

Date _____ Imbalance of energy mix in Pakistan and its consequences

Pakistan economy has always been struggling with energy crisis and it has been a major hurdle in the progress of Pakistan. Now Pakistan has total installed capacity of 43,775 MW and demand is around 30,000 MW. It means, Pakistan is producing more energy than it needs. And because of this Pakistan has to pay capacity payment. The issue in the energy policy is the imbalance in the total energy mix. A large percentage of electricity is produced by coal which costs a lot. And it affects the overall economy. Second major source of electricity is hydropower but it is almost half of coal based electricity production. Then comes nuclear power plants which is around one third of hydropower. After nuclear power plants wind power production comes which is the major source of renewable energy but it is half of the nuclear power plants production. Then comes solar which is the second major source of renewable energy and it is one third of wind energy. This energy imbalance leave negative effects on economy whether it is on macro or micro level. It affects industries which results in higher cost of production and because of higher cost of production, many industries have closed their operations and it is resulting in low foreign exchange reserves. At the same time unemployment is increasing and people are losing purchasing power to buy expensive goods. Government tries to subsidise them but the liability of government is increasing and to pay off liabilities, government has to burden common people by imposing tax. And this cycle is leading to security instability in Pakistan. There are some steps if they are taken, it would lead to energy security. Pakistan has to shift to renewable energy sources and for them it has to make policies and ensure policy continuation along with it. Pakistan has to shift the demand from industrial to household and for household it has to

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Promote net metering otherwise this imbalance of energy mix in Pakistan would create expensive electricity. And only authentic steps can resolve it.

What are the consequences to imbalance energy mix in Pakistan?

Imbalance of energy mix is creating stability in the progress of a country. When we examine the sources of energy production in Pakistan, we witness that more than 50 percent of electricity is being produced from only one resource and rest of the electricity is being produced from other resources like water, wind, and solar. It is causing serious implications on overall economy because energy is the main driver of economy. Pakistan needs to balance its energy mix and has to shift to cheap and clean energy sources which will ensure stability in the economy and it will lead to strong Pakistan.

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3. Sources of Energy production in Pakistan

- a) Energy production from Coal ✓
- b) Energy production from Hydropower ✓
- c) Energy production from Nuclear plants ✓
- d) Energy production from Wind ✓
- e) Energy production from Solar ✓

4. Consequences of Expensive electricity

- a) High Cost of production ✓
- b) Industries are closing ✓
- c) Exports are falling ✓
- d) Unemployment is increasing ✓
- e) Prices of Commodities are increasing ✓
- f) Increase in circular debt ✓
- g) Security instability is rising ✓

5. Ways for Catering Energy Challenges in Pakistan

- a) Shift to renewable energy sources ✓
- b) Make long term energy policy ✓
- c) Continuation of Policies ✓
- d) Shift to industrial consumption from household consumption ✓
- e) Promotion of net metering ✓

One of the major source of energy production in Pakistan is coal. It is because most of the energy production plants are coal based and they were installed decades ago. As with the passage of time no innovation came in energy sector and no steps taken to diversify the source of energy. Pakistan is a coal rich country and one of the largest coal reserves found in Thar parkar district which is around 172 billion tones. But there is a problem in the production of energy from local coal. Local coal moisture is not up to the mark which hinders the efficiency. Therefore, most of the coal is imported from African countries. And this is the reason we are producing expensive electricity. As per NEPRA report 2023, Energy production from coal takes 58.8 percent chunk in the total energy mix in Pakistan. It shows that large part of energy mix is dependent on coal.

After coal, hydropower is second major source of energy production in Pakistan. The reason is that Pakistan's geography is an advantage for Pakistan which gives many benefits and water resource is one of them. There are around 150 major dams in Pakistan. But few of them fulfil energy needs along with water need. Hydropower is considered as cheap source of energy but the construction of dams requires major investment and 10 to 15 years of completion time. Pakistan is getting energy from hydropower which comes from mainly large dams such as Tarbela and mangla but they are unable to fulfil current energy demand in Pakistan. According to NEPRA Report, 2023, Hydropower's share is 25.8 percent in the energy mix of Pakistan which is very low. It shows that hydropower is the second biggest source of energy in Pakistan.

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After Coal and hydropower, Nuclear is third major source of energy in Pakistan. It's because Pakistan has 5 to 6 nuclear power plants which are only dedicated for the production of energy. Pakistan has a potential of producing energy from nuclear resource as it has raw material and technology along with expertise. Nuclear power plants are considered as cheap energy resource in the world as they produce energy by enriching Uranium at upto a point. And many countries are taking maximum benefit from this resource. But Pakistan is not taking much benefits as it should. As per the Report of NEPRA, 2023, nuclear contributes only 8.3 percent in the total energy mix in Pakistan which is the lowest in the region. It reflects that nuclear is the third major source of energy in Pakistan.

In addition to it, world is shifting to renewable energy sources and wind is one of them. Pakistan also working on wind power plants and taking benefits of it. The topography of Pakistan gives a suitable areas where wind pressure is commandable. There are regions like deserts, hill areas and specifically areas of Balochistan, Cholistan, and northern part of Pakistan have immense potential of wind power plants. Wind is considered as the cheapest energy source in the world because it does not require any raw material or any other thing which makes it dependent. There are around 36 wind turbines are operating in Pakistan and in coming years their numbers will increase. But now As per NEPRA report, 2023, Wind power plants are producing 1845 MW of electricity which is around 4.7 percent of the total energy mix in Pakistan. It shows that wind has a very little share in the total energy mix in Pakistan.

Further more, whenever renewable energy world comes it bring Solar power along with it. Solar power is the major contributor to renewable energy. And in Pakistan it has great potential and it is one of the energy mix in Pakistan. The reason is that in Pakistan there is around 3000 hours of Sun shine daily. It makes Pakistan a major and suitable place where Solar power has a great potential to grow and get maximum share in energy mix. But at this time Pakistan is not taking and maximizing its energy benefits from solar power. As per NEPRA Report 2019, Pakistan is producing 430 MW of electricity from solar power which is around 1.4 percent of the total energy mix in Pakistan. It shows that Solar power share in energy mix is very little.

This energy imbalance creates many hurdles in the progress of Pakistan and high cost of production is one of them. Energy is the basic element to run the industry, whether it is textile, chemical or any other industry. One of the major reason of incompatibility is expensive electricity. As per unit of electricity is very expensive and government applies many taxes along with energy production cost which makes difficult to produce goods at minimum prices. And Pakistani products can not compete with other country's product just because of higher price. It makes a dent to industries in Pakistan. And overall production is also disturbed just because of expensive electricity. It shows the expensive electricity increases cost of production.

Because of higher cost of production and incompatibility of international level. Many industrialist are closing industries in Pakistan and they are moving to other countries where electricity prices are lower. As electricity is a very basic element to run industry and when this basic element takes a major share in overall production cost, it has impacts on overall industry's profitability. And when profits are squeezed up then there is no reason to run industry. As per Madran diplomatic report, in past one year, 1600 textile industries closed in Pakistan. It shows that expensive electricity leaving negative effects on industries.

Most of the companies are leaving Pakistan and existing companies are unable to export their products to other countries. It is resulting in falling exports. Behind falling exports, expensive electricity is one of the major reason. Pakistan is heavily dependent on its textile sector and textile sector contributes a lion share in overall exports of Pakistan. Now textile industries are hit immensely by higher cost of production and they are facing difficulty in capturing international market. With the passage of time these industries are becoming least compatible in the region. This all resulting in low export to GDP ratio. As per Economic Survey of Pakistan 2023-2024, Pakistan's overall exports are decreasing by 10% every year. Which means that Pakistan's foreign exchange reserves are falling. It shows how expensive electricity is resulting in falling exports.

Moreover, when industries are closing and they are becoming obsolete and incompatible and resulting in lower demand of products internationally. It is also resulting in unemployment. Many workers are unemployed and this is leaving negative impact on overall economy of the country. Unlike Service Sector industries accommodate the workers of the country and industries provide economic opportunities to the labor class and help them to play the role and contribute to society. But in Pakistan industrial sector are laying off their workers as they are unable to pay them. According to ILO, only textile sector in 2022-2023 laid off 7 million workers in Pakistan which indicates alarming situation. It shows that low expensive electricity is a major source of unemployment.

This story does not end here but it goes forward with other difficulties. And higher commodities prices are one of them. The reason is when local industries are closing and they are unable to produce goods. The demand would shift to imported items because people can not leaving of using certain items just because they are not being produced in a country. Demand is there and to fulfil those demands, goods are imported and as tariffs are high which makes products expensive and out of reach from household. Therefore Pakistan is witnessing the highest rate of inflation in the history. As per Pakistan Bureau of Statistics report 2023. The inflation in Pakistan remained 40 to 44 percent in 2023. It shows that how expensive electricity is contributing in higher commodities prices.

When commodities prices go up and people puts pressure on the government. Then government provides subsidies to the power sector to minimize the effect. Government also gives relief to industries in term of low taxes and other charges. It also gives relief to on imported items. But government has to borrow money to facilitate them. And money comes from international lenders which imposes harsh conditionalities on the government. Which result in higher debt to GDP ratio. It means that after relief period, again government has to increase taxes to maximize its revenue. As per State bank of Pakistan, Pakistan has to allocate \$ trillion in terms of Capacity payment in 2024. It shows that how energy imbalance creates hurdle for the government.

When people are unemployed and along with it government is increasing taxes and implementing conditionalities of international lenders. result is rise in Security instability. When people have no work, no income and have a family to cater then they are forced to go and adopt illegal means. Which result in higher crime rate. It does not only affect the people but overall image of a country. And where crime rate is high, the level of Foreign direct investment decreases and no industrialists want to come and invest in that country. According to Global organized crime index 2023, the crime rate of Pakistan has reached 3.88. It shows how negatively expensive electricity is posing great threat to national security.

If the same scenario continues, the miseries of people and industrialists will not end. Pakistan has to shift from fossil fuels to renewable energy sources. Pakistan has a great potential to produce cheap electricity from renewable resources. Areas, which are in KPK province and Balochistan province, have are vital for the generation of clean and cheap electricity. According to power division, Pakistan has a potential to produce around 8000 MW of electricity from renewable resources which is almost double of the current total demand. It shows that Pakistan has a potential of renewable energy sources and it should shift to them.

But to shift to renewable energy sources, Pakistan needs an overhaul change in its energy policy. Energy policy of every country sets a road map for the country where it wants to see itself after decades. It requires best brains and qualified policy makers who can shape energy policy and implement it in time. Pakistan has to make long term renewable energy policy which will ensure energy security in coming decades for Pakistan. As per the documents of ministry of power division, Pakistan has had three energy policies since its creation. First policy came in 1994, second policy came in 2002 and third policy came in 2012. It shows that renewable energy requires long term policies.

Policy making is useless without its continuation. Any policy which is made today and it is for 10 years. But if it only continued for 1 year. It means time is wasted all resources are wasted and the entire world went to trash in Pakistan, policy continuation is a major issue. As mentioned and discussed above that in the history of Pakistan three energy policies came but neither of them was implemented properly. If this ritual continues then Pakistan can not capitalise on its renewable energy potential and power generation from renewable resources will remain dream. It reflects how policy continuation is important.

After policy continuation, Pakistan has to shift to industrial consumption from household. The reason is that every country has two types of energy consumption. First is household and second is industrial consumption. Developed countries have big share of industrial consumption and small share of household consumption. Because household consumption is dependent on the weather condition. If it's cold the energy demand will fall and if it's hot then energy demand will go up. But this is not the case with industrial consumption. As per national energy report, in Pakistan, household consumption is at 47 percent and industrial consumption is 28 percent. This is the reason we have to pay capacity payments every year. It shows that there is a demand imbalance between industrial and household energy demand.

As most of the burden of expensive electricity falls on household because they consume 47 percent of electricity. Net metering is a growing concept among household in which a household install solar system and fulfil its energy needs and after fulfilling its own energy needs they sell rest of electricity to the government through meters. As Pakistan's weather supports net metering by ensuring 9 hour sunshine on average daily. Pakistan must capitalize on it and reap maximum benefit. It show how net metering can ensure energy security in Pakistan.

Conclusively, Energy is the core component of every country's economy and without it, there is darkness. Pakistan has a great potential to generate excessive energy and it can sell to other countries. But the imbalance in energy production is harming the overall economy. It is affecting agriculture sector, industrial sector and as well as common people. Pakistan has to shun energy production from fossil fuels and shift to renewable energy resources because most of the coal and furnace oil is imported and their prices are set internationally. If war erupts or any other miscalculated even happens in the world, it affects the prices of fossil fuel internationally. Pakistan has to build more dams and it have to invite private investment in wind power plants and solar power plants. Because these two ~~two~~ sources of energy can generate more electricity than any other source available to Pakistan. But for that Pakistan has to formulate policies and work on the continuation of policies. If Pakistan takes serious steps today then the future of Pakistan will be bright and promising.

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