



Youth Policy Forum Policy Brief
Energy and Infrastructure Policy Network

UNDERSTANDING BANGLADESH'S OVERCAPACITY CHALLENGES IN POWER PRODUCTION

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A. Context

Bangladesh's power sector has crossed commendable milestones recently. According to the government's estimate, all of Bangladesh's households have access to electricity, and the country's power generation capacity is higher than the peak demand, technically obliterating the main reason for frequent power cuts.

However, the achievements came at the cost of an overcapacity issue. Bangladesh's average power utilisation was 40% in 2021 and it was predicted to remain the same by 2025. According to IEEFA's estimation, in a worst-case scenario, this could further drop to 34% by 2025.¹

Having excess installed capacity is not a matter of concern given power plants often need to go through periodic maintenance. They might fail to produce electricity for a host of other reasons. According to the latest annual report of the BPDB, the total installed capacity of Bangladesh was 24,911 MW as of June 2023, while the maximum peak demand stood at 15,648 MW on 19 April 2023. Hence, the maximum power utilisation compared to the installed capacity, according to BPDB, is 62.82%. The country, therefore, has an excess capacity of around 40%, around 9,300 MW in capacity, including imported power.

Overcapacity in power production can result in a massive capacity charge and it can create a fossil fuel lock-in. Nevertheless, such possibilities can be avoided by implementing proper strategy. This paper firstly analyses why, or whether, there is an overcapacity issue in Bangladesh and further discusses the potential risks of an overcapacity problem. Finally, this paper concludes with some recommendations.

B. Why, or whether, Bangladesh has an overcapacity

Overcapacity in the power sector refers to a situation where the total installed capacity for generating electricity significantly exceeds the actual electricity demand.

A host of reasons can contribute to overcapacity. Countries may overestimate future electricity demand, leading to overbuilding of capacity. Market dynamics, such as incentives for new construction or competition, can also encourage over-investment in capacity.

The challenges around overcapacity in the power sector of Bangladesh are linked to the problems that arose in the early 2000s. During the first six years of the 2000s, Bangladesh's GDP grew by 5% per year. In 2006, the GDP growth stood at 6.7%, the second highest in that decade. With economic growth, electricity demand grew, but the government's failure to increase power generation capacity led to frequent power outages making the second cabinet of Khaleza Zia unpopular and lose the next election.

Following 2006, increasing power generation capacity became a key policy agenda for subsequent governments. In 2008, the Awami League presented a manifesto promising to

enhance power generation capacity and promote regional energy security through cooperation.

(i) Ambitious growth projections

Following the formation of the government in January 2009, the new administration made major efforts to increase the country's power-generating capacity to attain the goal of 100% electrification by 2021. The government predicted that by 2021, electricity consumption will be over 20,000 MW, owing to the economy's rapid and consistent growth. To provide sufficient electricity to all the households and the factories, the projected capacity growth was aimed at around 24,000 MW by 2021.²

This estimation was based on the assumption that, since in a typical developing economy, a 1% increase in GDP leads to a 1.5% increase in demand for electricity, an average 6% GDP growth each year would require 9% electricity demand growth. Accordingly, the government's target of achieving 8% GDP growth by 2015 and 10% by 2021 will require 12% and 15% growth in the supply of electricity.³

The projected demand for electricity detailed in the Power Sector Master Plan 2010 (PSMP 2010) and Bangladesh Power Development Board's (BPDB) projection of installed capacity, along with the actual installed capacity and maximum actual peak demand of 2018 and 2021 are given below.

Projected electricity demand, installed capacity and actual demand		
	2018	2021
PSMP 2010's total demand projection ⁴	15,676 MW	20,488 MW
BPDB's actual installed capacity	18,961 MW ⁵	22,400 MW ⁶
Maximum actual peak demand	13,044 MW ⁷	15,800 MW ⁸

The projected growth for both GDP and as a result electricity demand did not materialise. The average GDP growth from 2009 to 2013 was 5.2%, from 2014 to 2018 was 6.72% and from 2019 to 2022 was 6.34%.

Though the GDP growth was solid, it did not match the ambitious projections. As a result, the maximum peak demand, which is much higher than the average demand throughout the year, was 13,044 MW in 2018 and 15,800 MW in 2021.

Projected GDP growth rate and actual growth rate		
	2015	2021
GDP growth projection ⁹	8%	10%
Actual GDP growth ¹⁰	6.6%	6.9%

Though the economy did not grow as predicted, the new capacity addition by installing new power plants continued. By 2018-19 FY, the installed capacity reached 18,961 MW and by 2021-22 FY, it crossed 22,400 MW. These capacities were 5,917 MW and 6,600 MW in excess compared to the peak demand of those years respectively. As the economic growth has remained stagnant due to COVID-19 but the installation of plants continued, Bangladesh now has around 40% excess capacity.

(ii) Better energy efficiency

Another interesting aspect of Bangladesh is that the country's energy efficiency is comparatively better than other East Asian economies, namely, Thailand and Indonesia.

The Power System Master Plan 2016 (PSMP 2016) team considers Thailand as the reference country for the long-term projection of the energy demand in Bangladesh in the formulation of the master plan due to some identical features shared by these two countries. However, the PSMP 2016 found that, in comparison to Thailand, Indonesia, and Vietnam, Bangladesh has much lower per capita energy usage.

The differences in per capita energy consumption between Bangladesh and the three nations outweigh the differences in per capita energy consumption per GDP. Bangladesh consumes less energy than the other three countries to get the same economic value, and the economy has risen with less energy input.

Though the electricity demand projections of PSMP 2010 were done based on an average energy elasticity of 1.50 from 2010 to 2019, it was revised down to 1.27 in PSMP 2016, due to Bangladesh's better energy efficiency.

C. Possible implications of overcapacity

Overcapacity in power systems can raise consumer bills and put a burden on power providers' finances owing to decreased asset utilization rates. It may also present operational issues. Overcapacity can also have a detrimental environmental impact, particularly if it encourages the use of inefficient or polluting power plants. Furthermore, overcapacity might result in lost potential and discourage future investments in the power sector owing to unclear returns.

(i) Financial implications

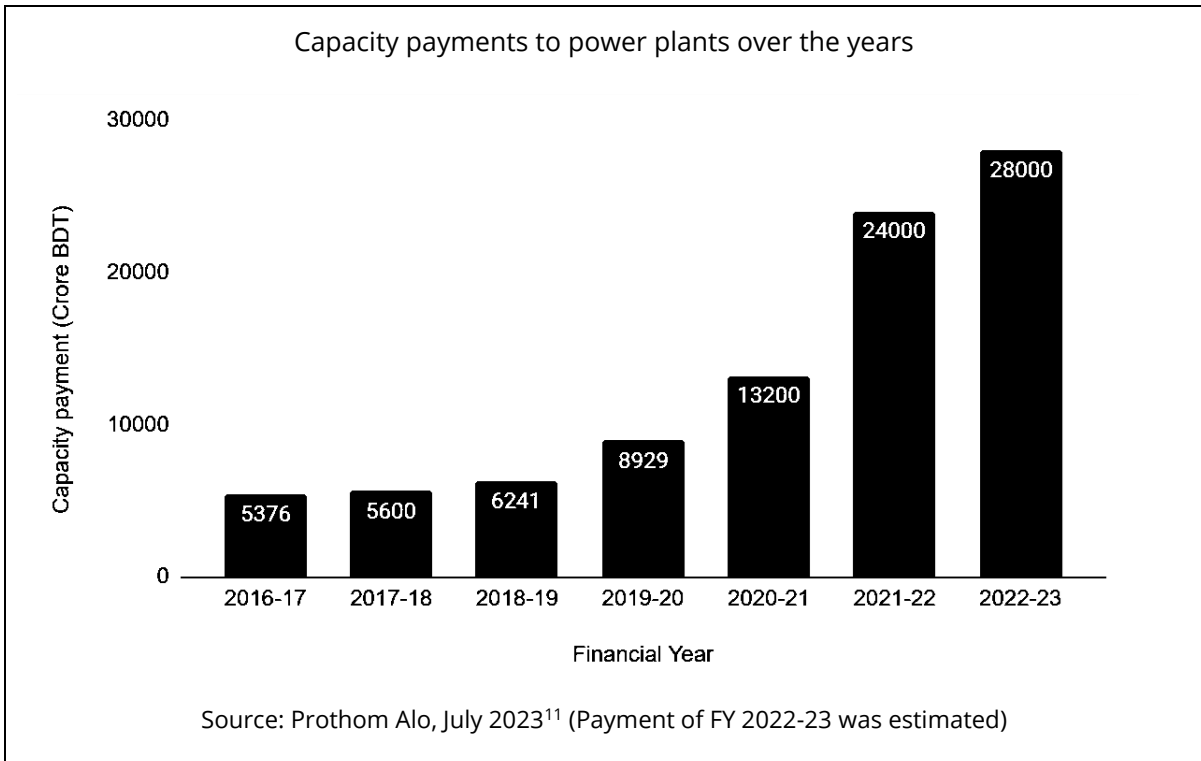
One of the much-talked-about terms encompassing the overcapacity challenge is capacity payments or capacity charges.

Capacity charges are the amount paid to electricity providers to ensure that a sufficient supply of energy is available during peak hours of usage on the power grid. It is paid to make sure that the amount of electricity that might be required by consumers is always available on the grid even though it might not be required.

Paying electricity producers for unutilised capacity is standard practice given the fact that the installation of power plants involves huge investments and uncertainties on return. In the event a power producer is granted a license to build a power plant but the government eventually suddenly decides not to buy from the same producer, the entire investment is jeopardized owing to high-interest loans and operational costs.

To mitigate these risks, independent power producers require government assurances such as higher-than-average electricity prices and capacity charges depending on the plant's output.

In 2009, when the government decided to attract private investments in the power sector, it provided them with guarantees for their investments through the provisions of capacity payments.



Since, in the early 2010s the installed capacity was much lower than the peak demand for electricity, capacity payments did not pose a significant challenge for the government. As the installed capacity grew significantly in the late 2010s but the electricity demand

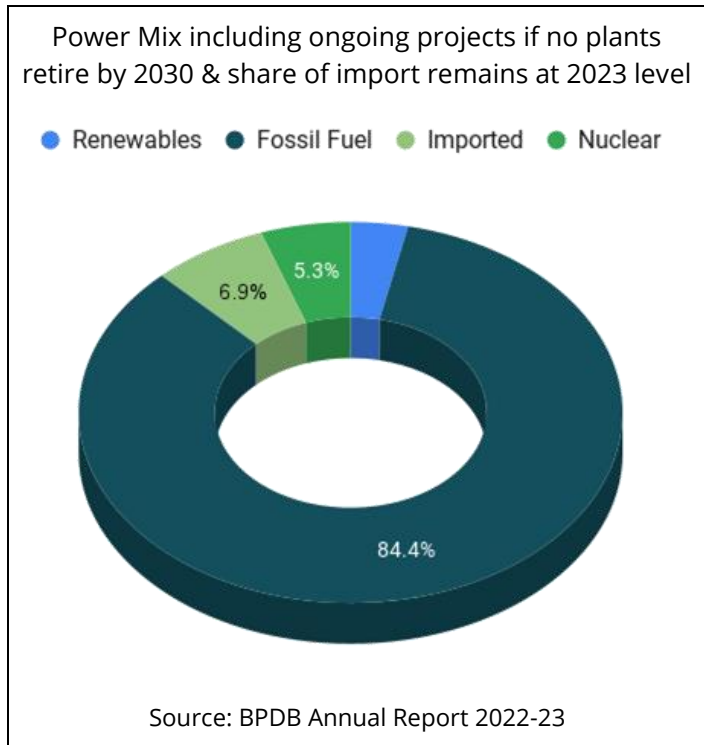
stayed stagnant, the size of capacity payments grew, putting pressure on the national budget, and eventually on the consumers.

As of June 2023, 82 independent power plants (IPPs) and 32 rental power plants in the country have received over BDT 1 trillion as a capacity charge in 14 years.

(ii) Fossil-fuel lock-in and investment disincentives

Overcapacity can disincentivise future investment in recent technologies or necessary upgrades to existing infrastructure, as the return on investment may be seen as too uncertain or low. It can also drive the country to a fossil-fuel lock-in, creating environmental impacts, if the share of fossil fuel is significantly high.

According to the BPDB’s Annual Report 2022-23, Bangladesh’s power mix is dominated by Gas (45.65%), followed by Furnace Oil (26.06%) and Coal (10.81%), all of which are fossil fuels. The total share of fossil fuel in the installed capacity as of June 2023 is 86.57%. In addition, 35 ongoing projects are expected to be completed by 2030 which will add 13,612 MW of which 80.31% are from fossil fuel and only 4.55% are from renewables (wind, waste and solar).



Though several power plants are supposed to retire by 2030 as well, the addition of more fossil fuel-fired power plants means the energy mix by 2030 will be led by fossil fuels.

If the ongoing projects are completed accordingly and no power plants retire by 2030, the expected total installed capacity will be 38,523 MW.

To understand a future scenario, let us assume that power plants with 10% capacity, all fossil fuel-based, will retire by 2035, and no new power plants will be commissioned. The total installed capacity in that case will be 34670.7 MW with 82.62% electricity coming from fossil fuels. Yet, the total installed capacity in this scenario would be only 2500 MW less than the projected peak electricity demand of the base case scenario by 2035

according to PSMP 2016, and higher than the low case scenario's projected peak electricity demand.

This is to note that, the GDP growth that Bangladesh has been experiencing in recent years matches the low-case scenario.

Therefore, as can be seen, the dominance of fossil fuel, even in 2035 will be so large that it can potentially disincentivise future investments in renewables and other clean energy sources.

D. Recommendations

Bangladesh has recently approved dozens of renewable energy projects and is in talks with off-shore wind farm builders which provide us a beacon of hope that the country is serious about a gradual transition to renewable energy.

However, as we can observe, overcapacity can pose a serious challenge in Bangladesh's energy transition pathway, if the policymakers do not take necessary steps to address the issue.

Some recommendations are offered here:

1. As of now only 3.20% of the total installed capacity is in the No Electricity No Payment (NENP) model (797 MW of 24,911 MW). Bangladesh can gradually revise the power purchase agreements with fossil fuel-based producers and enter NENP agreements to discourage fossil fuel investments and encourage investments in renewables.
2. Bangladesh government can consider a Pigouvian strategy to phase out the fossil fuel power plants. Having a significantly large excess capacity means a large portion of power capacity will remain unutilised across several power plants. Bangladesh will have to make hefty capacity payments for a long time for these unutilised capacities. To avoid this, the government can consider entering into an agreement with some of the fossil-fuel run power plants to encourage them to phase out early in lieu of a compensation that will be lower than the total potential capacity payments.

For example, ABC Coal Power Plant has a power purchase agreement with Bangladesh of 20 years. The estimated capacity payment for the unutilised capacity of the plant is 1000 USD. Bangladesh can offer 700 USD to the power plant to phase out early which will be paid over 20 years and additionally can offer them to build a renewable energy-based power plant.

3. The power purchase agreements with fossil fuel-based power plants that were supposed to retire by 2030 should not be renewed. The government can instead offer incentives to these power plants to utilise the land for renewable energy-based power production.

4. The government can offer Feed-in tariffs to the owners of solar PV to promote the installation of more rooftop solar PV and gradually decrease the dependence on large fossil fuel-based power producers.
5. To increase energy efficiency, the government take an initiative to raise awareness among the users and consumers through communication material, internet and cellular network about energy saving measures (switching off lights, fans, not using AC etc.)

E. References

- ¹ Nicholas, S. (2021). IEEFA: Bangladesh's power system overcapacity problem is getting worse. <https://ieefa.org/articles/ieefa-bangladeshs-power-system-overcapacity-problem-getting-worse>
- ² GED. (2013). National Sustainable Development Strategy (NSDS) 2010-2021. National Designated Authority to GCF.
- ³ Ibid.
- ⁴ MOPEMR. (2010). Power System Master Plan 2010 (pp. 7–14). https://policy.asiapacificenergy.org/sites/default/files/PSMP2010_reduced.pdf
- ⁵ BPDB. (2019). Annual Report 2018-19 (p. 27). https://bpdb.portal.gov.bd/sites/default/files/files/bpdb.portal.gov.bd/annual_reports/7b792f67_bf50_4b3d_9bef_8f9b568005c9/2022-10-18-05-38-b38d9a259adcd65ecb411b5ba4637b76.pdf
- ⁶ BPDB. (2024). Annual Report 2022-23. https://bpdb.portal.gov.bd/sites/default/files/files/bpdb.portal.gov.bd/page/771c9a89_a06c_4c2f_9b8c_699d17ed769a/2023-12-20-09-13-bc35a2ac1abda167c7c48437e4dc1061.pdf
- ⁷ BPDB. (2019). Annual Report 2018-19 (p. 27). https://bpdb.portal.gov.bd/sites/default/files/files/bpdb.portal.gov.bd/annual_reports/7b792f67_bf50_4b3d_9bef_8f9b568005c9/2022-10-18-05-38-b38d9a259adcd65ecb411b5ba4637b76.pdf
- ⁸ BPDB. (2024). Annual Reprot 2022-23. https://bpdb.portal.gov.bd/sites/default/files/files/bpdb.portal.gov.bd/page/771c9a89_a06c_4c2f_9b8c_699d17ed769a/2023-12-20-09-13-bc35a2ac1abda167c7c48437e4dc1061.pdf
- ⁹ GED. (2013). National Sustainable Development Strategy (NSDS) 2010-2021. National Designated Authority to GCF. <http://nda.erd.gov.bd/en/c/publication/national-sustainable-development-strategy-nsds-2010-2021>
- ¹⁰ World Bank. (2023). GDP growth (annual %) - Bangladesh. World Bank Open Data. <https://data.worldbank.org>
- ¹¹ Prothom Alo. (2023, July 8). 'Dubious deal,' looting model' in energy sector. Prothom Alo. <https://en.prothomalo.com/business/local/iwdjwqbf7f>