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'Imbalance of Energy Mix in Pakistan and its Consequences'

→ OUTLINE:

1- Introduction.

Thesis statement: Pakistan's energy mix is highly tilted towards non-renewable resources that poses multiple economic and climate challenges to state. By having a well-proportioned energy mix, Pakistan can progress on economic fronts without damaging its climate-~~change~~ maintenance goals.

2- Imbalanced energy mix in Pakistan

3- Causes of Pakistan's imbalanced energy mix.

a- Uncoordinated energy policy making.

b- Over-reliance on fossil fuels.

c- Under-utilization of domestic renewable resource.

4- Consequences of having dis-proportionate energy mix.

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a- Circular Debt.

b- High costs of electricity.

c- Questions climate change goals of Pakistan.

d- Frequent power outages due to increasing unmet demands and disruption in supply.

e- Trade deficit.

f- Political unrests.

g- Increased attempts of electricity theft.

5- Way forward to balancing energy mix

a- Untapping the potential of local renewable resources.

b- Exploring other indigenous options for energy generation.

c- Invest in improving infrastructure and distribution of electricity.

d- Promoting demand reduction and conservation in public.

Conclusion.

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Norway is known to be the biggest exporter of energy in world and its energy mix striked my interest. It uses less than 28 percent of coal sources wher energy generation while 71 percent of renewable resources contribute to the generation. Comparing it to Pakistan's energy mix shows a reversal of 180°. Pakistan's energy mix is heavily imbalanced and mostly tilt towards fossil fuels. It is the result of uncoordinated energy policy making, too much dependence on fossil fuels and under-utilization of abundance of domestic renewable resources. The resultant disproportionate energy mix leads to circular debt, trade deficit, high electricity cost, chronic shortages of domestic non-renewable resources, fall back on climate change goals, and political unrests of angered public. By exploring other

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indigenous options, shifting to renewable resources, investing in maintenance and upgradation of energy infrastructure and reducing demand for energy can help the country to have a balanced energy mix directive of economic growth with out compromising the environment protection goals. Pakistan's energy mix is highly tilted towards non-renewable resources that poses multiple economic and climate challenges to the state. By having a well-proportioned energy mix, Pakistan can progress on economic fronts without damaging its climate-maintenance goals

According to Economic Survey of Pakistan (2022-2023), Pakistan's energy generation mix is weighing highly towards fossil fuels particularly coal & oil. The estimates given in the survey report showed that 61% of energy is generated through burning fossil fuels, nuclear energy

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constitutes 12%, hydel energy has a share of 24% while renewable sector has a staggering contribution of mere 3%. The energy demand of the country is increasing because of economic activities, population growth and rapid technological advancements. This leads to increased burden on grid for generation and Pakistan is coping with its increasing demand through new projects. Its future attempts show a further tilt towards energy generation through coal ie Thar coal thermal project, which is causing further imbalance in the energy mix. Thus, such policies will lead to devastating consequences on multifront for Pakistan.

The disproportion Pakistan is facing is not desired but is result of certain policies and strategies adopted by state. During 1960s to 1980s, country was provided with multiple opportunities

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to balance its renewable and non-renewable resources of energy generation but over reliance of fossil fuels initially domestic and later imported has stretched the energy mix into non-renewable domain more. The responsibility for the energy sector has mostly been fragmented and different departments have major over lap. The uncoordinated Policy making has allowed departments to modify it as per interest and has not resulted into a coherent energy policy favouring healthy energ mix. For example, Ministry of Production and Industry deals with industrial energy conservation while Ministry of Food, Agriculture and Livestock oversee energy production by biomass. The Ministry of Finance, Planning and Economic affairs is concerned with energy pricing and taxing. so, different domains of same sector dealt by different departments have enhanced reliance on traditional

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means, that is, thermal and, hence, caused imbalance in energy mix.

Alongwith fragmented handling of the policy, overreliance on fossil fuels is also a causal factor of this debacle. During 1960s & 1980, Pakistan was provided with multiple opportunities to balance its renewable and non-renewable means of energy generation. But over-dependence on fossil fuels, initially domestic and later imported, has stretched the energy mix mare into non-renewable realm. In Pakistan, 41 thermal independent power producers (IPPs) are operational while 8 hydro IPPs are currently working. Country Energy Overview, Report, International Atomic Energy Agency, 2022) This shows how much Pakistan is dependent on fossil fuels for meeting its energy demand. Thus, disproportionating energy mix.

Another most important

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reason of imbalance in energy mix is under-utilization of domestic renewable resources by Pakistan. Naturally, Pakistan is blessed with abundance of solar, wind, hydel, biomass resources but, unfortunately, have has not be able to utilize this potential due to structural and economic hurdles. According to Pakistan Meteorological Department, the exploitable potential of energy generation in Pakistan through wind turbines is 50,000 MWs while is currently producing 1335 MWs. Sameways, another estimate shows that if only 0.25% of the land of Balochistan were covered by solar panels of 20% efficiency, this would be enough to provide electricity to entire country. Therefore, this untapped potential is being under-utilized due to structural and financial reason and resultantly thermal sector is dominating the energy generation

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domain.

Such imbalance is not a phenomenon of isolation but result into numerous consequences which the county is facing now, one of which is power sector circular debt. Due to heavy reliance on imported fuels for power generation, Pakistan is continuously spiraling in circular debt. It refers to the recurring problem of unpaid bills and delayed payments among government, power generation companies and distribution compan According to the data of Central Power Purchasing Authority (CPPA), in FY2013 circular debt was around Rs 450 billion which reached to Rs 1148 billion in 2018 Circular debt stood at Rs 2467 billion by FY2022. (Economic Survey of Pakistan, 2023). The debt is continuously mounting on the national exchequer and is causing most of country's exchequer being used in debt servicing leaving little

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fiscal space for investment and development. Due to this spiral debt trap, another consequence of imbalance in energy price is hefty electricity prices. To furnish payments and decrease debt, the state imposes higher tariffs on power unit consumption, thus, causing a higher price of electricity. For example, National Electric Power Regulatory Authority (NEPRA) in September (2023) decided to increase the electricity tariffs by 3.28 per unit to throw an additional burden of Rs160 billion on the power consumer. The state authority was bound to impose such high ~~heat~~ tariffs increasing electricity price to counter circular debt under IMF guidance. Thus, more reliance on imported fossil fuels means more circular debt which will resultantly increase consumer price of electricity for public already suffering from inflation.

Disproportionate energy mix

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because of heavy dependence on fossil fuels plus new projects in same sector questions Pakistan's goals about climate change. Though contributing less than 1% (World Bank, 2022.) of carbon emission to global net emission, Pakistan is drastically impacted with repercussions of climate change in face of floods, droughts, storms etc ~~Further~~ For example, Pakistan has been victim of deluge of 2022 due to torrential rains caused by global warming. According to World Bank(2022) estimates, deluge of 2022 incurred 30 billion dollars loss and destruction to Pakistan. So, furthering the energy production in non-renewable sector like two projects of Thar coal will not only increase the net emission of carbon's contribution but will help the state to axe its own feet by climate disaster. Hence, one of the consequence of imbalanced energy mix will be drastic climatic implications

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for the country.

As stated earlier, electricity availability contributes to standard of living in a country and Pakistan is currently facing a population boom. Due to increased population, demand is increasing and its ~~w~~ is becoming difficult to meet such demands by an already cracked power generation system. The result has been frequent power outages and disruption in supply for longer times. Another contributive factor is non-payment of dues to Independent Power Producer (IPPs). High market prices (international) of fossil fuels for an already struggling economy makes it difficult to promptly pay its dues and, thus, causing power outages. So, ~~thru~~ disruption in supply of electricity and power outages can be less if the energy mix of Pakistan would be balanced

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Imbalance in energy mix leads to excessive impact of fossil fuels to meet energy demands which in turns or increases demand of import and leads to trade deficit. Energy sector of Pakistan is highly dependent on coal, oil and gas imported from other countries. and it contributes majorly to trade deficit, given by our less exports. As given in a report of Central Asia Regional Economic Cooperation Programme (carec) named 'Energy Outlook 2030', Pakistan is a major importer of fossil fuels (coal & oil) ie it imports 15 million tons of coal to satisfy its demands. By utilizing domestic resources, Pakistan can save upto $420 million per annum. Therefore, a disproportionate energy mix also negatively impacts the statistics of trade and larger imports contributes majorly to trade deficit.

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Along with these consequences, the imbalanced energy mix also yields into recurrent and violent political and social unrest in the country. Due to heavy domination of one sector of energy resource, imports increase which leads to increased tariff and, hence, the electricity becomes available at high cost For the public, already suffering from inflation, hike in electricity prices is not taken as a good policy measure The result is public protests against such measures. This could been seen in the pubic protests of Pakistan when NEPRA increased the price by Rs 3/- and people came out and blocked numerous roads, burned the electricity bills and strikes were observed in many cities impacting economic activities. Previously the protests were violent enough to attack and destroy the WAPDA buildings or atleast hurted the WAPDA officials. So,

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public protests are more likely to occur due to hiked prices of electricity, resultant of imbalance in energy mix.

High prices of energy also leads to high probability of electricity theft. When slashed with hefty electricity bills, the public tries to accomodate its needs of energy through illegal means like tampering with meter, installation of special devices to stop meters calculation or a technique famously known as 'Kunda' in Pakistan. The root cause of it is the over-reliance on expensive fossil fuels in our energy mix that unlocks a spiral of repercussions budding out of heavy imports and high electricity prices.

Though Pakistan is smearing under the consequences of its unhealthy energy mix but it is not too late to make necessary amendments to its energy mix policy. First step

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Of which is to balance renewable resources with non-renewable ones. The country is blessed with numerous and plenty of natural resources that can be used for power generation be it solar, hydel or wind power. According to World Bank (2020), utilizing just 0.071% of the country's area for photovoltaic (Solar) power generation would meet Pakistan's current electricity demand SO, the first step should be expanding the renewable mix to 60% of energy mix and attempting to reduce coal-based generation to 15%. This will not only lessen the burden on national exchequer but will be a positive contribution to environment or green energy policy of the country.

Second major point of intervention would be exploring other indigenous sources of energy generation like nuclear power plant, coal gasification,

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shale gas etc. Moreover, small hydel projects are clean and inexpensive source of energy generation and can easily be manipulated in Pakistan's case. Such project can serve as a transition of shifting nonrenewable energy mix into favor of renewable. Moreover, by diversifying and expanding energy mix into various domain will balance the energy mix and will have the ability to cope with increasing energy demand.

Thirdly, for efficient shifting, Pakistan should invest in updating and rehabilitating infrastructure and distribution channels. Rehabilitating and reconstruction will save the line loss of energy ~~by~~ and will ease out the demand pressure on generation capacity. While updating and upgrading the distribution channels will pave out smooth shifting towards renewable setting and to

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with the surveying will highlight the points of energy theft which will bring more people towards energy consumption with bill payment.

Lastly, demand reduction and conservation will promote the culture of accountability and safe energy use among public. People should be incentivize for green metering, by which one one hand they can domestically fulfill their consumer needs and on another excess energy can be sold to grid to contribute to national energy capicity. Campaigns for energy conservation and promotion of austerity measures can also help reduce energy demand that will provide breathing space to goverment for making and implementing energy project conversion.

In conclusion, Pakistan is facing numerous challenges in its energy, economic and environment sector. These challenges can be resolved

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back to unhealthy energy mix ie dominance thermal dominating all other sources of energy generation. Such an unhealthy hit has been impacting economy of the country in the form of circular debt, heavy imports and trade deficit while impacting country's green energy and climate change goals. Furthermore, the impact can be felt on individual level in the form of energy price hike, energy outages and public dissatisfaction among consumers. In any country, the state of energy closely correlates with economy. Growth in energy consumption and economic growth have followed almost identical patterns. The sun has not set. So, by adopting and implementing strategies to balance out energy mix can serve the country in long-term. Instead of phasing out fossil fuels, Pakistan should balance its energy mix with non-renewable sector

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from domestic resources. Only when the state and citizenry will be on the pase and are motivated to work together for integrated and balanced energy, this challenge will serve as an opportunity for economic growth of Pakistan and lifting standard of living of public.

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