

Mention proper question statement for evaluation. These are just like notes and notes cannot be properly evaluated

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"Energy Crisis in Pakistan"

*1. Introduction:-

Pakistan's energy crisis has indeed been a major stumbling block to its economic growth and industrialization. Energy is indispensable for economic growth as it facilitates agriculture, manufacturing, and many other sectors. The major conundrum emanating from ~~there~~ ^{exists} this crisis is load-shedding. Over-reliance on non-renewables, higher circular debt in energy sector, lack of political consensus, expensive agreements with Independent Power Producers (IPPs), rupee devaluation, and energy theft have ^{proved} to be Achilles' heel for the country's energy sector, leading to expensive electricity. The country is facing increasing demand on a day-to-day basis, while the growth of its production is stagnant. Nevertheless, the crisis has plagued the entire population; however, with adequate measures ~~they~~ it can be surmounted.

*2. Overview of the Energy Crisis:-

Pakistan has incurred significant energy challenges during the last decade. According to NTDC 2022 study, Pakistan has a total installed capacity of plus

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40,000 MW and a demand of plus 34,000 MW. As per the National Energy Efficiency and Conservation Authority (NEECA) study, there is a saving potential of 30%, 25%, and 20% in the domestic, industrial, and agricultural sectors, respectively.

2.1) Sufficient Installed Capacity and Saving Potential:-

The above statistics reflect sufficient installed capacity for energy production and savings across the sectors to meet the country's soaring demand. Thereby no load shedding should occur. However, due to the mismanagement in the energy sector, the country's present demand cannot be met, and a verba Galloping energy crisis compounded by inadequate planning has resulted in increased load shedding.

3) Load Shedding:-

Energy crisis are persistent in Pakistan, plaguing the entire population. One of the major problems inflicted due to energy crisis is load shedding. In summer 2022, the duration of load shedding was 4-6 hours in urban centers, while above 12 hours

in rural areas. The shortfall was 6000 megawatts. In 2023, the duration ~~was~~ has become 16 to 8 hours in rural and urban areas, and the shortfall was plus 10,000 MW.

4) Demand Exceeds Supply:-

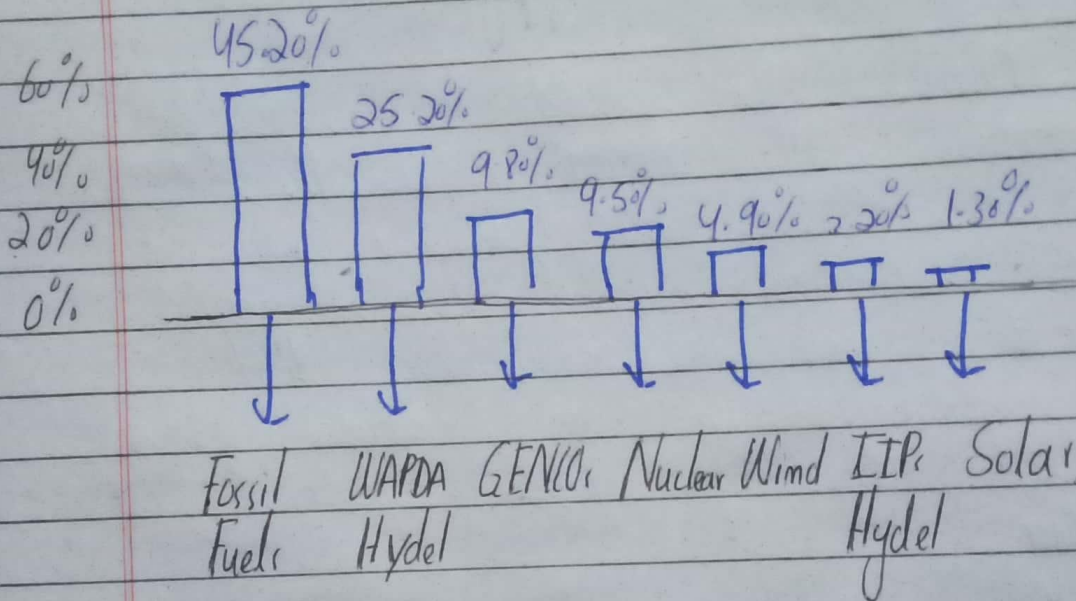
In Pakistan, the demand exceeds supply. In summer 2023, according to the Power Division, the demand was 28,000 MW and supply was 22,000 megawatts. These figures portend that the electricity dearth in Pakistan, leading to load shedding and expensive electricity.

5) Expensive Electricity:-

In June 2023, the per-unit cost paid by domestic consumers, conceiving 300-600 units was Rs 46 pkr. In commercial areas unit varies from 42 to 92 pkr. Pakistan produces third most expensive electricity in the world and first in Asia.

6) Reasons For Expensive Electricity and Load Shedding:-

6.1) Over-Reliance on Non-Renewables/ Hydrocarbons:-



Above figure depicts the installed capacity for generating electricity and shows total energy consumption, which mainly comes from thermal sources. From hydrocarbons, the most expensive source, Pakistan produces more than 60% of electricity. 7000 MWs are produced from coal, a third most expensive source. 6000-8000 MWs are produced from LNG, the second most expensive source. 12000 MWs are the installed capacity of diesel and petrol.

6.2) The Hydrocarbons are Imported:-

The imported hydrocarbons make electricity more expensive. In July 2020, the international market, the price of hydrocarbons is exponentially increased. In July 2020, in the time of COVID-19, the cost was 23 dollars per barrel. In July 2023, it was 90 dollars per barrel. In July 2023, above 23 billion dollars of hydrocarbon was imported from which a minimum of 40% was consumed in electricity generation.

6.3) Rupee Devaluation:-

Furthermore, rupee devaluation against the dollar has exacerbated the already grim situation. The rupee has increased from 178 in June 2021 to around 290 in 2023. Any depreciation of the rupee against major foreign currencies like the US dollar will lead to an increase in the cost of energy imports.

6.4) Lack of Political Consensus:-

Political polarization and the blame game of politicians have already put Pakistan on the verge of a ^{energy} dilemma. The key political parties hold varying views

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regarding the policy reforms in the energy sector. For example, the Kalabagh dam can produce an estimated 3600 MW of electricity, but certain disagreements of Sindh and KPK have hindered its construction, citing it will create acute water shortages. In this way, lack of political consensus results in the absence of long-term consistent energy policies. This uncertainty impedes investment or private investors abstain from committing long-term projects without a stable policy framework.

6.5) Energy Theft:-

Energy theft is ubiquitous in all the regions of Pakistan. In the fiscal year 2022-23 the country has lost Rs 380 billion due to this malicious practice and loss is estimated to reach Rs 520 billion next year. These unpaid bills and power theft coupled with higher circular debt jeopardize the energy sector and the economy of the country.

6.6) High Circular Debt in Energy Sector:-

In the fiscal year 2023, the circular debt has increased to 2.31 trillion.

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This reflects a deplorable state of affairs. It is estimated to reach Rs. 4 trillion by 2025. This debt cycle has a detrimental impact on the overall energy sector and contributes to the energy crisis.

6.7) Expensive Agreements with IPPs:

Independent Power Producers (IPPs) are entities that generate electrical power independently from traditional government-owned utilities. Pakistan has entered into expensive agreements with IPPs with greater capacity payment. The demand for electricity fluctuates between summer and winter. If Pakistan utilizes 28,000 MW in summer, while 13,000 MW in winter, it has to pay for the unused electricity.

6.8) Problems with the Transmission and Distribution Sector:

The outdated transmission lines lead to line losses. About 33% of electricity vanishes while reaching consumers. There is an average 17% transmission loss in Pakistan, the highest in Asia, and 3rd most in the world.

Furthermore, tampering or meter cheating, and departments with no bill payment, have contributed to electricity crisis in Pakistan.

7) Impacts:

7.1) Deleterious Impacts:-

Energy crisis has been deleterious for country's economy. It has resulted in lesser exports and greater imports creating a trade deficit. According to Pakistan Bureau of Statistics (PBS), gap between exports and imports was recorded at a deficit of \$5.29 billion in July to September period of the year 2023-24.

7.2) Socio-political Implications:-

Major industries have downsized due to expensive electricity bills. Thereby unemployment proliferates and the purchasing rate keeps reducing. Domestic consumers grapple with expensive bills, due to which protests have erupted, challenging the writ of the state.

8) Solutions:

8.1) Renegotiate Agreements with IPPs:

Agreements made in 1994 and 2005 should have renegotiated earlier. However, they were not until 2020 due to criminal negligence and kickbacks. After renegotiation certain provisions were added such as exemption from capacity payment, dollar price has been fixed at 180 pkr irrespective of its fluctuations, and local IPPs are now being paid in pkr. The agreements of 2011 and 2014 are not negotiated yet.

8.2) Endorsing localization of Electricity Products:

It has been reckoned that by 2030 reliance on imported hydrocarbons would be quashed. A shift to local source is advocated such as coal. By energy vision 2030, Pakistan focuses on generating 60% of its energy from renewable sources. 15,000 MW electricity would be generated from hydel, cheapest source costing a maximum of 8 pkr per unit. Wind projects generating 44000 MW would be completed by 2027.

at the coastal belt of Sindh and Balouchistan. These renewable sources will provide the cheapest electricity.

8.3) Building Resilient Infrastructure:

Developing a modern and resilient energy infrastructure will ensure a stable and uninterrupted power supply, enabling industries to operate efficiently and attract both domestic and foreign investments. For this factor government has to pay heed to the use of modern technology. There is a dire need for the government to harness advanced technology to surmount the crisis.

8.4) Revamp the Transmission Lines:-

This involves upgrading and modernizing the existing network of power transmission lines and infrastructure. The goal is to reduce transmission losses, improve the efficiency of electricity delivery, and enhance the overall reliability of the power grid.

8.5) Improve the Writ of the State.

~~Writ~~ of Improving the Writ of the State refers to strengthening the government's ability to regulate, enforce and manage the energy sector efficiently. This involves stamping out the corruption, streamlining bureaucratic processes, and ensuring effective governance in the energy sector.

8.6) Privatization:

Privatization involves transferring ownership and control of state-owned enterprises or assets to private entities. It will attract investment and promote innovation in the energy industry.

9) Conclusion:-

In a nutshell, Pakistan's energy crisis constitutes a substantial hindrance to its economic growth and industrialization. The multifaceted challenges include chronic load shedding, over-reliance on non-renewable sources, political discord, expensive agreements with IPPs, and systemic issues like energy theft and circular debt. The impacts are far-reaching, affecting production costs, trade balances, and socio-political stability. To address these challenges, measures such

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renegotiating TPP agreements, endorsing localization of energy production, revamping transmission lines, improving governance, and considering privatization should be ~~taken~~ implemented. These solutions collectively aim to build a more resilient and efficient energy infrastructure, fostering sustainable economic development and alleviating Pakistan's energy woes.

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