

Question No. 2

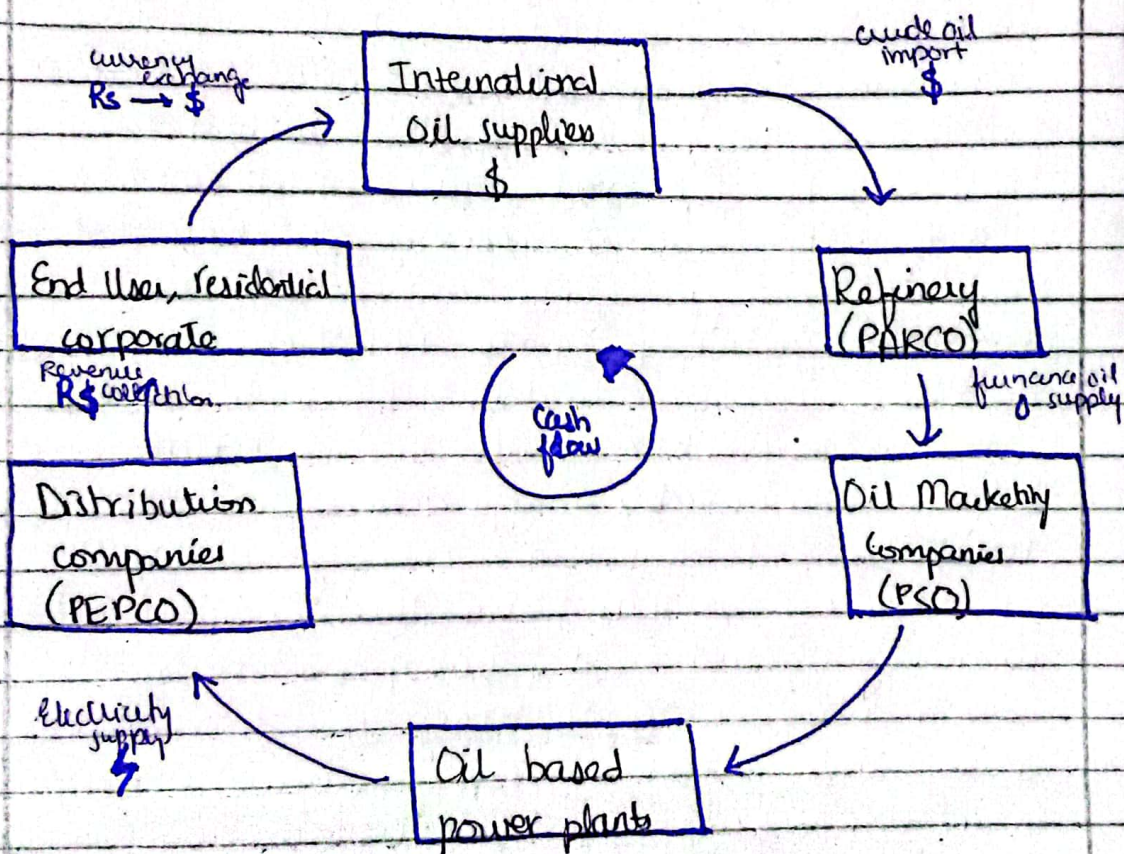
Analyze the root cause - - - - - this cycle.

Introduction:

Energy availability is essential for the development of a country. Every sector contributing to growth i.e. industry, agriculture, administration etc operates on energy. Pakistan's energy sector has long been plagued with persistent issue of circular debt which has now ballooned to over Rs. 2.3 trillion. The recurring problem of unpaid bills and arrears among various stakeholders including power generation companies (IPPs), distribution companies (Discos) and the government itself contributes to circular debt. The root causes of Pakistan's circular debt issue in energy sector includes; expensive energy generation, inefficient independent power producers (IPPs), subsidized tariffs, persistent loadshedding, line losses and non-payment/default on electricity bills. Only a sustainable approach through structured reforms in energy sector can rescue Pakistan from this crisis. For instance, gradual and transparent tariff adjustments, renegotiation of agreements with independent power producers (IPPs), improved billing and collection system, energy conservation, revamping transmission lines and focus on long term planning etc. A transparent and accountable energy sector with financial management will pave way for sustainable future of Pakistan.

2. Circular debt crisis in Pakistan:

Circular debt is a public debt accumulated by unpaid government subsidies and bills by multiple stakeholders i.e. DISCOs, IPPs and government etc. The cycle begins with crude oil import in dollars from international sources and expensive electricity production. The government subsidizes electricity tariffs to keep them artificially low which contributes to revenue shortfalls for DISCOs and power generation companies (GP).



The currency exchange rate variation and volatile global market further helps accumulate massive debts which strain the financial resources of the government.

3. Root causes

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Root causes of Pakistan's circular debt crisis:

① - Subsidized tariffs:

One of the main cause of growing circular debt is the government's practice of subsidizing electricity tariffs for agriculture and industrial sector. This provides temporary relief and help boost low cost production but in the long run, is a heavy burden on national exchequer.

② - Growing energy demand:

According to International Energy Agency (IEA), the energy demand for Pakistan will grow upto 49000 MW by 2025 with current demand (19000 MW) already exceeding production (15000 MW), the energy short fall has contributed to persistent loadshedding for around 4-5 hours in urban areas and more in rural areas.

③ - Expensive electricity generation:

Pakistan produces the most expensive electricity in Asia and is ranked 3rd in global ranking. Bangladesh and India produces approximately 30% cheaper energy. The domestic unit in Pakistan ranges from 34-64 Rs/hr. The high circular debt has further increased the price range for commercial unit in last few years.

④. Imbalanced energy mix :

High dependence on fossil fuel is not only contributing to environmental crisis but also circular debt. Pakistan imports around 64% of fossil fuel in energy mix in the form of LPG or LNG (liquefied natural gas) which leads to import cost of around \$7bn (2021).

⑤. Lack of focus on 'Renewable Energy' :

Renewable energy like solar, hydropower or wind contributes to 4% share in energy mix. This low share is primarily due to large financial cost associated with it. Total energy produced by Pakistan during 2016-17 was 123 terawatt/hours with only 2.2% renewable energy.

⑥. Poor transmission and distribution system and line losses :

The transmission losses and electricity theft further increase the circular debt. According to an article of "The Nation", Pakistan has lost around 20bn worth due to line losses and electricity theft in 2020 only. This trend hinders meeting the energy demands of Pakistan.

1. Sustainable solution to break circular debt cycle:

①. Renegotiation of agreements with IPP's:

The currency exchange rate and capacity payment in the agreements with IPP's have made it redundant. The government should renegotiate IPP agreements such that the capacity payment of around 35% be removed and exchange rate should be considered to reduce financial burden.

②- Focus on line losses, theft and recoveries:

Revamping transmission lines on the "Built and transmit" model will help prevent line losses and electricity theft. The bill net should also be expanded (especially in government sector), privatize DISCOs and Gencos to increase efficiency and accountability.

③. Increase renewable energy in energy mix:

Pakistan should explore more renewable options for energy production, instead of fossil fuels. According to Pakistan AED Board (Alternative Energy Development), Pakistan can produce up to 2.9 mn MW energy from renewable sources i.e. solar, wind, hydropower etc.

④. Re-introduce Net Metering programme:

The Net Metering system was introduced in 2015 in Pakistan. The energy produced by the people under this programme was purchased by government. This dealt with energy shortfall in a sustainable fashion. If Pakistan produces around 1GW of electricity from this system, upto \$1.5 bn can be saved (by 2025).

⑤. Utilize energy storage technology and sugar mills (electricity production from waste)

Pakistan should manage the high demand in summer by storing excess electricity in winter season. If this method is used, Pakistan can focus on efficient energy production. Also, the sugar cane waste can be used to produce energy and should like in India.

⑥. Implementation of Alternate Renewable Energy Policy (ARE) 2019.

Pakistan introduced An Alternate renewable energy policy (ARE) in 2019 with an objective to build an environment where renewable sources can be utilized efficiently for energy production. If implemented carefully, this policy can increase energy mix share of renewable energy and reduce energy shortfall.

Conclusion :

The energy crisis due to circular debt in Pakistan is a complex and deeply rooted problem which requires a multifaceted approach to resolution. The government along with other departments can take sustainable steps to improve the situation and ultimately upend it. A transparent and accountable energy sector with financial management, will provide a pathway for recovery from circular debt crisis.

Question No. 3

Urbanization ----- population.

Introduction :

The 2023 ~~Census~~ Population Census of Pakistan, the growth rate has increased to 2.55% with total population of around 241 million. With limited water supplies, population growth and hydro-politics, the domestic water management in Pakistan needs to be revamped to promote conservation and access to clean water to population. A new pricing model, renegotiation of Indus water treaty, solving inter-provincial problems, water recycling programmes and re-allocation of water from agriculture to domestic use will help solve the domestic water crisis.

2. Policies to enhance domestic water management promote conservation and ensure clean water access to population.

① Water management — not scarce but poorly managed:

Although according to IMF, Pakistan is 3rd most water scarce country, the main issue is not water scarcity but water mismanagement. In the words of Dr. Ishrat Hussain,

"We (Pakistan) do not have a water crisis — we have a failure of governance with regard to water issues."

Around 80% of population in Pakistan is facing severe water scarcity — with only approximately 1000 m³ water available per individual (according to 2017 data). Hence proper management through pricing model, modern irrigation system and recycling water will help tackle the problem at hand.

② Reallocation of water away from agriculture.

In Pakistan, the agriculture sector uses 96-97% of fresh water while contributes to 80% of GDP. With access

like Balochistan (Quetta) and some parts of Sindh facing drought (occasional), the inter-provincial mismanagement of water and use in agriculture has led to water issues.

③. Revisiting pricing model:

The current pricing model of Pakistan is not suitable for long term. Approximately $1/3^{\text{rd}}$ of water is wasted and lost in seepage. Pakistan needs to increase the prices to generate more income and make people aware of water usage - and lower demand.

④. Focus on demand management instead of increasing supply.

Considering the current scenario, making dams won't solve the water scarcity issue. It will surely increase water supply but if current demand is not capped, the water waste can't be controlled or treated. Therefore the government should focus on reducing demand and efficient water utilization.

⑤ - New technology-oriented agriculture practices:

Agriculture reworking can help reduce water burden in Pakistan. Drip irrigation system, terrace farming etc help in

efficient use of water while increasing production as well as GDP.

- ⑥ - Reducing water contamination and wastage
- ⑦ - Solving inter-provincial disputes - water availability to lower riparian region and population.
- ⑧ - Timely water data monitoring and sharing.
- ⑨ - Empowering Indus Regulatory River System Authority for water management
- ⑩ - Re negotiate Indus treaty (1960)

Conclusion:

Although Pakistan's growth in population doesn't catch up with its scarce water resources. efficient and effective water management can still ensure water availability in domestic sector but steps must be taken now.
