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Energy crisis in Pakistan, causes, effects and solutions.

Outlines

I. Introduction

Thesis Statement: Energy is a lifeline ~~at~~ **for** a country. The economic engine, wheels of the industry, agriculture and business need energy to move forward. It is the backbone of the economy of a country.

II. History of energy crisis in the country

III. Causes of energy crisis in Pakistan

- (a) Lack of dams
- (b) Inability to exploit coal
- (c) Line losses
- (d) Power theft
- (e) Circular debt
- (f) Aging power equipment
- (g) Overuse ~~use~~ of energy

IV. Effects of energy crisis

- (a) Economic loss
- (b) Agriculture loss
- (c) Industrial closure
- (d) Unemployment and poverty
- (e) Brain drain
- (f) Increase **in** crime rate

V. Solution and measures

- (a) construction of dams ✓
- (b) Desiltation of dams ✓
- (c) Use alternate energy sources ✓
- (d) Exploit the coal reserves ✓
- (e) Update aging power equipment ✓
- (f) Reforms in energy policies ✓

VI. Conclusion

Energy is a lifeline of a country and backbone of the economy. The economic engine, which is the industry, agriculture and business, need energy to move forward. There are multiple causes of energy crisis. These include, lack of construction of dams, lack of technology, use of oil to produce electricity, circular debt, no use of renewable energy resources, aging power equipment, overuse of electricity, power theft and lack of policy reforms.

Multiple effects of energy crisis, economic loss, agriculture loss, industrial closure, increase in unemployment and poverty, increase in crime rate and brain drain.

Pakistan has potential to overcome the energy crisis. Some measures

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to be taken to alleviate the energy crisis, construction of new dams, desiltation of dams, use of renewable energy resources, exploit the coal reserves, updating the aging of power equipment, reforms in policy, and complete rehaul gas and oil pipeline.

Pakistan has been facing energy crisis ~~from~~ **since** the last couple of decades. The country hit the worst energy crisis in 2007 due to non payment ~~of~~ **to** oil and gas companies. The country hit the energy crisis when the power companies **became** unable to pay oil companies. The subsidy ~~was~~ was being provided to the consumers and the power companies were not. The oil prices jumped from 100 dollar per barrel to 147 dollar per barrel and in summer 2008 this problem became more **serious**. Consequently 1600 MW of energy reduced due to non payment to oil companies.

According to Pakistan Economic Survey Report 2000-2001 total installed capacity at power generation reached 48557 MW while the distribution and transmission stalled at 29000 MW.

According to another report at Pakistan Economic Survey 2021-2022 and National Electric Power Regulatory Authority (NEPRA) total installed power generation capacity reached 43775 MW and transmission and distribution stalled at 16000 MW. 30% of the electricity is consumed in industrial sectors and 45% of the electricity is consumed in domestic and household as well.

There are multiple causes of energy crisis in the country. These include lack of construction of dams and many others. Lack of construction of dams is one of the most important reasons of energy crisis in the country. In Pakistan, no big dam was constructed in the last 50 years after the completion of Tarbela and Mangla dam in the early 1980s. Many governments came and completed their tenure. No government paid attention to construct dams. Kalabagh dam is plagued with politics since the inception of the country. It would fulfill the 80% of the energy need of the country. According to Indus River System Authority (IRSA), the

country receives 117 MAE annually, it can have capacity to store only 14 MAE. Remaining water gone waste. According to estimate at IRSA Pakistan wastes water at Rs 95 billion annually due to lack of water reservoirs and storages. Hence, all the above circumstances shows lack of construction of dams. It is one of the most important reason of energy crisis which is the cheapest way to produce energy. Currently, the country is producing only 655 MW of electricity from hydropower. The country has potential to produce electricity at hydropower at about 50,000 MW.

Another big reason of energy crisis in the country, inability to explore and exploit the coal reserves. The country has world's sixth largest coal reserves. Due to lack of technology the country is facing energy crisis. That in Sindh is replenished with largest coal reserve in the country. This is complained that the quality of coal is inferior. Some ready made solution solutions are available to utilize the coal to produce energy. The country has not paid attention

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towards coal reserves to produce energy and leading to energy crisis.

One of the most important reasons of energy crisis is circular debt. The country has been facing worst energy crisis from the last couple of decades. Since 2007, the country is in worst energy and other crisis, like political and economic crisis. The subsidy was not given to transmission and distribution companies that was being provided to the consumers. The power companies unable to pay oil companies and the price of oil in international market ~~price~~ jumped to 147 dollar per barrel from 100 dollar per barrel. Due to high circular debt the energy produced was only 6000 MW in that year. In summer 2008, this problem became more serious due to circular debt. The country has been unable to eradicate the energy shortage from the country. Resultantly, circular debt proves to be the most important reason of energy crisis.

Line losses is also an important reason of energy crisis in Pakistan. According to Pakistan Economic Survey report 2001-2002 total installed

power generation capacity at the country reached 43715 Mw while the transmission and distribution stalled by 36000 Mw. The remaining at the electricity gone waste during transmission and distribution. According to estimates 30 percent at the electricity is wasted during distribution and transmission at the energy. It is eight to ten percent in other countries. The huge loss at electricity during transmission and distribution at energy is because at the poor and less efficient system at the energy sector. No attention has been paid to the line losses. Power theft is the important reason at energy crisis in the country. Most at the influential people use electricity by unfair means. No disciplinary action is taken against them due to political influence in the country. Industrial sector consume 30% at the electricity and a lot of energy gone waste in industrial sector. In other countries, most at the countries, consume 30 percent less electricity in industrial sector. For example, China uses 30 percent less electricity in industrial sector because of it partially

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heated water by solar

Another most important reason of energy crisis is overuse of electricity in domestic and household. According to estimates 45 percent of the electricity consumed in domestic and household unnecessary lights use during day time. In most events needless lights are installed for exhibition.

According to dawn newspaper shops use huge light which is the most important reason of energy crisis. Shops, mostly, are closed during day time most of the shops are opened after noon. They do not exploit the day light. Some shops are opened till midnight which is the huge losses of energy.

Aging power equipment is one of the most important reasons of energy crisis in the country. The whole power system is tripped time and again. According to dawn newspaper more than 8 times the entire system at the energy sector gone fail in 75 years. In the last years 2009 and 2013 the entire system at the wapa was tripped and the whole country left left in dark. The aging power

stations unable to meet the energy need of the country. In spite of the tripping of the entire system for many times, no attention was paid to upgrade the equipment.

Non-adoption of renewable energy sources is the most important reason of energy crisis. The country has not paid attention to use renewable energy resources to produce electricity. These include solar, wind, hydel, tidal and biogas. The country has potential to produce 100,000 MW of electricity from solar system. The country has ability to generate electricity from 10000 MW to 50000 MW from hydro. Currently, 6555 MW is being generated from hydro. Most of the electricity is being produced from fossil fuels which is the ~~expensive~~^{expensive} way to produce electricity. Renewable energy sources are the cheapest way to produce energy. Renewable energy sources are also environmentally friendly ways to generate electricity. Tidal and biogas are also the cheapest ways to produce electricity.

One of the most important reason of energy crisis is production of energy from oil which is

the most expensive way. Pakistan has been facing energy crisis since 2007 when the oil price increased from 100 dollar per barrel to 147 dollar per barrel and lead to heavy debt. Consequently 6000 Mw at electricity generation was declined due to increased oil prices at international and non payment to oil companies. Pakistan, most at the energy, produces from oil which resulted to depletion at foreign exchange reserve and additional burden on the economy of the country. Pakistan imported oil from middle east to produce electricity which cannot meet the energy need at the country.

There are multiple effects of energy on countries different sectors. These include agriculture sector and industrial sector which are the backbone of the economy of the country. All the economic are run with energy. The nexus between energy and economic sectors is very deep. Pakistan's economy is dependent on energy; agriculture and industrial sector. Due to shortage at energy

all the sectors, related to energy and economy, facing challenges. These challenges exacerbated by inflation, high cost production, political instability, economic instability, and currency value depreciation. Due to high cost production agriculture production and industrial production decreased. The agriculture sector is not meeting the need of the country as in 2009 the target of wheat production was not met. In 2009 the input as well. The industrial production also declined due to high cost production in last three years since covid-19 hit the world. The decline in production of agriculture and industrial sector taken to decline in export. According to estimate the export was declined from 10.9 billion dollar to 9.6 billion dollar.

Another effect of the energy crisis is decline in Foreign Direct Investment (FDI). According to Dawn newspaper, in 2009, 2013, most of the foreign industries were evaporated due to energy crisis, inflation, currency depreciation and increase in oil prices. These factors contributed to high cost of energy production. High tariff of energy is not profitable for industries.

domestic and foreign. It further contributed to decline the economic growth at the country which is led to decline in exports.

Another bad impact of energy crisis is that industrial closure. According to Dawn newspaper, most of the industries were closed down in the mid of 2008 when the inflation was peaked. According to Dawn, most of the industry was closed down due to inflation and high cost production and rest of the industries declined their production because at the people lost their purchasing power.

One most important effect of the energy crisis is that increased unemployment and poverty in rural and urban areas. 60% to 70% of the labour force engaged in agriculture sector left unemployed due to energy crisis. Most of the industries were closed down and left the employees unemployed due to closure of industry. According to Dawn Pakistan is facing 7% of unemployment and expected to 10% in coming days. Women are most vulnerable in rural and urban areas because they work in agriculture sector in rural areas and industrial sector in urban areas left unemployed.

One of the most important effects of energy crisis is that migration of people from developing countries to developed nations. According to dawn news paper in 2023 more than 800,000 people left the country up to Nov. 2023. Highest mass migration recorded in 2015, more than 900,000 people left the country due to many issues facing the country. Since Pakistan facing energy crisis, economic crisis and unemployment the mass exodus increased rapidly. In 2022, 838,339 people left the country owing to many crisis including energy crisis.

Pakistan has potential to deal with the energy crisis prevailing in the country since 2007. The country must take several measures to eradicate energy crisis.

One of the most important measures to deal with energy crisis is construction of new dams. As the country is facing shortage of dams to store water. The production of energy through this way is the cheapest way to meet the need of the energy. Currently the country is generating 6555 MW of energy.

from hydro electric projects, large dams should be completed by the government i.e., ^{Katabagh} ~~Tarbela~~ dam, Dasu dam, Buni dam and Bhakra dam. Small dams to be completed to meet the needs of the country. Neelum Jehlum, Tarbela Fourth Extension, Sukilandi, and other small dams.

Wind is another renewable energy source. Currently the country is producing 6 MW of energy from installed wind power project at Orhoro. This was installed by the cooperation of Turkish company. 50 MW of wind power electricity project will be installed to deal with energy scarcity. The country has potential to produce energy from wind ranging from 10,000 to 50,000 MW of electricity. The country must install ~~more~~ more wind power ~~energy~~ generation projects in near future. In this regard projects are under way at Orhoro, Keti Bandar.

Solar power is also an important renewable energy source. Solar cells ~~convert~~ convert the sunlight into electricity. The country has potential to generate electricity from solar is about 100,000 MW. The

country should boost this process of generating electricity. In this regard projects are underway in Kashmir, Punjab, Sindh, and Balochistan. The public and private vendors should play their role in this sectors. The government is going to install 50,000 solar heaters in Gilgit Baltistan to contain energy crisis.

Biomass is also an important renewable energy source. Biomass energy production involves using at garbage and other renewable resources like sugarcane, corn and vegetables. Woods are also used to generate bio energy. Brazil has the largest renewable energy programmes at biomass, followed by USA. The country should generate electricity from this renewable source.

Tidal energy is produced from the moon gravity powered tides by locating a water turbine in tidal current. The turbine can form electrical generator or a gas compressor, that can then store energy until needed. Coastal tides are a source of clean, free, renewable, and sustainable. The govt is taking steps to generate electricity from tidal.

Nuclear power stations use nuclear fission reaction to generate energy by the reaction of uranium inside a nuclear reactor. Pakistan has a small nuclear power program, with 485 MW capacity, but there are plans to increase this capacity substantially. Since Pakistan is outside the nuclear non-proliferation Treaty, it is excluded from trade in nuclear plant or materials, which hinders its development of civil nuclear energy. Remaining issues in development of nuclear are enrichment of uranium from U385 to U388, controlling chain reaction and dumping of solid waste.

Pakistan has world's sixth largest coal reserve. After the recent discovery in Thar, Sindh province, the total coal reserve of Pakistan is about 175 billion tons. According to estimates, coal production of the country is 3.5 million tons per year. Most of the coal is used in brick and cement industries. The typical problem of coal is its high sulphur content, causing acid rain, carbon content causing pollution, carbon dioxide causing global warming.

These are technologies to reduce these challenges. The USA is working on coal energy to produce zero emission this energy production way. The country should exploit the coal reserve and produce surplus electricity from coal.

Regional cooperation is very important to meet energy, gas and oil need from neighbouring countries. In this regard gas and oil pipeline is installed. These include Iran - Pakistan - India gas pipeline and Turkmenistan - ~~Pakistan~~ Afghanistan - Pakistan and India gas pipeline to meet the energy requirement. Further to bridge the energy shortage, projects completed and underway under the CPIC projects 14 projects have been completed of worth 15 billion dollar and other projects are under process and worth is about 0.5 billion dollar.

In conclusion, like many other developing countries, Pakistan is also facing energy crisis. This is the backbone of the economy. The economic engine, wheels of the industry, agriculture and business need energy to move forward. According to Pakistan

Economic Survey report 2021-2022
 total installed power generation
 capacity reached 41557 MW. According
 Economic Survey report 2022-2023
 Pakistan energy profile is, 58.8 percent
 from fossil fuels, thermal, 25.8 percent
 hydro, 6 percent nuclear and 1.8
 percent from renewable energy sources.
 The country should revise its energy
 policy 2015-2018 to provide affordable
 electricity to the people. The country
 is producing most of its energy
 from fossil fuel, coal, gas, and oil.
 This is the expensive way to produce
 electricity. Every now and then, the
 prices of oil and gas increase and
 the cost of energy is increased
 as well. The country should adopt
 alternative methods to produce electricity
 which is the cheapest way to affordable
 and sustainable electricity. The country
 should take collective measures to
 recover from the energy crisis. It is
 not possible overnight, it will take
 time to remove the energy crisis.
 Energy crisis led to many social
 problems so the energy crisis must be
 removed on urgent basis.

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