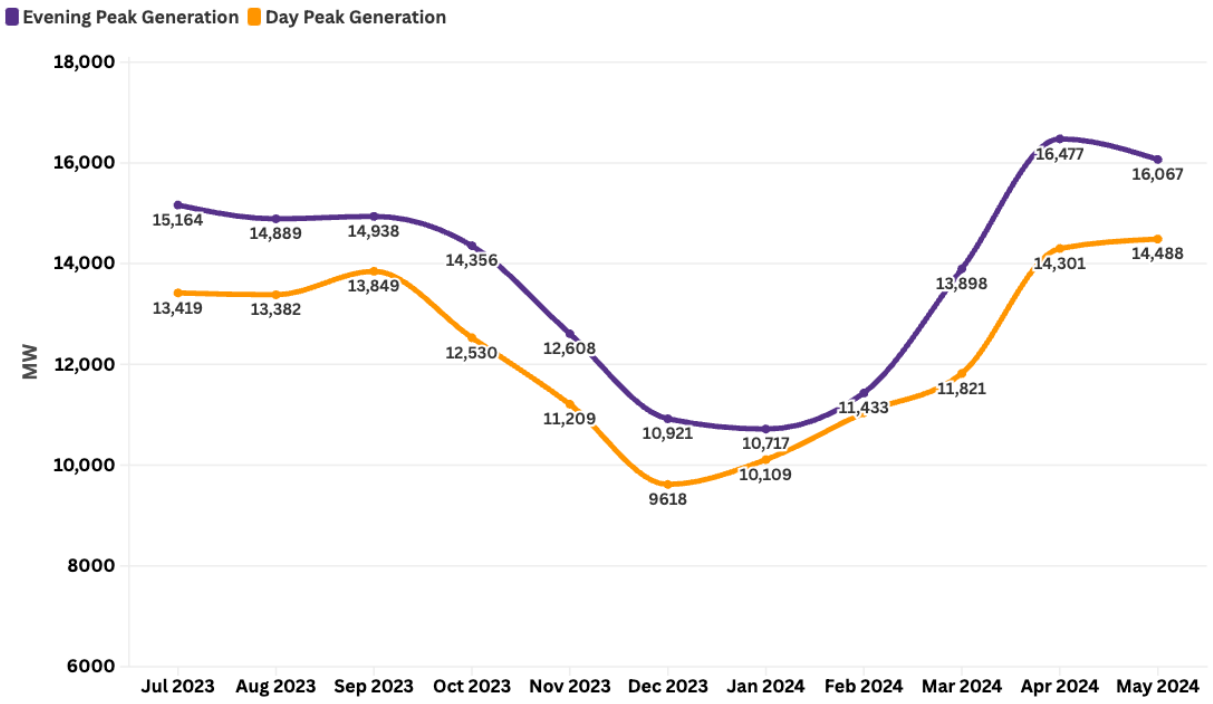
Sources: NITI Ayog, Economic Times, Vietnam Electricity, Ministry of Industry and Trade, Vietnam & BPDB; IEEFA's Analysis.
** Rooftop solar is not considered when calculating Bangladesh's reserve margin.*

Plant Factor Drops to Less than 50% in Winters

During winter, power demand falls sharply due to a lack of cooling demand. The maximum day-peak generation was 9,618MW in December 2023, representing an unused capacity of 63%.[16] Further analysis shows that the capacity utilisation rate of the power system varies from 37% to 43% during the day and evening peaks from December to February (see Figure 4).[17,18] Such a low capacity utilisation poses risks to BPDB as its revenue shortfall increases.

[16] Unused capacity (Day peak of December 2023) = (1 – peak generation/installed capacity) * 100% = (1 – 9,618MW/25,991MW) *100% = 63%.
[17] Used capacity (Day peak of December 2023) = (9,618MW/25,991MW) * 100% = 37%.
[18] Used Capacity (Evening peak of February 2024) = (11,433MW/26,504MW) * 100% = 43%

Figure 4: Variations in Peak Power Generation

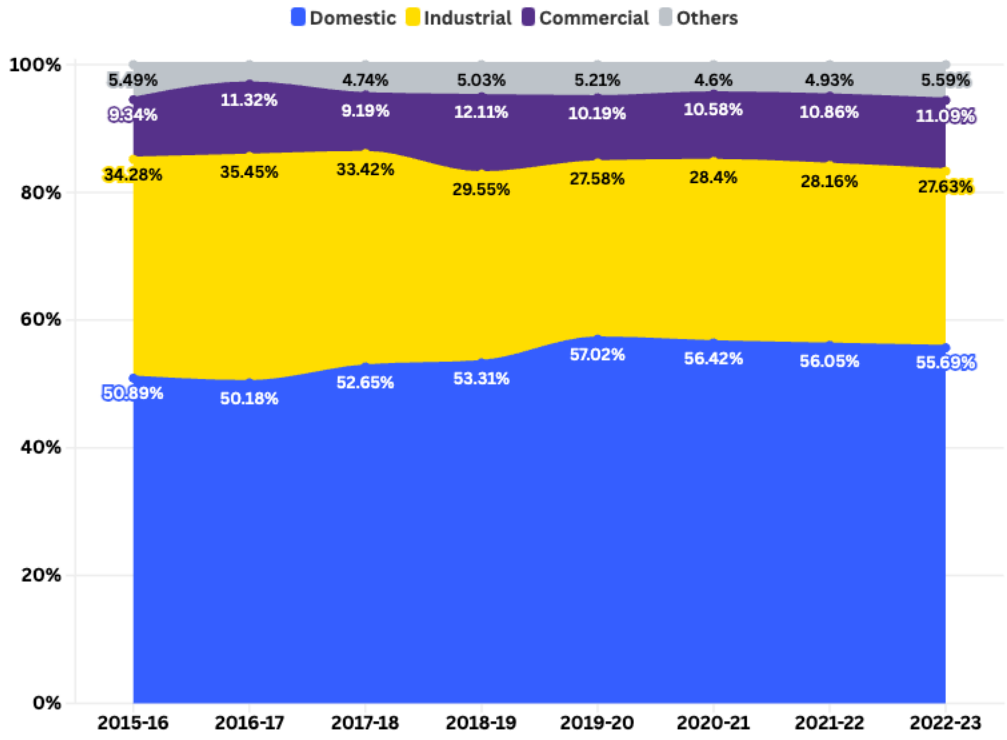


Sources: Power Grid Bangladesh PLC's Monthly Operational Reports & BPDB Daily generation Archive; IEEFA's Analysis.

Tepid Growth in Industrial Power Demand

With a share of more than 55%, Bangladesh's residential sector dominates grid-based electricity consumption. The industry sector consumes 27.63%, while the commercial sector consumes most of the remaining grid-based electricity (see Figure 5).

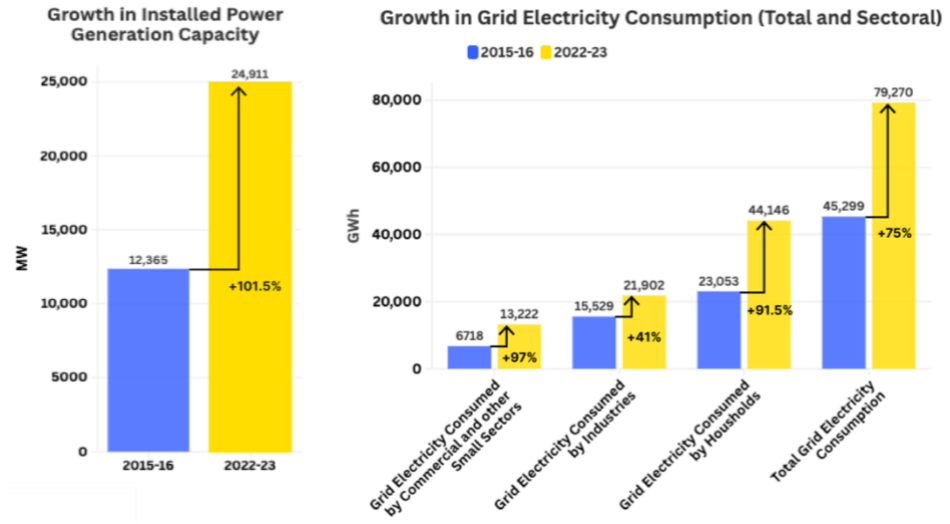
Figure 5: Grid Electricity Consumption Pattern



Sources: BPDB Annual Reports; IEEFA's Analysis.

Notably, the household sector continues to drive growth in grid-based electricity consumption (see Figure 6). Moreover, Bangladesh did not lower the power system capacity growth rate following COVID-19, which shook the economy and slowed the expected industrial growth.

Figure 6: Growth in Power Capacity Expansion vs Growth in Grid Power Consumption (FY2015-16 to FY2022-23)



Sources: BPDB Annual Reports; IEEFA's Analysis.

The tepid demand growth in the industry sector is largely because of its excessive dependence on captive power in the absence of reliable grid electricity. Industries have gas-fired captive generating units of more than 3,000MW, which mostly operate as baseload systems.[19] Load-shedding and sudden grid power outages disrupt industrial production, making gas-fired captive generators popular.

Despite a drastic increase in gas tariff by 87.5% in February 2023 from the June 2022 level (Tk16/cubic meters (m^3, US$0.134/$m^3$)), followed by a modest increase of 2.5% in February 2024 (Tk0.75/m^3 (US$0.006/$m^3$)), industries find electricity from captive systems more competitive than the grid.[20,21&22]

Industries with gas-fired generators of 35% to 45% efficiency can save between Tk1.3/kilowatt-hour (kWh) (US$0.011/kWh) and Tk3.53/kWh (US$0.03/kWh) compared with grid electricity tariffs (see Table 2). The strong economics make industries heavily dependent on their captive systems, resulting in a lacklustre demand growth in grid power. This severely weakens the BPDB's financial health as it loses the high tariff-paying industrial consumers.

[19] IEEFA. Industrial Energy Efficiency to Curb Bangladesh's Short-term LNG Demand Growth. 13 May 2024.
[20] Bangladesh Energy Regulatory Commission (BERC). Gazette on Prices of Gas at Consumer Level. 4 June 2022
[21] Ministry of Power, Energy and Mineral Resources (MPEMR). Gazette on Gas Prices for Consumers of Different Distribution Companies under Bangladesh Oil, Gas and Mineral Corporation (Petrobangla). 18 January 2023.
[22] MPEMR. Gazette on Gas Prices for Power Plants and Captive Power Plants. 25 February 2024.

Table 2: Cost of Power from Gas-fired Captive Generators under Different Efficiency Scenarios

Efficiency of Generators	Gas Consumption	Fuel Cost	Total Cost of Power from Captive Generators (including operational cost)	Flat Electricity Tariff for Industries (Sanctioned Loads 50 kilowatt (kW) to 5MW) as of October 2024	Flat Electricity Tariff for Industries (Sanctioned Loads 5MW to 30MW) as of October 2024
35%	0.293m^3/kWh	Tk9/kWh (US$0.075/kWh)	Tk9.45/kWh (US$0.079/kWh)	Tk10.88/kWh (US$0.091/kWh)[23]	TK10.75/kWh (US$0.09/kWh)[24]
40%	0.256m^3/kWh	Tk7.9/kWh (US$0.066/kWh)	Tk8.3/kWh (US$0.07/kWh)	These industries can save between Tk1.43/kWh (US$0.012/kWh) and Tk3.53/kWh (US$0.03/kWh)	These industries can save between Tk1.3/kWh (US$0.011/kWh) and Tk3.4/kWh (US$0.029/kWh)
45%	0.228m^3/kWh	Tk7/kWh (US$0.059/kWh)	Tk7.35/kWh (US$0.062/kWh)		
Formula used: Gas consumption = 860*100/(lower calorific value*efficiency)[25,26] Assumption and value used: Operational expenditure of 5% on top of the cost of gas; Lower Calorific Value: 8400 kilocalories per cubic meter (kcal/m^3)[27]; **Gas price: Tk30.75/m^3 (US$0.26/$m^3$)[28]**					

Source: IEEFA's Analysis

Expensive Fuels in Power Generation

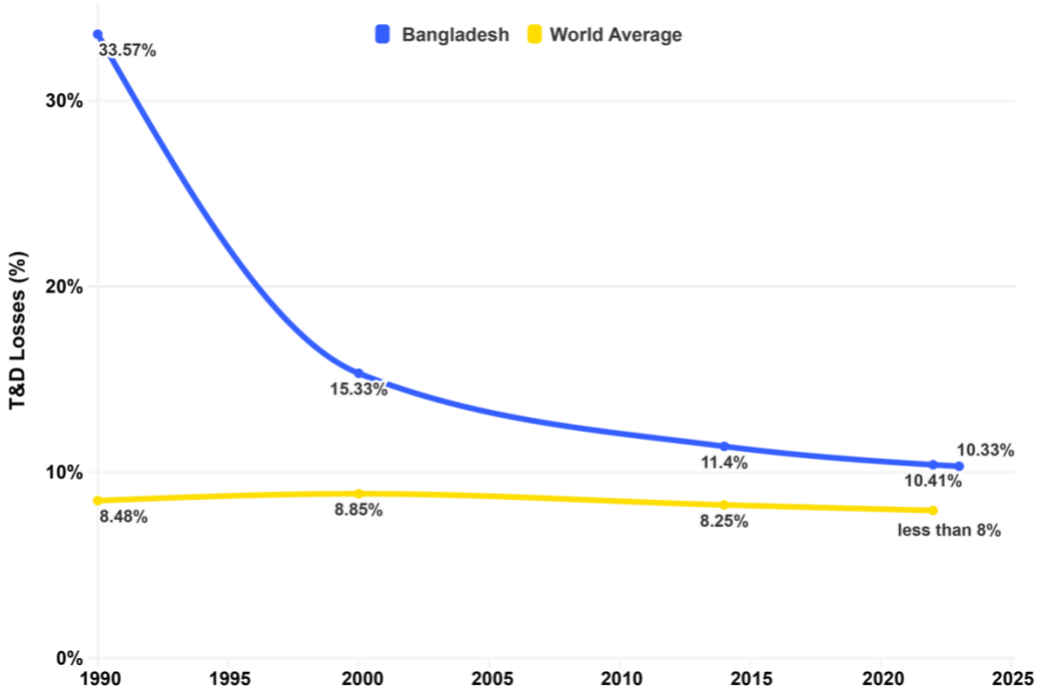
Using expensive fuels continues to erode the power sector's financial sustainability. This is evident from the Power Grid Bangladesh PLC's data from July 2023 to May 2024, where oil-fired plants contributed 10.9% of the grid power generation while incurring 32% of the total fuel cost. [29]

T&D Loss

Bangladesh has considerably reduced T&D losses to 10.33% in June 2023 from 33.57% in 1990.[30,31] However, the global average of T&D losses recorded in 2022 was less than 8% (see Figure 7).[32] This shows Bangladesh still has room for improvement and cutting costs.

[23] Power Division, MPEMR. Gazette on Retail Tariffs for Electricity. 29 February 2024.
[24] Ibid.
[25] BERC. Regulatory Energy Audit of Generation Facilities Regulations, 2017. January 2017. Page 17.
[26] IEEFA. Industrial Energy Efficiency to Curb Bangladesh's Short-term LNG Demand Growth. 13 May 2024. Page 33.
[27] Ibid.
[28] MPEMR. Gazette on Gas Prices for Power Plants and Captive Power Plants. 25 February 2024.
[29] Power Grid Bangladesh PLC. Operation Monthly Reports - July 2023-May 2024. September 2024.
[30] The World Bank. Electric Power Transmission and Distribution Losses (% of Output). 2018.
[31] BPDB. Annual Report 2022-23. 1 January 2024. Page 10.
[32] International Energy Agency (IEA). Electricity Grids and Secure Energy Transition – Enhancing the Foundations of Resilient, Sustainable and Affordable Power Systems. November 2023. Page 50.

Figure 7: Transmission & Distribution Losses in Bangladesh vs Global Average

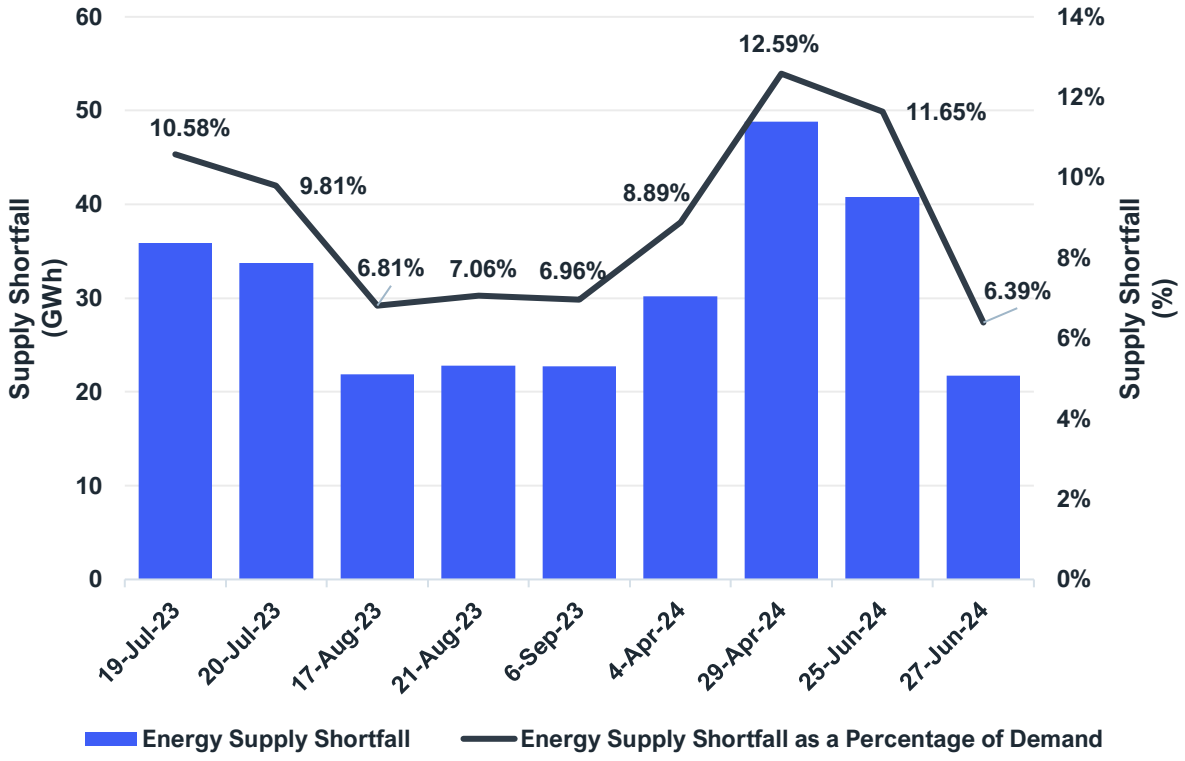


Sources: World Bank, BPDB & IEA. IEEFA's Analysis.

Weak Financial Health Affects Power Generation

The BPDB's financial crisis limits its capacity to generate and purchase expensive power, opting for load-shedding rather than meeting consumers' electricity demand. Notably, the grid-based energy supply deficit reached 12.59% on 29 April 2024 (see Figure 8).

Figure 8: Unserved Grid Energy on Selected Days, FY2023-24



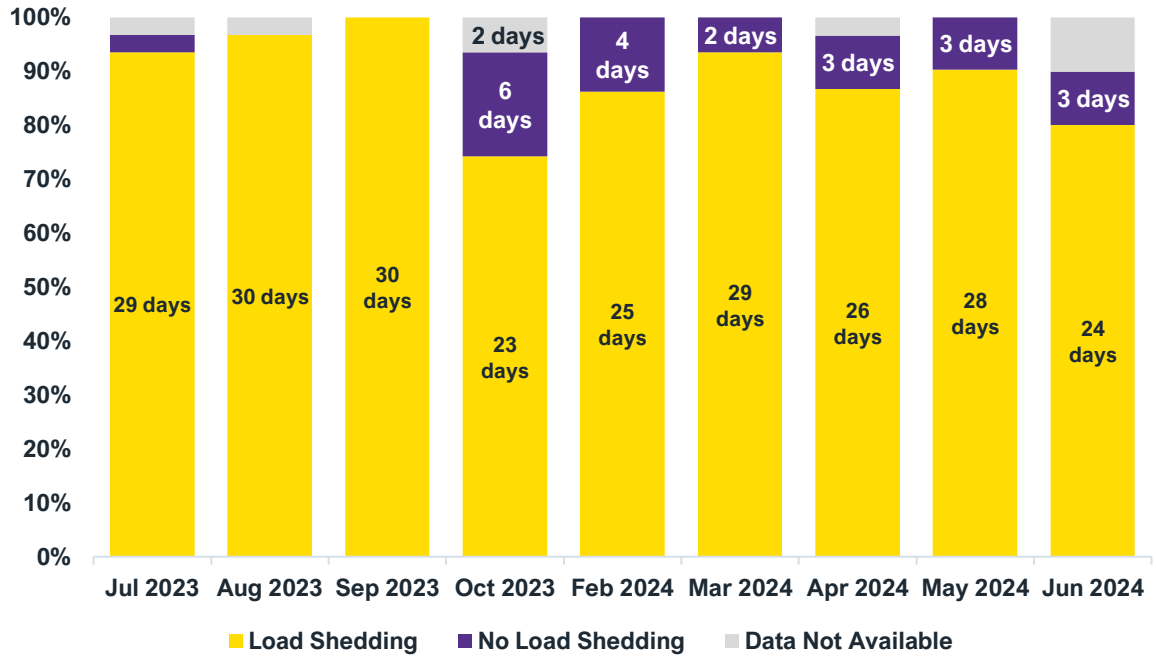
Sources: BPDB Daily Generation Archive; IEEFA's Analysis.

Bangladesh also experienced load shedding on at least 23 days in nine months of FY2023-24 (see Figure 9). The unserved energy demand during the last fiscal was more than 2,244.89 gigawatt-hour (GWh).[33]

While power rationing affects people during the scorching heat and stifles all economic activities, it is a negative sum game for the BPDB owing to capacity payments to different power producers as per contractual obligations. The apparent crisis management process adds to the BPDB's costs, further deteriorating its financial health.

[33] IEEFA's calculation based on the BPDB's daily generation archive (see Annexure 2 for data of sample unserved energy demands of randomly selected days)

Figure 9: Load Shedding Frequency in Selected Months, FY2023-24



Sources: BPDB Daily Generation Archive; IEEFA's Analysis.

Planning for the Power Sector's Sustainability

Addressing the prevailing gaps that hurt the power sector requires a transformation plan that focuses on sustainability.

This plan needs better organisation and coordination with a long-term vision. Past decisions can provide lessons on course correction. For example, in 2009, the then government adopted a quick-fix strategy by relying on imported fossil fuels to address the problem of limited electricity access. In 2024, the result of such a decision is evident—despite excess generation capacity, load-shedding is prevalent. Therefore, a gradual and orderly transformation is the key to avoiding costly mistakes and keeping the long-term sustainable trajectory intact.

Realistic Power Demand Projection

Bangladesh usually considers gross domestic product (GDP) growth rates to estimate future power demand. Similarly, the Integrated Energy and Power Master Plan (IEPMP), devised in July 2023, assumed different economic growth scenarios to project the country's future power demand. While the IEPMP estimated power demand through 2050, the current data already shows significant

deviations from the projections. For instance, the maximum peak demand reached 17,200MW in 2024 against the IEPMP's projections of 18,083MW and 18,682MW, respectively.[34,35]

With different consumers, such as households and industries, continuing to pursue energy efficiency and conservation measures, power demand will gradually decouple from economic growth. Furthermore, the government should encourage industries to slowly shift to the national grid instead of relying on captive generation.

After factoring in energy efficiency gains and the demand shift measures into our projection, we found the resultant power demand forecast more rational. IEEFA considers three alternative scenarios for power demand projection till 2030:

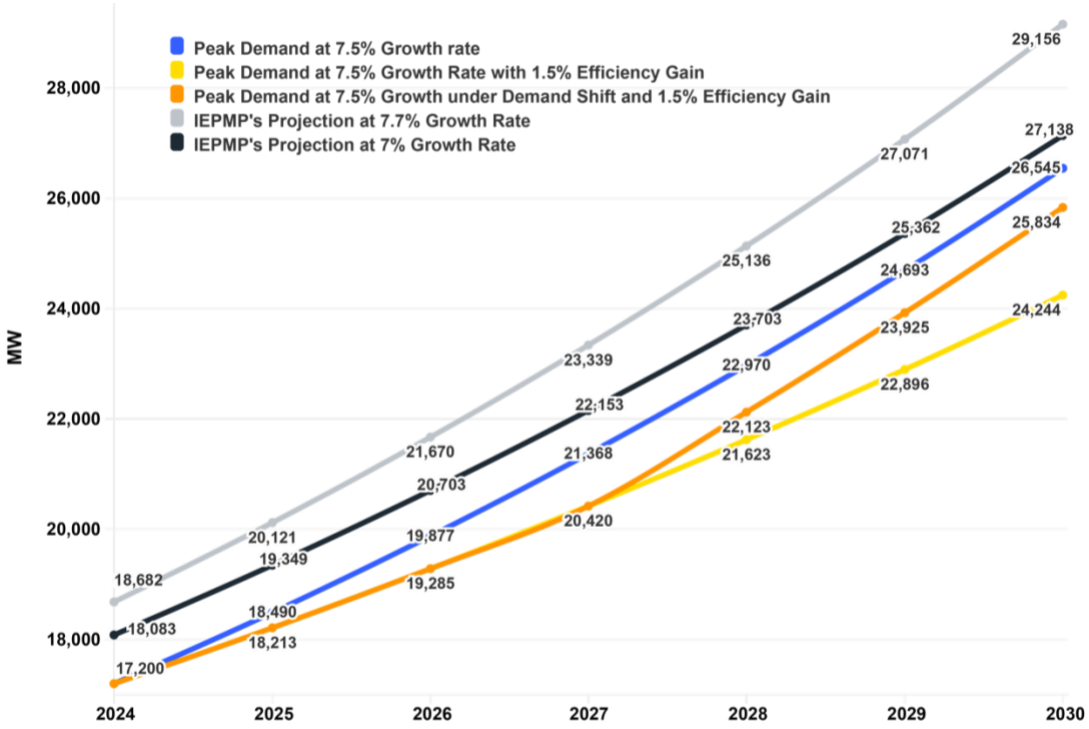
a. A growth rate of 7.5% per annum[36]
b. A 1.5% efficiency gain per annum coupled with the scenario "a"[37]
c. Scenario "b" coupled with demand shift (with 50% demand of the gas-fired captive power met by the grid in 2030)[38]

According to these three scenarios, the power demand will rise between 24,244MW and 26,545MW by 2030.

As Bangladesh should consider the opportunity of reducing overcapacity and minimising cost, scenario "c" appears most favourable. Under this scenario, the country's peak demand will likely reach 25,834MW, which is 4.8% to 11.4% less than IEPMP's estimates of 27,138MW and 29,156MW, respectively (see Figure 10).

[34] MPEMR. Integrated Energy and Power Master Plan (IEPMP). July 2023.
[35] The IEPMP considered 2019 as the base year when the country experienced a maximum demand of 12,893MW. Taking a 7% growth rate, the projected power demand in 2024 is: 12,893 * 1.07^5 = 18,083MW; Similarly, with a 7.7% growth rate, IEPMP's projection reaches to 18,682MW.
[36] Taking roughly an in-between rate of IEPMP's assumptions of 7.7% and 7% economic growth scenarios.
[37] Bangladesh's household, industry and commercial sectors demonstrate significant energy efficiency potential as per the Energy Efficiency and Conservation Master Plan up to 2030. With households consuming much of the grid electricity and efficient appliances, such as fan, light and air conditioner, are available, a 1.5% efficiency gain per annum, i.e., 9 percent reduction in electricity consumption from 2025 to 2030 appears possible.
[38] Demand shift from gas-fired captive power to grid: 500MW/annum from 2028 to 2030 which will result in a shift of 1,500MW power to the grid. This means that utilisation of grid power will increase.

Figure 10: Peak Power Demand Projections till 2030



Sources: IEPMP 2023; IEEFA's Analysis.

Renewable Energy Projections

With the likely power demand for 2030 estimated, the next step is maintaining a sufficient installed capacity. While the BPDB's report on the power sector's progress provides a snapshot and status of the under-construction power plants, IEEFA recommends commissioning 2,500MW of renewable energy, including rooftop and utility-scale projects, from 2026 to 2030 in addition to the planned capacity of around 600MW.[39,40&41]

While investors reportedly have concrete proposals for 2,678MW renewable energy projects that received Letters of Intent (LOIs), the government may further review these projects. This may affect the timing of these projects to be online. Therefore, this study considers an additional 2,500MW of renewable energy projects, including rooftop solar, that may realistically come online from 2026 to 2030. It also assumes that the government, supported by different development agencies, will implement a 900MW solar irrigation system by 2030 to replace almost one-fifth of the diesel-run

[39] BPDB. Draft Information on the Advancement of Power Sector. 17 September 2024.
[40] Upcoming 600MW capacity includes 40MW hydropower to be imported from Nepal.
[41] Of the proposed additional renewable energy capacity, it is assumed that battery backup of 500MW system for three hours will be installed by 2030.

irrigation systems.[42] The assumption of installing 900MW solar irrigation systems by 2030 is comparable with the Asian Development Bank's roadmap of implementing solar irrigation pumps of 1,100MW by 2031.[43] However, since locations may be challenging for grid integration, this study considers 400MW of grid-connected solar irrigation systems. The remaining 500MW of off-grid systems will serve the purpose of irrigation and will likely help other agricultural applications, such as threshing, hulling and milling when irrigation is not required. These off-grid solar irrigation systems will help limit the high demand for grid power, particularly during the summer peak.

Projection of Required System Capacity

Analysing data from different power plants, IEEFA assumes that the BPDB could phase out fossil-fuel-based plants of 4,500MW, leading to a combined system capacity of 35,239MW (see Table 3). As oil-fired plants are expensive and more renewable energy capacity will likely operate from 2025 onwards, Bangladesh may consider gradually phasing out 3,500MW oil-fired plants between 2025 and 2030. This will reduce the combined oil-fired capacity from 6,511MW in August 2024 to 3,339MW in 2030, including 325MW of under-construction plants. This will align with the government's plan to reduce expensive and old oil-fired plants.

Additionally, contracts for gas-fired plants of more than 600MW will expire by 2030, and some plants are very old. As such, Bangladesh may phase out gas-fired plants of 1,000MW capacity.

Table 3: IEEFA's Projection of Installed Power Generation Capacity for Bangladesh till 2030

	2024	2025	2026	2027	2028	2029	2030
Existing Capacity	27,851MW[44]	28,569MW	30,492MW	31,325MW	32,475	33,405MW	34,195MW
Baseload Capacity Addition as per BPDB's plan (including hydro)	718MW	2,116MW (including 40MW hydropower)	1,356MW (1st nuclear unit: 1,200MW)	1,200MW (2nd nuclear unit)	880MW	590MW	1,244MW
Peaking Power Capacity Addition as per BPDB's plan (including renewable energy)		707MW (including 382MW renewable energy)	177MW (renewable energy)				
Proposed Renewable Energy Capacity Addition		100MW	300MW (solar irrigation: 50MW)	450MW (solar irrigation: 50MW)	550MW (solar irrigation 75MW)	700MW (solar irrigation: 100MW)	800MW (solar irrigation: 125MW)
To be Retired	0	(1,000MW)	(1,000MW)	(500MW)	(500MW)	(500MW)	(1,000MW)

[42] Replacement of 1.07 million diesel-run irrigation systems will require an installation of around 4,000MW solar irrigation pumps. Solar irrigation of 900MW capacity is approximately one-fifth of the total requirement.
[43] ADB. Road Map to Scale up Solar Irrigation Pumps in Bangladesh (2023-31). December 2023.
[44] Grid connected rooftop solar capacity of 111MW is considered (as of August 2024).

Total Capacity	28,569MW	30,492MW	31,325MW	32,475MW	33,405MW	34,195MW	35,239MW
Contribution of Baseload	>20,000MW[45]	>21,500MW	~23,000MW	>24,000MW	~25,000MW	>25,500MW	>26,000MW

Assumptions:
i. Timelines of the planned projects are based on BPDB's current projection but may change if the related infrastructure, like transmission lines, is delayed.
ii. The first and second nuclear power plants will likely be online in 2025 and 2026, as per the BPDB's projection. As transmission lines are not ready, their commercial operation year is taken as 2026 and 2027.
iii. While oil-fired plants of 6,511MW are operational and 325MW capacity will be online by 2025, the country will not need such a high capacity for peaking power plants, which are expensive. The country also has more than 1,000MW gas-fired peaking plants. Therefore, Bangladesh may phase out oil-fired plants of 3,500MW capacity from 2025 to 2030. The government has already declared that it will reduce the capacity of oil-fired plants.
iv. Gas-fired plants of 1,000MW capacity will be retired **(**contracts for one 450MW plant and another 210MW plant are likely to end by 2024 and 2030, respectively. Additionally, some plants are old and as such, the assumption is that gas-fired plants of 340MW capacity will be phased out by 2030.)
v. Renewable energy capacity of 2,500MW, beyond the plants under implementation, will be added from 2026 to 2030.
vi. While Nepal supplied 40MW hydropower to Bangladesh's grid on 15 November 2024 on a trial basis, the continuous supply will start on 15 June 2025. As such, this capacity addition is considered in 2025.
vii. A coal-fired plant that may come online in 2030 is excluded.
viii. The projection of required system capacity has not conducted the least-cost assessment. However, it has, among other things, considered the possibility of reducing the use of expensive oil-fired plants and minimising the burgeoning reserve margin to reduce the overall system cost.

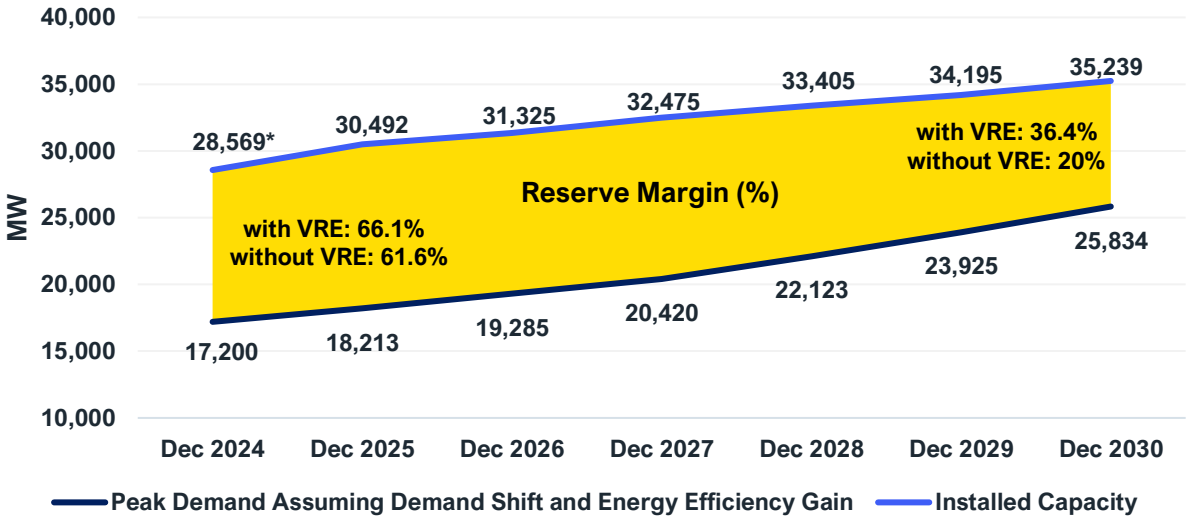
Source: BPDB's Information on the Advancement of the Power Sector; IEEFA's Analysis

Projection of Reserve Margins

A system capacity of 35,239MW will help Bangladesh meet the peak demand of 25,834MW by 2030. It will bring the reserve margins down to 36.4% (including VRE) and 20% (excluding VRE) (see Figure 11). Notably, a reserve margin of 20%, excluding VRE, is comparable to countries like India and Vietnam.

[45] Baseload capacity = Total capacity – oil-fired peaking power capacity – gas turbine capacity – VRE (utility-scale + rooftop) = 28,569MW – 6,511MW – 1,218MW – 663MW (utility-scale VRE) – 111MW (rooftop solar) = 20,066MW.

Figure 11: Bangladesh's Projected Installed Power Capacity and Demand, 2030



*Sources: BPDB Key Statistics & BPDB Daily Generation Archive; IEEFA's Analysis. *The installed capacity of 2024 includes rooftop solar under the net metering and the gas-fired plant of 718MW, which is under the trial run.*

However, if Bangladesh can cater to the entire captive power demand of industries and gradually encourage them to use electric appliances, such as electric boilers, in place of gas boilers, demand for grid power will significantly increase. A conducive investment environment will help new industries enter the market. Special economic zones developed for future industries will help install more renewable energy, as they should consider rooftop solar in their plans.

Restricting New Fossil Fuel Plants until 2030

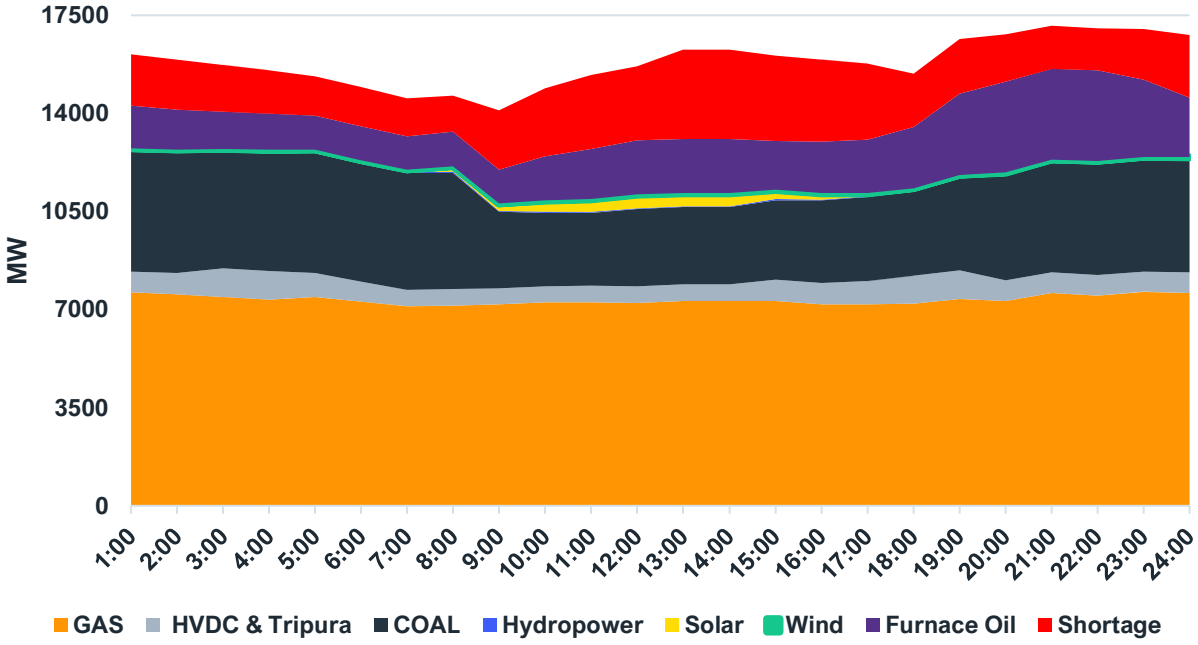
There is already a growing misalignment between power supply and demand. The BPDB's current expansion plan, betting on high demand growth, will lead to a massive overcapacity without retiring some old fossil fuel plants. This demonstrates that there is no value proposition for planning new fossil fuel-based plants till 2030. As such, Bangladesh should restrict signing contracts for new fossil-fuel-based plants till 2030.

Reducing Oil-fired Generation

Oil-fired power plants are the most expensive option for meeting peak demand, at least when sunlight is available. With solar energy being much cheaper than oil-fired electricity and costs likely to fall further, replacing this liquid fuel use during the day peak is compelling now. A typical energy mix on 29 April 2024 shows that from 9am to 4pm, the power generated by oil-fired plants and the

shortfall combined was hovering from 3,311MW to 5,110MW, representing the potential for utilising more than 4,000MW of renewable energy capacity.[46]

Figure 12: Energy Curve of a Typical Day, 2024



Sources: Power Grid PLC Bangladesh; IEEFA's Analysis.

Limiting T&D Losses

Bangladesh should aim to reduce the T&D losses from 10.33% to at least 8% to get closer to the global average. Such an improvement will help BPDB reduce energy losses by around 2,222GWh annually, saving costs and meeting part of the unserved energy under the prevailing scenario (see Annexure 3).

Minimising Unserved Power Demand

When Bangladesh declared 100% access to electricity in 2022, the goal was to ensure uninterrupted power supply, driving sustained economic growth. Soon after the declaration, however, the country faced regular load shedding that persists even in 2024, forcing industries to operate at lower capacities. Better management can decrease load shedding to 5%, avoiding huge economic costs.

[46] Power Grid Bangladesh PLC. Operation Daily Report – 29 April 2024. 29 April 2024.

Benefits of Reforming the Power Sector

With the pressure of revenue shortfall mounting and high dependence on dollar-denominated imported energy commodities spiralling, Bangladesh's power sector needs reforms to become sustainable. In the foreseeable future, the BPDB can undertake a suite of measures to swiftly reduce its annual losses:

i. Shifting industrial power demand met by gas-fired captive generators to the national grid
ii. Enhancing renewable energy capacity
iii. Limiting T&D losses
iv. Bringing down the country's load-shedding

This study concludes that BPDB could save Tk138 billion (US$1.2 billion) a year by implementing the aforementioned measures. Specifically, it can realise the savings if it can cater to the 50% of the industrial demand met by gas-fired captive generators, add grid-connected renewable energy capacity of only 3,000MW, reduce T&D losses from 10.33% to 8% and minimise load shedding to 5% from the FY2023-24 level (see Annexure 4 for details).

Table 4: Financial Benefits

Measures	Annual Monetary Savings
Shifting half of the industrial captive power demand to the national grid	Tk34.14 billion
Installation of new renewable energy capacity of 3,000MW (mostly solar)	Tk72.71 billion
Minimising T&D losses	Tk24.44 billion
Reducing load shedding	Tk6.65 billion
Total	***Tk137.94 billion ~ Tk138 billion (US$1.2 billion)***

Source: IEEFA's Analysis.

However, to further reduce the BPDB's subsidy burden of Tk382.89 billion (US$3.22 billion) recorded in FY2023-24, Bangladesh should gradually transition to electric systems from gas-driven appliances, like boilers, to increase the demand for grid electricity. Alongside this, industries should fully rely on the grid, keeping gas-fired captive generators as backups. These will help increase BPDB's revenue from selling additional energy while reducing capacity payments to idle plants.

Policy Traction for the Power Sector's Sustainability

Conducive policies are key to advancing the power sector's sustainability, riding on renewable energy and energy efficiency and reducing dependence on oil-fired plants. Attracting industries to rely on grid electricity will require policy adjustments. Among other things, it is important to spearhead efforts to assess future power demand accurately, keeping a rational reserve margin and modernising the grid. The government should tailor these policies to the context of the relevant

stakeholders, such as renewable energy project developers, energy efficiency service providers and industries, to boost confidence in the sector and provide investment certainty.

- The GDP growth rate-centric power demand assessment has proven unreliable, exposing Bangladesh to considerable long-term risk. As manufacturers continue to improve the efficiency of appliances, power demand assessment must consider energy efficiency gain rather than solely relying on GDP growth rates. Further, keeping idle power capacity while supplying gas for captive power generation in industries is counterproductive. It is, therefore, evident that the country's broader energy policymaking should include relevant factors that contribute to the power demand to help avoid estimating inflated power demand beyond economically justifiable levels.

- Bangladesh should contain overcapacity to minimise toxic capacity payments. While the reserve margin, including VRE, will likely reach 66.1% by the end of 2024, the government can still increase VRE and limit it to around 36% by 2030 (see Figure 11). Excluding VRE, the reserve margin will hover around 20%, comparable to countries like India. It is a policy decision to fix a suitable reserve margin that is efficient and does not inflict too much cost on account of capacity payments.

- Since the combined capacity of operational and under-construction baseload plants will be more than the peak electricity demand in 2030, Bangladesh should avoid signing contracts for new fossil fuel plants till 2030. This will help prevent excessive capacity payments to idle plants.

- Renewable energy, which could have reduced oil-fired generation, accounts for only a small fraction of Bangladesh's grid power. As the country has drawn experience from the past, it can set at least a conservative goal of installing a total combined grid-connected renewable energy capacity of up to 4,500MW by 2030. Given that it already has a grid-connected renewable energy capacity of 1,004MW while projects of 600MW capacity are under different stages of implementation, new grid-connected renewable energy of around 2,900MW between 2026 and 2030 will help achieve the goal.[47,48,49] Notably, using battery storage of 500MW with a backup for three hours will help reduce the operation of oil-fired plants in the evening, too. If batteries become more economical in the future, Bangladesh may consider their increasing use during the evening peak.

  Bangladesh currently has an off-grid renewable energy capacity of 380MW. Combining this with the proposed off-grid solar irrigation capacity of 500MW and community-level projects,

[47] Current grid connected renewable energy capacity = 230MW (hydropower) + 603MW (utility-scale solar) + 60MW (utility-scale wind) + 111MW (rooftop solar under net metering) = 1,004MW
[48] Utility-scale projects under implementation = 560MW (as per BPDB's plan) + 40MW (hydropower from Nepal) = 600MW
[49] Additional capacity from 2026 to 2030 = 2,500MW (utility-scale and rooftop projects) + 400MW (solar irrigation).

like solar-powered drinking water supply, may lead to an off-grid capacity of 1,000MW in 2030. This will result in a combined renewable energy capacity of 5,500MW in 2030.

The government should develop guidelines for reverse auctions, battery storage and Corporate Power Purchase Agreements (CPPAs) to accelerate renewable energy deployment. The government can benchmark the project cost as renewable energy projects are still costly in Bangladesh. It should also revisit the import duty structures of rooftop solar accessories and prioritise renewable energy financing. Such policy measures will provide a market signal to renewable energy investors to be ready for new renewable energy projects in Bangladesh.

Additionally, the government must invest in grid modernisation to transform the traditional grid into a more resilient, reliable, efficient, and secure network, thus allowing for the increasing integration of VRE.

- Using oil-fired plants does not make economic sense when the sun is available. As such, the country may restrict the use of oil-fired plants to up to 5% of the total power generation, particularly to meet the evening demand.

- Reducing power sector overcapacity will largely depend on whether the national grid can meet a part of the industrial demand for which onsite captive generation is the current practice. The government may fix a target for 2030 to at least cater to 50% of the industrial demand met by gas-fired captive generators. This will require two-pronged measures – raising gas tariffs to reflect the cost of imported LNG and ensuring reliable grid electricity supply. Alongside fixing gas tariffs for industries based on the actual cost of LNG, the government should frontload efforts for grid modernisation to improve the reliability of electricity.

  In the past, industries like readymade garments perceived least-cost production as the only strategy to remain competitive in the international market. As environmental, social and governance (ESG) requirements are more stringent now, industries should revisit their strategy and find ways to reduce emissions. With Bangladesh's nuclear power plants of 2,400MW coming online by 2027, its grid will be cleaner in the future compared to now. Further, the government's attempt to ramp up grid-scale renewable energy capacity will reduce the country's grid emission factor, allowing the industries to minimise their products' carbon footprint. Despite a higher tariff for using grid electricity, industries will likely become more competitive on the ESG front.

- As high costs have saddled Bangladesh's power sector, reducing wastage, such as T&D losses, is important. The government should set a target to bring down the T&D losses to 8% from 10.33% by 2030.

- Bangladesh's reliance on imported dollar-denominated energy commodities makes a compelling economic case to reduce energy consumption through efficiency gain. Since

households consume more than 50% of the grid electricity and depend on appliances, such as lights, fans and air conditioners, a 1.5% energy efficiency per annum is achievable. Moreover, commercial buildings and industries offer significant energy efficiency potential. Wasteful energy use, owing to behavioural patterns and a lack of awareness, is evident in the country, too. The government may fix an energy efficiency target of 1.5% per annum.

On the implementation side, it should design a proper awareness-raising campaign for households on the economics of using efficient appliances and conserving energy by reducing wasteful energy use. If enforced, standards and labelling regulations will ensure the availability of efficient appliances and help consumers make informed purchase decisions. The Sustainable and Renewable Energy Development Authority (SREDA) may help catalyse this development. SREDA should also engage with industries to scale energy efficiency while demonstrating best cases.

- Despite an excess power generation capacity, the BPDB faces an uphill task to ensure uninterrupted power supply amid its high revenue shortfalls. This further complicates its financials as it pays capacity charges to the idle plants. As such, the government should set a goal of reducing load shedding to 5% from the FY2023-24 level.

Envisioning a Pathway for Sustainable Power Sector

Although making Bangladesh's power sector sustainable may seem like an insurmountable challenge, it is possible if a roadmap for reforms is available. The roadmap should include policy drivers to ensure that they benefit the sector and lower costs. In light of these, the study proposes a roadmap for 2030, articulating key areas of concern and proposing likely solutions.

Table 5: Roadmap for the Power Sector's Sustainability

Particulars	Activity	Goal	Timeline
Power Demand	Estimating power demand considering all relevant variables rather than focusing only on GDP growth.	Project the power demand for 2030, keeping the reserve margin within 40% after incorporating renewable energy.	2025
Fossil Fuel-based Plants	Limiting new investment in fossil fuel-based plants.	No investment in new fossil fuel-based plants beyond the under-construction ones to avoid overcapacity and capacity payments	2025-2030
Renewable Energy	Creating a conducive system for renewable energy expansion: i. Assessing the rationale for reducing high import duties for rooftop solar accessories ii. Bringing down the cost of renewable energy projects iii. Allowing renewable energy projects under CPPA	i. Rationalise the import duties applicable for rooftop solar accessories ii. Benchmark project costs iii. Make guidelines for reverse auctions to reduce cost iv. Prepare guidelines for CPPA to expedite utility-scale renewable energy	2025

	Accelerating renewable energy	Install a combined renewable energy capacity of 5,500MW, including grid-connected renewable energy of 4,500MW.	2030
Transmission and Distribution (T&D) Losses	Reducing T&D losses	Bring down T&D losses to 8%.	2030
Demand Shift	(i) Encouraging industries to use grid electricity (ii) Increasing gas tariff for captive power, reflecting the high cost of imported LNG	Shift at least 1,500MW captive power demand of industries to the national grid, starting with 500MW from 2028.	2030
Load Shedding	Minimising load shedding	Reduce load shedding to 5% of the FY2023-24 level	2026
Modernise Grid	Expediting the ongoing projects and undertaking new projects based on proper assessment	Ensure reliable electricity supply	2030
Energy Efficiency	Enhancing energy efficiency on the demand side	Achieve 1.5% energy efficiency per annum	2025-2030
Oil-fired Plants	Reducing the contribution of oil-fired power plants	Limit the use of oil-fired plants to 5% of total power generation	2030

Source: IEEFA's Analysis.

While the proposed roadmap will help streamline Bangladesh's power sector towards sustainability through 2030, the country must spearhead measures consistently to narrow the gap between the sector's cost and revenue, bringing down the subsidy burden close to zero.

The country should work on gradually transitioning to electric systems from gas-driven appliances, like boilers, to increase the demand for grid electricity. Alongside this, industries should fully rely on the grid, keeping gas-fired captive generators as backup. These will help increase the BPDB's revenue from selling additional energy while reducing capacity payments to idle plants.

The success of Bangladesh's efforts to fix the power sector's problems will hinge on how it makes policies more conducive, whether it shifts focus from GDP-centric demand projection to other factors, like energy efficiency gain, modernises the gird, adjusts gas tariffs to attract industries to use grid power and addresses the challenges of renewable energy expansion.

Annexure 1

Calculation of Reserve Margins

Scenario 1: Total Installed Capacity and Maximum Power Demand are Considered'

Country	Installed Capacity	Maximum Demand Served	Reserve Margin = [(Installed Capacity - Maximum Demand) / Maximum Demand] %
Bangladesh	27,740MW (October 2024)	17,200MW (April 2024)	61.3%
India	453,000MW (September 2024)	250,000MW (May 2024)	81.2%
Vietnam	80,555MW (December 2023)	45,919MW (June 2023)	75.4%

Scenario 2: VRE is Excluded from the Total Installed Capacity

Country	Installed Capacity excluding VRE	Maximum Demand Served	Reserve Margin = [(Installed Capacity excluding VRE - Maximum Demand) / Maximum Demand] %
Bangladesh	27,077MW (October 2024)	17,200MW (April 2024)	57.4%
India	314,880MW (September 2024)	250,000MW (May 2024)	26%
Vietnam	58,928MW (December 2023)	45,919MW (June 2023)	28.3%

Source: IEEFA's Analysis.

Annexure 2

Unserved Energy on Randomly Selected Days During FY2023-24

Date	Unserved Energy due to Load Shedding GWh	Unserved Energy as Percentage of Total Demand
10 July 2023	27.946	8.72%
19 July 2023	35.896	10.58%
20 July 2023	33.737	9.8%
17 August 2023	21.891	6.8%
20 August 2023	25.561	7.22%
7 September 2023	20.77	6.45%
12 October 2023	8.875	3%
2 November 2023	1.667	0.63%
4 to 31 December 2023	0	0%
20 January 2024	5.347	2.63%
20 February 2024	3.307	1.4%
30 March 2024	13.169	4.42%
4 April 2024	30.175	8.89%
6 April 2024	31.036	9%
28 April 2024	39.781	10.64%
29 April 2024	48.84	12.6%
30 April 2024	37.498	9.83%
2 May 2024	15.955	4.45%
16 May 2024	15.735	4.33%
25 June 2024	40.825	11.65%
27 June 2024	21.739	6.4%

Note: Total unserved energy during FY2023-24 was more than 2,244.89GWh.50 Data for several days were not available in the daily generation archives.

[50] IEEFA's analysis based on BPDB's daily power generation data available at: https://misc.bpdb.gov.bd/daily-generation-archive

Annexure 3

Energy Savings from Reduced T&D Losses

Bangladesh's T&D losses stood at 10.33% in FY2022-23[51]

Target: Limiting T&D losses to 8%

Total Generation in FY2023-24: over 95,374GWh[52]

Energy Savings with 8% T&D Losses = 95,374 * (10.33% - 8%) = 2,222GWh per year

Note: Energy savings per year will increase for a higher generation, which is a likely scenario due to economic growth.

[51] BPDB. Annual Report 2022-23. 1 January 2024. Page 10.
[52] Power Grid Bangladesh PLC. Operation Monthly Reports – July 2023-June 2024. September 2024.

Annexure 4

Calculation of Savings

Option 1: Industries shift to grid electricity

Current scenario: Gas-fired captive generation capacity is around 3,000MW

Proposed scenario: Grid electricity will cover half of the demand met by captive generators

Savings from a Shift of Industrial Power Demand to the Grid by 50%	
Additional Grid Power Demand (1,500MW power demand for 16 hours a day for 330 days a year)	7,920,000,000kWh
BPDB's savings for meeting additional demand (35% of the new demand will be met by economic gas-fired power plants owned by BPDB and taking cost saving of Tk5.815/kWh) [53,54,55]	Tk16,119,180,000
Reduction in Capacity payments (for 65% of the remaining demand and a conservative capacity charge of Tk3.5/kWh)	Tk18,018,000,000
Cumulative Savings	**Tk34,137,180,000(Tk34.14 billion)**

Option 2: Renewable energy capacity addition (Conservative estimate of 3,000MW)

Assumptions:

i. Of the 3,000MW renewable energy capacity, 750MW will be under Corporate Power Purchase Agreements (CPPAs) and rooftop solar.

ii. The 750MW system under CPPAs and rooftop solar will have a battery backup of 250MW for three hours, saving the cost of power from oil-fired plants.

iii. 250MW utility-scale renewable energy project will have battery backup for three hours, which will only replace oil-fired power but will not result in any financial savings. This is due to the estimated cost of US$0.021/kWh from the battery storage system.[56] The average cost of power from oil-fired plants is Tk23/kWh (approximately US$0.021/kWh).

Savings from Adding at least 3,000MW Renewable Energy Capacity	
Savings from 2,250MW of grid-connected renewable energy[57,58]	Tk42,525,000,000

[53] As several economic gas-fired power plants of BPDB operated at lower capacities in FY2022-23, these plants can meet at least 35% of the additional power demand to be created.
[54] Average cost of the economic gas-fired plants recorded in FY022-23 was approximately Tk5/kWh.
[55] Flat electricity tariff for industries with sanctioned loads ranging from 50KW to 5MW and 5MW to 30MW is Tk10.88/kWh and Tk10.75/kWh respectively. The average of two tariffs is approximately Tk10.815/kWh.
[56] Bloomberg. Bangladesh Power Sector at the Crossroads. 2 October 2023. Page 5.
[57] Considering the likely fall in renewable energy tariff to Tk9.5/kWh in the future, the saving will be Tk13.5/kWh for replacing oil-fired power.
[58] Four hours of operation for 250 days a year.

Savings from 750MW of renewable energy capacity implemented under CPPA (grid-connected) and on rooftops (this will save Tk23/kWh)	Tk24,150,000,000
Savings from 250MW battery backup capacity for three hours under rooftop and CPPA (this will save Tk23/kWh)	6,037,500,000
Cumulative Savings	**Tk72,712,500,000 (Tk72.71 billion)**

Option 3: Limiting T&D losses

Savings from Limiting T&D Losses to 8%	
Energy savings due to a reduction in T&D Losses from 10.33% to 8% (see Annexure 3)	2,222.2GWh
Monetary Savings (Taking average power generation cost of Tk11/kWh)	**Tk24,444,463,846 (Tk24.44 billion)**

Option 4: Minimising load shedding

Savings from Reducing Load Shedding to 5%	
Load Shedding Considered in this Study (Load shedding in FY2023-24 was more than 2,044.89GWh - see Annexure 2)	2,000GWh
Energy Savings (load shedding is reduced to 5% from the stated level)	1,900GWh
Monetary Savings (Taking capacity charge of Tk3.5/kWh)	**Tk6,650,000,000 (Tk6.65 billion)**

Total Annual Savings: Tk34.14 billion + Tk72.71 billion + Tk24.44 billion + Tk6.65 billion

= Tk137.94 billion (~Tk138 billion)

= **US$1.2 billion**

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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