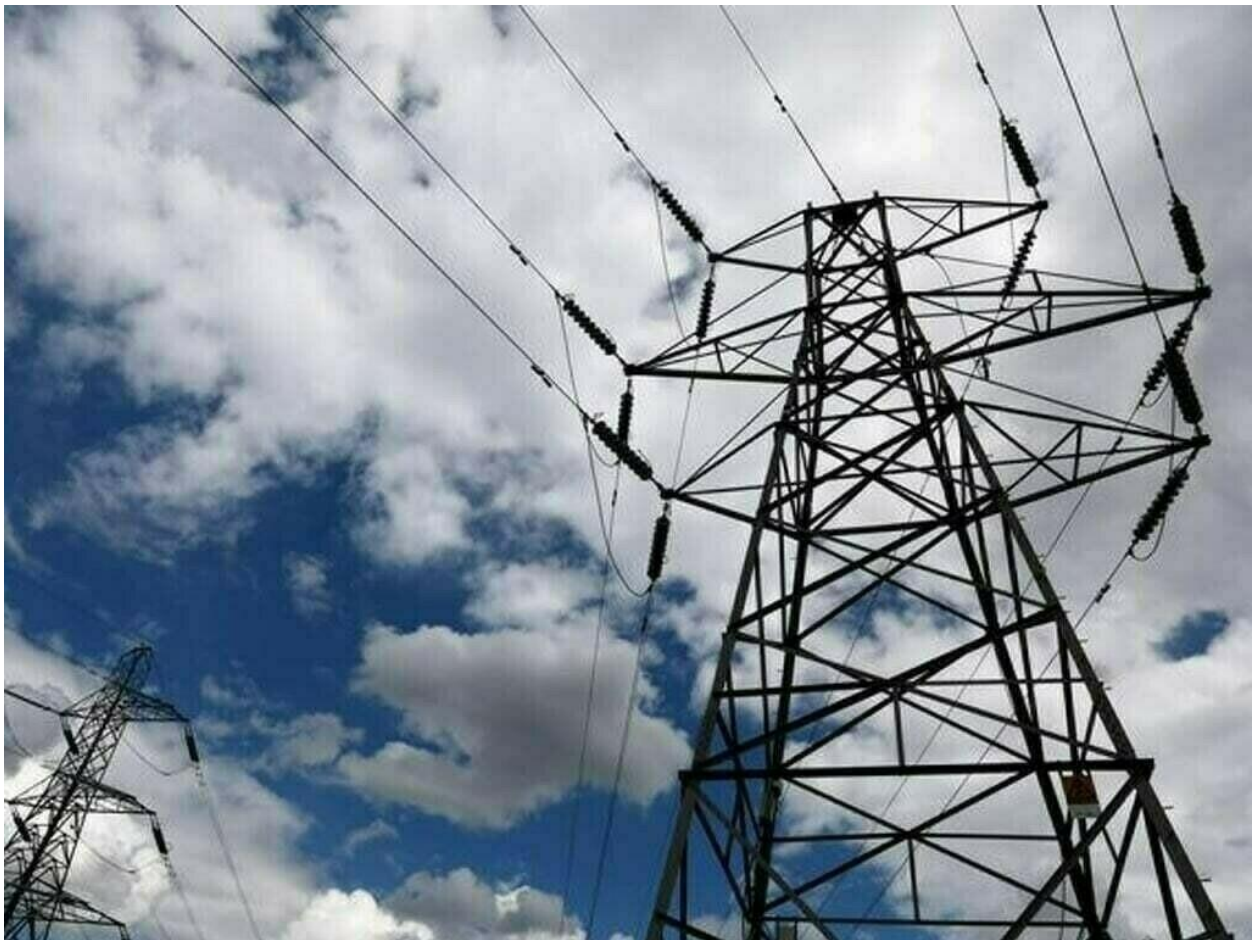


Pakistan's energy conundrum: challenges and elucidations

Usman Ahmad | 19th Mar 2025



Pakistan's energy sector faces significant challenges such as frequent power outages, high transmission losses, reliance on imported fuels, prompting the introduction of IPPs to bridge the electricity gap.

The rising costs of global energy, coupled with the depreciation of the Pakistani rupee and domestic political instability, are pushing the country towards a severe energy crisis. Pakistan's energy generated by fossil fuels, which account for 60% of total energy production, primarily relying on imported LNG, domestic natural gas, and coal.

Hydropower contributes 25% and nuclear energy makes up 8%. Renewable energy (RE) sources (wind and solar) constitute 7% while India and Afghanistan relying on RE 10% and 13%, respectively.

In the 1990s Pakistan faced severe energy shortfalls, with demand far exceeding supply and the concept of (IPPs) was first introduced in the early 1990s under the Power Policy of 1994. That policy allowed private companies to establish power plants and sell electricity to the national grid under long-term agreements, primarily through the "take-or-pay" model.

As a result of which several thermal plants commissioned, most of which relied on imported furnace oil, significantly increasing electricity generation costs. To overcome the generation cost Power Policy 2002 introduced, and the purpose of this policy was to focus on hydropower and indigenous coal to reduce reliance on imported fuels. However, despite these efforts, Pakistan remained dependent on fossil fuels.

Pakistan's energy crisis worsened, leading to the CPEC energy projects in 2015. Under the CPEC framework, several new coal-based IPPs were established, further locking Pakistan into expensive power purchase agreements. While these projects helped alleviate power shortages, they added to the financial strain due to sovereign guarantee and the dollar-indexed capacity payments.

As of March 2024, Pakistan's installed electricity capacity reached 42,131 MW and currently more than 80 IPPs are operational across Pakistan,

contributing to the nation's energy mix. Out of total installed capacity IPPs collectively generating 24,958 MW.

Out of them 10 major IPPs account for 53% of this capacity, while the remaining IPPs share the other 47%. 40% of the total capacity payments are made to 10 large IPPs and these IPPs accounts for 25% of Pakistan's total circular debt — a key issue threatening the stability of the economy. The “capacity payment” to IPPs has been a significant cause of financial distress in the energy sector, where the government is bound to pay IPPs for their full capacity regardless of actual electricity consumption.

This system has led to an exponential increase in circular debt, surging from Rs. 1.2 trillion in 2018 to Rs.2.6 trillion by the end of current fiscal year.

The circular debt makes it more difficult for producers to invest in upgrading existing power infrastructure. The cost of these payments is ultimately passed on to consumers due to high electricity tariffs, making energy unaffordable for households and industry. To address these challenges, the government has renegotiated contracts with 14 IPPs, and claimed to save Rs.1.4 trillion for these agreements.

Moreover, contracts with five IPPs have been prematurely terminated, expected to save Rs.411 billion. However, these measures alone are insufficient to overhaul the energy sector. The removal of energy subsidies in 2023 led to a staggering rise in electricity and gas prices, pushing inflation to unprecedented levels.

Electricity prices in Pakistan are 45% higher than those in other regional countries. While the average regional electricity cost is 8-9 cents per unit, Pakistan stands at 15 cents per unit, with domestic consumers paying an average of Rs.40 per unit. The gas tariff also witnessed historic increases of 174% for domestic consumers, 137% for commercial, and 193% for industries.

To overcome energy challenges its imperative to explore alternative energy sources like solar, wind and coal. Renewable power resources such as solar, and wind are abundant in Pakistan.

Pakistan Council of Renewable Energy Technologies (PCRET) highlighted Baluchistan, Sindh and the deserts in Punjab-Cholistan as areas with great potential for the production of solar energy.

The sun shines for above 2300-2700 hours a year in the south-western province of Balochistan and the north-eastern region of Sindh. According to International Renewable Energy Agency (IRENA), in 2023 Pakistan's total solar installed capacity was 1,244 megawatts an increase of 17% compared to 2021.

Wind corridors, particularly in Sindh (Gharo, Jhimpir), offer significant potential for wind power generation. Solar and wind energy are weather-dependent, necessitating the development of energy storage solutions and smart grids to ensure a stable supply.

With reference to coal reserves stand at an estimated (185 billion tonnes), valued at (US\$30 trillion), only (20%) of the country's electricity is generated from coal, compared to (70%) in India and (60%) in China. If utilized efficiently through environmentally-friendly technologies, Pakistan's coal reserves could generate (100,000 MW) of electricity for 250 years.

Pakistan has massive untapped clean energy potential of energy with nearly 60,000 MW from hydropower, 40,000 MW from Sun and 346,000 MW from wind. To secure an energy-independent future, Pakistan must prioritize structural reforms and reduce its dependence on conventional energy sources. This includes shifting from costly capacity-based power contracts to a competitive bidding system, modernizing its transmission infrastructure, and reducing transmission losses.

The government, private sector, and civil society need to work together to address the challenges facing the energy sector.

Additionally, policies should be aligned to promote renewable energy integration while ensuring consumer affordability. By diversifying the energy mix, increasing energy efficiency, and encouraging private sector participation, Pakistan can overcome its energy crisis and achieve sustainable economic growth.

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