

# Maktab Competitive Exams Services

## Current Affairs Workshop for CSS 2025

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### The IPP Conundrum: Reforming Energy Sector of Pakistan

#### Generation – Transmission – Distribution – Regulation

1. **Power Generation:** power is generated by public as well as private producers. A non-exhaustive list of the main producers is given below.
  - a. **Public Producers:**
    - i. **WAPDA:** the Water and Power Development Authority handles only the energy produced by dams. Its mandate however also includes the development of water resources in an efficient manner. WAPDA's power wing was unbundled in 2007 after which thermal generation,
    - ii. **PAEC:** the Pakistan Atomic Energy Commission is an independent governmental authority and a scientific research institution concerned with research and development of nuclear technology and the use of this technology for peaceful purposes, including energy generation.
    - iii. **GENCOS:** the Generation Companies which deal with mainly the thermal energy.
  - b. **Private Producers:** some private entities can be grouped as:
    - i. **IPPs:** the Independent Private Producers are entities that own a facility which generates electricity which can be sold to public utilities or end users.
    - ii. **SPPs:** the Small Power Producers are basically private producers who generate electricity below a certain amount (normally below 50-80 MW) and usually by renewable resources of energy.
    - iii. **CPPs:** the Captive Power Producers are independent person(s) who set up a power plant to satisfy their own energy needs. It could be a single person or a housing society or an industry. Setting up of solar panels with a battery bank at a house, or installing a steam turbine to produce electricity for a factory are examples.
2. **Power Transmission:** all these producers sell their energy to the CPPA (Central Power Purchasing Agency) which transmits it over the national grid or the NTDC (National Transmission and Dispatch Company).
3. **Power Distribution:** these include 10 public sector DISCOS (such as LESCO, IESCO, PESCO, QESCO, SEPCO) and 1 private sector K-Electric (previously known as KESC, involved in generation besides distribution and operates only in Karachi).
4. **Independent Regulatory Authority:** NEPRA (National Electric Power Regulatory Authority) is an autonomous regulatory body. Its main role is to improve the efficiency and availability of electric power services by protecting the interests of investors, operators and consumers with a view to promoting competition and deregulating the power sector.

#### Pakistan's Energy Mix:

1. **Hydro Electric:** Pakistan can potentially generate somewhere b/w 41000-45000 MW of power if its hydro-resources are utilized properly. As of now Pakistan generates only 10000 MW of hydropower Mangla Dam, Tarbela Dam (Tarbela extension 5), Kalabagh Dam Controversy (Impacts on Electricity generation, irrigation and economy), Diamer Bhasha, Dasu, Kohala.

2. **Oil:** nearly 35.5% energy is generated through oil. Problems – Single source of Oil Import – Middle East – Expensive – Environmental considerations – lack of capacity in oil refineries
3. **Natural Gas:** 29% energy generation. Overexploitation. 12 trillion cubic feet to 2 trillion cubic feet. Dependence on import – IP Gas pipeline – LNG terminal issues
4. **Nuclear Energy:** Only 3 to 4% contribution to national electric supply. Nuclear plants are expensive to construct but provide cheap energy in the long run. However, they also pose threats to the environment and to the population as was seen in the case of Chernobyl and Fukushima disasters. KANUPP 1, CHASHNUP 1,2,3,4, (KANUPP 2 and 3 are in process.)
5. **Solar and Wind:** 43000-50000 MW power production potential. Virtually absent. Recent initiatives have been taken, Jhimpur, Gharo, Quaid e azam solar power plant.
6. **Coal:** Pakistan has an estimated 186 billion tons of coal reserves in total (Thar + all others) and its extraction remains at 3 million tons a year while the demand is around 9 million tons. The world produces 41% of its energy from coal and India, China and US produce 56, 66 and 42% respectively. Pakistan's dependence on Imported coal from South Africa, Afghanistan, Mozambique and Indonesia

### Challenges at hand:

Pakistan's Installed power Generation capacity is 42000 MW but original generation is around 23000 MW. Following are the Reasons:

1. Inefficiencies: old generators and old turbines tend to be inefficient as compared to those based on new technologies
2. Irregularities by the staff: corruption and malpractices: reversal of meter readings
3. Electricity Theft
4. Increase in Demand
5. Lack of Proactive Planning: This involves an absence of or a lack of planning to deal with future needs and requirements before they transform into crises. This can happen for a variety of reasons. Not keeping records of electricity demand and supply, improper forecasting, not maintaining sufficient stocks of raw materials needed
6. Imbalanced Energy Mix: 65 percent dependence on Thermal energy
7. Circular Debt
8. IPP Conundrum: Pakistan's energy sector has historically struggled with supply-demand imbalances, inefficiencies, and circular debt. The role of **Independent Power Producers (IPPs)** became prominent after the **1994 Power Policy**, which aimed to address power shortages by encouraging private sector investment. IPPs operate under long-term contracts with guaranteed returns, often denominated in foreign currency, creating financial liabilities for the government.
  - a) **Capacity Payments:** IPPs receive payments for installed capacity even if electricity is not utilized. This arrangement burdens the national budget.
  - b) **Foreign Exchange Exposure:** Payments linked to foreign currency fluctuations increase costs as the rupee depreciates.
  - c) **Inefficiency in Transmission and Distribution:** High transmission and distribution losses (~18%) exacerbate the financial strain on the energy sector.

## **Solutions:**

1. Negotiations with IPPs to reduce capacity payments and shift from fixed returns to profit-sharing models.
2. Diversification of Energy Mix: Increasing the share of renewables (wind, solar, hydro) to reduce dependency on expensive imported fuels.
3. Strengthen billing systems by adopting **prepaid smart meters** and enforcing **penalties for electricity theft**.
4. Invest in modern, smart grid technologies to reduce transmission and distribution losses, which are currently around 18%.
5. Regional Grid Integration: Explore **regional energy cooperation** (with Central Asia and China) for access to cheaper power supplies through initiatives like CASA-1000.
6. Privatization of DISCOS at the earliest

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