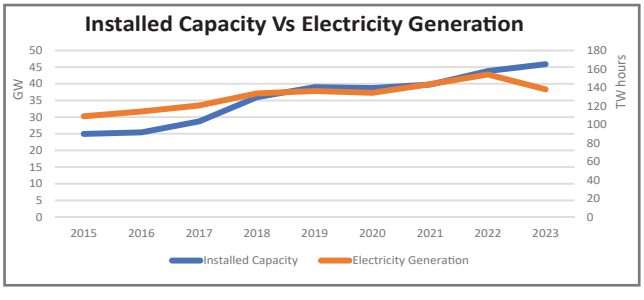


Cost of Electricity: A Conundrum to Solve



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Hours-long load shedding remains a vivid part of our recent past. Electricity shortages have been a significant impediment to Pakistan's economic progress. The decade-long capacity expansion plan has yielded results, providing the country with "adequate" generation capacity. However, this achievement has come at a cost that is prohibitively high for consumers. Pakistan now has the highest power generation costs in the region, rendering electricity unaffordable for all consumer categories—industrial, commercial, and domestic. This has led to an unforeseen challenge: electricity demand has declined consistently over the past three years due to low reliance on the national grid, leaving generation capacity underutilized. Had electricity consumption grown as anticipated, surplus capacity would not have arisen. In reality, the country's generation capacity is not truly in surplus. Demand exists, but the exorbitant cost of electricity makes it inaccessible to consumers.



The conundrum of power sector is far deeper than it appears to be. There are facts to highlight, and myths to debunk. We cannot move forward before the myths are debunked.

Busting the Myths

1) **Infamous capacity charges:** Capacity charge is the biggest villain in town. In fact, it is a concept widely misunderstood, and its nature makes it an easy target for blame. Base load power plants typically have a lifespan of 25 to 30 years. Tariffs are determined in such a way that they recover the total project cost along with an appropriate Return on Equity (ROE) over the project's lifespan. Establishing a large power project is a multibillion-dollar undertaking, with a substantial portion of the project cost financed through long-term debts. The debt component is payable to the lenders over 10 to 15 years. Under the terms of take |or pay contracts between GoP and IPPs:

- Government of Pakistan is the sole buyer of electricity.
- Electricity dispatches are at the disposal of GoP.
- Power producers are bound to maintain the specific generation capacity at any given time.
- Failure to meet the dispatch requirement will cost the power producer huge penalties.

This arrangement resulted in three types of fixed costs.

- Debt servicing
- Fixed operation and maintenance cost to keep the plant available for dispatches and
- A rental cost to power purchaser for acquisition of right to operate the plant.

These covenants and costs necessitate the existence of a fixed revenue stream over the project's life. Thus, the tariff is divided into two components: first, the **Capacity Purchase Price** to cover the fixed costs, and second, the **Energy Purchase Price** to cover the variable costs, which mainly include fuel and variable O&M costs. To sum up, the Capacity Purchase Price is merely an arrangement to meet the fixed costs by ensuring the availability of cash inflows throughout the project's life. It is the modus operandi of the single-buyer regime in the power sector.

2) **Trendy Solar Power:** With the increase in energy prices and the decrease in the cost of solar PVs, exponential growth has been witnessed in solar net metering and off-grid solar installations. As of the end of FY 2023-24, a total of 3,100 GWh of electricity has been generated through net metering, which accounts for 2.25% of total energy generation. While this may seem insignificant, it is important to note that this net metering generation data does not include self-consumption from net-metering and off-grid solar installations, which otherwise draw electricity from the national grid.

Furthermore, consumers with on-grid and off-grid solar installations are generally high-paying consumers who fall under the highest tariff slab. Therefore, the actual financial impact of recent solarization on national energy pricing is much greater than it appears.

Contrary to the popular narrative, the ballooning of capacity charges and the shift of consumers toward solar energy are not the driving forces behind the escalation of electricity prices. Rather, these are the results of the economic factors explained earlier. These factors lead to an increase in the cost of generation, which in turn reduces demand from the national grid. As more consumers shift toward solar energy, those still reliant on the grid will have no choice but to curtail their consumption. This shrinking consumer base for capacity absorption leads to an increase in the per-unit cost.

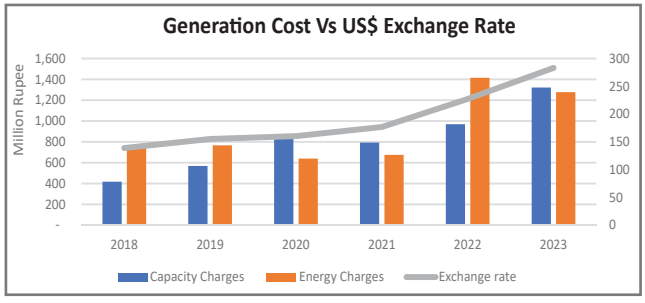
Over the past decade, more than 20,000 MW of generation capacity has been added to the national grid, much of it through CPEC and private sector investments. This has resulted in the addition of capacity charges amounting to Rs. 1 trillion. The cost of capacity expansion must be recovered through electricity tariffs. However, due to multiple factors, the demand for electricity from the national grid has not increased as forecasted. As a result, the additional expansion costs must now be absorbed by a smaller consumer base, further driving up the per-unit cost.

Demisting the Facts

Now we explain the real factors which are responsible for the increase in electricity prices.

1) **Nose diving of Pak Rupee:** The devaluation of the Pakistani Rupee is the primary reason for the increase in energy prices in Pakistan. Electricity in Pakistan is, to a large extent, an imported commodity, and a significant portion of its cost is exposed to exchange rate risk. Power projects established under successive power policies and the CPEC framework are largely foreign-funded. Many power plants rely on imported fuel, and the maintenance costs required to keep these plants running are also dominated by foreign currency. Additionally, projects' target ROE (Return on Equity) is calculated in dollar terms. To account for these factors, tariffs are indexed to the USD. As a result, the overall cost of generation is positively correlated with fluctuations in the exchange rate.

2) **Sky Rocketing Interest Rates:** The historic high in KIBOR, the increase in LIBOR, and the rise in the US CPI have all contributed to the recent hike in electricity prices. Outstanding receivables in the power sector supply chain, commonly known as circular debt, carry interest and use KIBOR as the benchmark rate. Over the last five years, KIBOR has increased from 10% to 23%. To make matters worse, the circular debt itself continues to mount. As of June 2023, it stands at 2.3 trillion. Power producers are entitled to raise invoices for late payment interest, and this cost is ultimately passed on to consumers through quarterly and annual baseline tariff adjustments.



3) **Plethora of taxes:** The "elephant in the room" is the presence of multiple taxes in the consumer-end tariff. A typical electricity bill includes up to 30% in various taxes. Over time, electricity bills have become a major source of revenue collection for the government. Electricity bills are the largest contributor to sales tax collection. During FY 2022-23, a total of Rs. 322 billion was collected in sales tax and income tax through electricity billing.

4) **Mounting Transmission and distribution losses:** Pakistan has one of the highest T&D losses in the world. The average loss rate reaches 16%, which is well above the allowable tolerable limit. Some DISCOs report T&D losses as high as 37%. T&D losses up to the allowed limit are included in the consumer-end tariff, while the excess accumulates in the circular debt stock. Major contributors to these losses include an outdated distribution network, electricity theft, and non-recoveries.

Immediate Actions for Stabilization

The above factors have brutally shaken the power sector. Following measures can stabilize the power sector for a while.

1) **Utilization of idle capacity:** The current average generation cost is Rs. 21/KWh. Meanwhile, the maximum slab rate for domestic and industrial consumers reaches up to Rs. 48.84/KWh. The differential between the average cost and the maximum slab rate is utilized for cross-subsidization. Any rate above the variable cost positively impacts cash flows.

To achieve this, special rates can be offered to industrial consumers, and reduced rates can be introduced for residential consumers during the winter season.

2) **Removal of bottlenecks from transmission networks:** Efficient transmission and distribution are as crucial as electricity generation. Most of the country's power generation facilities are located in the northern and southern regions, while the majority of the consumer base is concentrated in the central region. An efficient transmission network is essential for the optimal utilization of generation facilities. Unfortunately, the transmission networks have not been upgraded in line with the expansion of generation capacity. Bottlenecks in the transmission system resulted in losses amounting to Rs. 20.210 billion during FY 2022-23.

3) **De-indexation of generation tariffs:** Most power projects established under the 1994 and 2005 power policies are funded by foreign sponsors, with many of these plants relying on imported fuel. To ensure financial viability, project revenues are indexed to the USD. Tariffs are typically divided into multiple components, including ROE, fixed cost, fuel cost, and variable O&M elements. For power projects that have repaid their foreign sponsors' debts, the fixed cost component could be delinked from the US dollar. Similarly, the fuel cost component for plants using domestic gas or coal could also be decoupled from the USD.

4) **Rationalization of net metering policy:** Some experts have suggested reducing the net-metering buying rate and switching to gross metering. However, any changes to the net-metering policy should be made prudently to ensure a win-win situation. This approach will help maintain a high opportunity cost for going off-grid.

5) **Debt reprofiling and renegotiation of power purchase agreements:** Debt reprofiling of CPEC power projects, renegotiation of capacity charges under "take or pay" contracts, and early termination of contracts are often proposed as remedies for the ailing power sector. While these measures may seem promising, they are likely to exacerbate the situation. A similar contract renegotiation exercise was conducted in 2021, and if it had been significantly beneficial, the country would not be in its current predicament.

Estimates suggest that even if all capacity charges related to the 1994 and 2002 power policy projects were forfeited, the impact on the overall tariff would be less than one rupee per unit. Similarly, converting "take or pay" contracts into "take and pay" contracts is practically infeasible without establishing competitive markets in the power sector. No business model exists globally where manufacturers produce goods at the sole discretion of a single buyer. Forceful or negotiated modifications to contracts might yield short-term gains, but failing to honor sovereign commitments in their true spirit will cause irreparable damage to the country's investment climate in the long term.

The Cure

The aforementioned remedial measures may help reduce electricity costs. However, they are arbitrary, temporary, and focused on short-term gains. Some could even prove counterproductive if not implemented judiciously. The root cause of the power sector crisis lies in the devaluation of the rupee, which is itself a consequence of poor macroeconomic management and weak fiscal discipline.

Pakistan has been consistently grappling with budget and trade deficits. Persistent revenue shortfalls have left the government with limited capacity to invest in human and physical capital, leading to declining productivity levels. Over time, this has transformed Pakistan into a consumption-driven, import-dependent economy, highly vulnerable to exchange rate fluctuations. Budgetary deficits compel the government to rely on domestic borrowing, while trade deficits necessitate seeking assistance from international lenders.

With a low tax-to-GDP ratio, Pakistan remains trapped in a cycle of twin deficits. The real solution lies in comprehensive structural tax reforms. Pakistan is not the first country to face such challenges; it only requires strong political will to overhaul its taxation system. Without decisive steps in the right direction, the nation risks chasing an unattainable mirage instead of achieving sustainable economic progress.

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