

Topic 2.

Imbalance of energy mix in Pakistan and its consequences.

Outline

1. Introduction

a. Thesis Statement.

Pakistan's heavy reliance on fossil fuels and underutilization of abundant renewable resources create a perilous imbalance in its energy mix, resulting in dire economic, environmental, and security consequences, necessitating an urgent transition towards a sustainable and balanced energy future.

2. Navigating Pakistan's Energy Crossroads.

3. The Imbalance of Energy **Dominates** Pakistan.

- Fossil fuels heavily dominate Pakistan's energy mix.
- Most of the energy Pakistan uses, is imported.
- Despite the immense potential of its renewable energy in Pakistan, it is underutilized.
- Pakistan faces financial obstacles to make green energy.

4. Consequences of the Imbalance in Energy mix

- Liquefied Petroleum gas (LPG) constitute a significant portion of Pakistan's import.
- Pakistan's Energy sector is the highest contributor to the country's greenhouse emission.
- Disruptions in International oil markets directly impacts local Economy.
- Higher energy cost is hurting local businesses and households.
- Hindering Industrial Development.

f. fossil fuel burning is a major contributor to health problems in major cities.

5. ⑥ Balancing the seesaw: Pathways to sustainable future.

- a. Investing in Solar, wind, and hydro power
- b. Providing financial incentives on use of solar panels
- c. Creating a supportive ecosystem for renewable energy sector.
- d. Promoting energy efficient practices in household and Industries
- e. Optimizing the current grids where ~~are~~ possible
- f. Exploring cleaner Alternatives

6. Conclusion.

~~1~~ Faisalabad once a growing textile district, now sits quite with a lot of factories closed. This highlights the story of Ashraf, the sole breadwinner of his family of five, sitting with the idle machines. His tired eyes reflect the dim reality of his unemployment. High energy costs, fuel fueled by Pakistan's dependence on imported fuels, have choked the life out of his factory, leaving him and countless others in a sea of economic uncertainty. This is not just an isolated story but a mere the reality of many Pakistanis being affected directly or indirectly by Pakistan's energy mix that heavily and dangerously tilts towards fossil fuels. Pakistan's heavy reliance on fossil fuels and underutilization of abundant renewable resources create a perilous imbalance in energy mix, resulting in dire economic, environmental, and security consequences, necessitating an urgent transition towards a sustainable and balanced energy future.

Pakistan stands at a perilous crossroads, its energy landscape a stark illustration of imbalance. On one hand, a fossil fuel-driven present casts long shadows as a 2023 World Bank report reveals that 20% of Pakistan's GDP is consumed by dependence on fossil fuels. This imbalance dependence puts economic strain on families burdened by crippling energy bills. Smog-choked cities, gasping for clean air as per the 2022 Air Quality Report, meanwhile on the other side of the seesaw lies abundant sunshine and a remarkable ~~60%~~ of the world's ~~unexploited~~

hydro power potential. According to International Energy Agency 60% of the world's untapped hydropower potential lies within Pakistan. This imbalance is a ticking timebomb, threatening national security with its dependence on volatile global fuel prices. Families struggle to afford basic energy needs, industries grapple with high energy costs hindering competitiveness, and the environment suffers under the weight of pollution.

Pakistan's energy landscape is overly dependent on fossil fuels. This dependence is not simply a matter of preference but historical legacy fueled by readily available resources and lack of investment in renewable energy alternatives. The world bank report of 2023 shows that Pakistan heavily relies on fossil fuels, with natural gas accounting for roughly 60% of the country's energy mix. This shows the extent to which Pakistan is ~~using~~ only using fossil dependent over fossil fuels.

Pakistan's energy generation is sourced by fuel imported from overseas. As Pakistan does not have enough capacity of base this is because Pakistan's energy production possibility curve have always faced an inward shift due to non-exploration of reserves or if explored they are not utilized to its maximum capacity. According to 2023 report of International Gas Union, 70% of the

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Gas ~~and~~ gas consumed in Pakistan is imported and ~~also~~ according to the ~~the~~ bureau of statistics 80% of the countries oil needs ~~are~~ met through oil coming from middle east. This highlights our overdependence on imported Energy ~~and~~

The imbalance also comes from the ~~under~~ underutilization of renewable energy sources. Although Pakistan has immense potential to cater its energy needs from renewable sources. ~~due to however~~ According to Pakistan Alternative and Renewable ~~Policy~~ Energy Policy 2019, Pakistan boasts some of highest solar insolation levels in the world, with an estimate of 60,000mw potential enough to meet the country's entire electricity needs ~~several~~ ~~times~~ over. However due ~~to~~ high upfront costs, policy and regulation hurdles, etc it has yet not been achieved. ~~This~~ showcasing the underutilization of Pakistan's energy renewable energy potential.

One of the main reason for Pakistan's underutilization of renewable energy sources is financial constraints the country is facing. ~~As~~ Most of the renewable energy projects requires proper infrastructure, staff training that comes with significant upfront cost that would eventually result in a great financial burden ~~on~~ on both Government and consumers. This can not be afforded by a country ~~with~~ that

near bankruptcy and consumers who already are facing high inflation cannot accommodate further tax burdens.

This imbalance has ^{poor}straggling consequences on the country ranging from Economic to environmental and Social.

Pakistan ~~imports~~ spends most of the dollars it earns on import of LNG. This adds further burden on the country, that already is struggling with balance of Payment crisis. According to Pakistan's Ministry of Finance, Economic Survey 2023-24,

Pakistan spends US\$13.2 billion in the year 2022-23 on import of LNG that is 43% of Pakistan's total trade deficit. This shows that our over reliance on imported fossil fuels have eaten our foreign reserves over time and brought us to verge of bankruptcy.

11 The overreliance on fossil fuels also adds to the country's carbon emissions. As Pakistan's energy sector is the highest contributor to the country's greenhouse gas emissions. As per world resource institute data in 2020 the energy sector of Pakistan contributed a significant 80% ~~of~~ to its total emissions. This not only ~~reduces~~ ^{impact} our claims at different forms ~~are~~ ^{are} for climate justice but also reduces our chances of getting aid for climate vulnerability. While it also shows that urgent need for balancing the imbalance in Pakistan's energy mix.

Alongside, ~~the~~ due to the imbalance in ^{Pakistan's} ~~international~~ energy mix and distortion in international oil markets impacts Pakistan's local economy. As Pakistan relies on imported fossil fuels to meet its energy demand, when ever there is disruption in global oil markets Pakistan's local economy suffers. This has been prominent due to the recent Ukraine crises, According to International monetary fund, world economic outlook report 2023, the Ukraine crises has disrupted global oil markets causing prices to surge by over 50%. This resulted in inflation in transportation, energy bills, and overall consumer goods. ~~thus~~ Therefore it is evident that reliance on imported fuel ~~has~~ caused local ~~dis~~ inflation in the country.

Furthermore, the higher energy costs is hurting local businesses. As most of the businesses in Pakistan ~~do~~ not have not implemented ^{renewable} ~~renewable~~ businesses practice the increase in energy cost directly impacts their businesses mainly by shrinking their profits. According to the report published by Pakistan business council higher energy costs ~~eat~~ ^{add} into operating costs that eats up profit margins of the businesses. This is further evident from the 2023 survey conducted by Federation of Pakistan Industries, ~~that~~ ~~shows~~ according to which 70% of businesses reported decreased profitability due to rising energy cost.

Whilst the imbalance in energy mix has also been hindering industrial development. The imbalance in energy mix reduces the competitiveness of Pakistan's industries in wake of international companies thus they cannot compete in international markets. According to Pakistan Business Council, 2023 report, Pakistan's dependence on imported fuels like LNG and oil makes energy costs volatile and significantly higher than competitor nations. This creates a difficult cost structure for industries, hindering competitiveness and profitability.

Health problems like asthma and other respiratory illnesses are directly linked to the burning of fossil fuels. When fossil fuels are burned they release carbon, and nitrogen and sulfur that are causes these health problems. As it is evident from the 2020 data of world research institute that 80% of the total emissions of Pakistan are linked to energy sector. Thus the major contributor on air pollution in ~~the~~ cities like Lahore and Karachi is our overreliance on fossil fuels.

However this problems associated with the imbalance of energy mix can be mitigated by different ways, where the government and public needs to play their role.

First of all there should be investments in developing solar, wind, and hydro power projects. Through developing domestic manufacturing capabilities of solar panels, wind turbines, and other components we won't need to rely on imported components thus reducing costs. This would enable us to take advantages of the untapped renewable energy sources in Pakistan.

The Government should incentivise the purchase of solar panels by businesses and households. This would enable households and businesses to shift from fossil fuels to renewable energy thus reducing the burden to operate it on larger scale. According to State bank of Pakistan financing scheme for Renewable energy, tax exemptions or rebates on the purchase or installation of solar panels should be provided to make them more affordable for household and businesses. This would help in reducing the carbon emissions and also decrease load on current infrastructure.

Along this, A supportive ecosystem should be fostered for renewable energy sector. This can be achieved through a proper institutionalized talent and skill development programs that would invest in education and training, would promote research and development and facilitate knowledge sharing. As proposed by Pakistan Solar PV institute to create

training programs for engineers, technicians, and installers to build a skilled workforce for renewable energy sector. This would not only let Pakistan bring a balance between renewable and non-renewable sources but can also make us potential market leader in the ecosystem.

Energy Efficient practices shall also be promoted in household and industries to mitigate the risks of ~~low~~ Energy mix imbalance. As by promoting energy efficient practices the demand for energy would reduce and even if we don't switch to renewable sources in the short term, these measures can significantly decrease ~~the~~ costs associated to the imbalance. As according to NEECA's Smart Metering program's 2020 study shows that switching to LED lights can lead to 80% energy saving in households. Therefore Green practices would also result in greener future.

Finally, Pakistan can also explore alternatives other than solar, hydro or wind energy. These alternatives can be in the form of geothermal and biofuels to diversify Pakistan's energy portfolio. According to Alternative Energy Development board, Pakistan can develop solutions like geothermal energy, biofuels, and green hydrogen to diversify the energy mix and tap into untapped potential. As a result we will be free from the able to attain a better and greener energy mix.

To sum up the above mentioned points, Pakistan stands at a critical crossroads in its energy journey. With current imbalance heavily tilted towards imported fossil fuels casting a shadow on Pakistan's economic future, environmental health and national security. However the abundances of renewable resources like wind, solar and hydro power presents a ray of hope for the country future. Embracing this potential through bold policy shifts, targeted investments, and technological advancements is no longer a choice, but a necessity. This transition to a sustainable energy mix requires a multi dimensional approach. This transformation will not only alleviate immediate challenges but also unlock an era of clean and sustainable energy that would help the country grow economically and forge a brighter, cleaner future for its people and the planet.

Add more research based references/examples