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Pakistan Energy Crisis

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ABSTRACT

The research report is theoretical in nature and underlines how the present energy crisis in Pakistan stems mainly from a failure in governance and the lack of a strongly implemented policy. Pakistan has been undergoing an energy crisis for decades now and it is generally accepted that the present crisis is a problem brought upon the country by the government itself, resulting from prolonged poor management, the lack of proper long-term vision, and inefficient policies. The primary objective of this report is to examine and analyze the problems faced by the power sector in Pakistan. The report will attempt to critically analyze the main reasons behind the current energy crisis despite the seemingly strong commitment of the government and the initiatives already taken to resolve this problem. The most important causes such as circular debt, pricing policy and distribution losses, among others are individually scrutinized to ascertain where the government went wrong. The main questions to be answered are whether the primary reason behind the current energy crisis is the government's failure to respond effectively to the energy crises or if there are any other significant reasons behind this steadily worsening crisis.

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Introduction

Electricity in Pakistan is generated, transmitted, distributed and retail supplied by two vertically integrated public sector utilities: Water and Power Development Authority (WAPDA) for all of Pakistan (except Karachi), and the Karachi Electric Supply Corporation (KESC) for the city of Karachi and its surrounding areas. There are around 20 independent power producers that contribute significantly in electricity generation in Pakistan. For years, the matter of balancing Pakistan's supply against the demand for electricity has remained a largely unresolved matter. Pakistan faces a significant challenge in revamping its network responsible for the supply of electricity. Pakistan's electricity producers are now seeking parity in returns for both domestic and foreign investors which indicate it to be one of the key unresolved issues in overseeing a surge in electricity generation when the country faces growing shortages.

Contrary to Pakistani government and expatriate claims, Pakistan suffers from a massive electricity shortage. Electricity generation in Pakistan has shrunk by up to 50% in recent years due to an over-reliance on fossil fuels. In 2008, availability of power in Pakistan falls short of the population's needs by 15%. Pakistan was hit by its worst power crisis in 2007 when production fell by 6000 Megawatts and massive blackouts followed suit. Load shedding and power blackouts have become severe in Pakistan in recent years. The main problem with Pakistan's poor power generation is raising political instability, together with rising demands for power and lack of efficiency. However, the most imperative underlying problem is the rising political instability, which according to popular belief is the main cause of the supreme shortage of power generation that Pakistan faces today. Since the inception of Pakistan, India has been threatening to cut off the water supply through the Indus River, because of the ensuing politics that followed the decision

to go ahead with the partition giving the Indus Water Head Works in India's custody.

Dearth of sufficient dams is also due to the fact that governments were not able to reach a consensus mutually in order to initiate large-scale projects like the 'Kalabagh Dam' and 'Bhasha Dam', which if present today would have prevented a power crisis of the colossal magnitude that we face today. There is a constant power struggle in the government and nobody is bothered about the problems at hand. On the contrary, people in power are always on the lookout to get their hands on mounds of money through unlawful means; money, which if dispensed in the right direction can make Pakistan a prosperous country.

This power shortage has resulted in a number of problems, which are solely responsible for dwindling Pakistan's business industry. Running businesses were forced to close factories because they did not have enough electricity to power huge manufacturing plants. As a result, influential and shrewd businessmen are leaving Pakistan to set up their businesses elsewhere because of the bleak business scenario of Pakistan. Foreign investors are afraid to invest in Pakistan because of similar reasons, so it's a small wonder as to why things are not going to well in Pakistan. Apart from this, it is the common people of Pakistan who are suffering the most, be it men in offices or housewives at home. They do not even have enough electricity to complete their everyday chores. Students cannot study at night because they do not have light at home. So we can see, that majority of the problems in Pakistan are being caused because of the power shortage nowadays. The intent of present study is to investigate the role of governance in present energy crisis.

Objectives Of The Report

1. To connect poor governance and policy failures with the energy crisis

2. To discover another, if any, significant reason(s) for the crisis

Research question:

1. What is the significance of political (government failure, weak policies) factors in aggravating the crisis?
2. Is there another factor underlying the energy crisis in Pakistan?

Answer to Research Questions

Pakistan is currently undergoing what has been termed as one of the worst energy crises in the country since its inception. For the purpose of this research report, the crisis has been restricted to that of electricity only. Electricity is one of the most important components of infrastructure and plays a vital role in national growth and development. With almost about half the country's population having access to electricity, a large population base provides an optimum opportunity for the expansion of electricity generation. Moreover, the growing pace of urbanization and industrialization also leads to an increase in the demand for electricity. [Policy for Power Generation Projects, 2002]

The energy crisis has its roots in a number of issues including lack of integrated energy planning and demand forecasting; an imbalance in energy mix with heavy reliance on oil and high-cost imported fuel; lack of utilization of indigenous resources such as coal and hydel energy; lack of effective planning, structuring, and implementation of identified and viable projects. [NEPRA Annual Report 2010-11]

According to Javaid et al (2011), the main *technical* causes of the energy shortfall in Pakistan are:

- “1. Insufficient installed generating capacity
2. Transmission system unable to transmit the load imposed
3. Grid stations and related equipment unable to carry the load imposed
4. Substantial distribution system of power supply

And the major management related causes of the crisis are:

1. Faulty management information system
 2. Failure of forecast and future planning
 3. No new transmission / distribution networks and grid stations”
- Mills (2012), in her publication, “Pakistan’s Energy Crisis” points out the following factors that have led to the power crisis as it is today:

- Circular Debt
- A Lack of Investment
- Cultural Change
- Security Issues
- Federal-Provincial Tensions
- Bilateral and Regional Tensions
- Reform and Governance Issues

Malik (2012) lists the following as the issues currently facing the power sector:

- Circular Debt
- Pricing Policy
- Losses in Distribution
- Fuel Mix
- Limited Capacity
- Energy Conservation

The widening gap between the demand for and supply of electricity has exacerbated the situation and during peak load shedding season, some cities witness up to 22 hours without power every day! Despite a period of a surplus in electricity (late 1990s-2005), Pakistan has been facing a grave energy crisis, with the electric power deficit crossing 7000 MW during May 2011 (Malik, 2012). As per the Pakistan Electric Power

Company (PEPCO), currently, the shortfall of power in Pakistan is greater than 4000 MW. (NEPRA Annual Report, 2010-11). According to an estimate, power shortages have resulted in a yearly loss in GDP, of 2 percent (Abbasi, 2011). Another study reports the loss of total industrial output to be within the range of 12-37 percent as a result of increased load shedding (Siddiqui, *et al.*, 2011).

Role of Policy Failure and Poor Governance

To quite an extent, failure on the part of governments with respect to a timely reaction has led the country into a steadily worsening electricity crisis (Asif, 2011).

Circular debt is seen as one of Pakistan’s major energy policy problems that began when the government pledged to compensate energy companies with subsidies in the face of higher costs rather than allow them to increase prices, but the subsidies eventually went unpaid (Kardar, 2011). As a result, energy companies have borrowed to make their payments, with the result that many they cannot afford to borrow further (Khalid and Munir, 2011). Consequently, fuel supplies have been curtailed, which means that power companies have insufficient supplies to run their plants, thus, reducing generating capacity (Mills, 2012). The government has addressed the issue on an ad hoc basis only so far, which means that the total debt remains unclear. There is no permanent solution to curtail the circular debt yet, except for borrowing more and more from the commercial banks. The default amount is a lot more than the government can actually pay at a given time which results in worsening the circular debt situation.

Alongside increasing tariff the government is considering decisions like withdrawing the free electricity facility currently available to WAPDA employees and improving law and order in the areas where electricity bills are not generally collected (Malik, 2012).

Circular debt also affects the credit worthiness of the country/sector from the point of view of the investors, as was seen in the demand for higher security for the Rental Power Plant payments (ADB, 2010). This issue demands serious initiatives from the government, consumers and power companies for complete resolution.

Pricing Policy:

Failure of the DISCOs to effectively pass on the price to consumers is seen as the most significant factor in exacerbating the circular debt problem. In addition, the system of electricity subsidies is a major source contributing to the circular debt issue. This indicates the inability of the government to pay the difference between the applied tariff and the determined tariff in a timely manner. Consequently, the government’s inability to fund subsidies, inefficiencies within the sector and the steadily rising cost of fuel in the world market have all contributed to the problem of circular debt in quite a significant manner. [Trimble, et al. (2011)].

Despite the measures taken by the government, the problem of circular debt still exists. As suggested in the report of FODP (2010) there is a need to eliminate untargeted energy subsidies. In addition, FODP (2012) reports:

“electricity pricing on a full cost recovery basis is necessary to reestablish the financial sustainability of the energy sector, to revitalize progress towards a liberalized energy sector, to foster private sector investments in development and production of indigenous resources (gas, coal, conventional power plants, hydropower, renewable alternative energy resources) and to

enhance the willingness of the banking sector to provide lending to the energy sector.”

Completely relying on tariff increase will just lead to more inefficiency [Khan (2011)].

“The reason being the large part of this subsidy is caused by the corruption and incompetence of the management in the collection of bills, no real effort to control power theft, wrong fuel choice, and a complete apathy on facing the problems of a degraded generation, transmission and distribution system” [Umar (2011)].

Also, the government needs to take all the necessary steps to reinvent the collection of electricity bills in due time from all consumers, regardless of their position or stature.

Losses in Transmission:

Safe, efficient and trust-worthy transmission and distribution of electricity has always been a major problem in Pakistan that has hardly improved over the years. The failure of the DISCOs to control the inefficiencies has resulted in extremely heavy losses, mainly owing to theft within the distribution companies (IESCO, LESCO, GEPCO, FESCO, etc) (Malik, 2012) Although the government initially made some progress on improving line losses but abandoned the initiative after coming under pressure of politically motivated elements, who were allegedly making billion of rupees by electricity theft and overcharging consumers [Rana (2011)]. Furthermore, the existing default increases everyday owing to deferment of current bills, instead of recovery of arrears [Kiani (2011)]. While the present government has even held an Energy Summit to reduce the power-sector deficit and the reduce losses in distribution, however, it has not helped matters.

Fuel Mix:

At present, the fuel mix is 30% hydro and 70% thermal. This means an overall increase in the cost of generation for Pakistan, considering that Pakistan imports all of its oil and has scarce gas reserves, and that the oil prices have climbed to over \$140/barrel after 2010. (Khalid & Munir, 2012). Currently, the price of furnace oil has increased to Rs 64000 per ton from around Rs 21000/tonne as on January, 01, 2007 and the cost of electricity based on furnace oil plants has crossed Rs 14 per unit [Bhutta (2011)]. From an economic point of view it is very important that the full cost of generation should be passed on to the consumers. But at the same time it is equally important to keep the cost of generation low. (Malik, 2012)

However, in the last four years, no policy shift has taken place. The primary focus of the present government is still on oil based projects. There have been no new hydro power projects.

Are There Any Other Reasons?

Privatization:

Khalid and Munir (2012) make the case for a poorly planned privatization policy at the core of this power crisis, as opposed to a crisis in governance in the article “Pakistan’s Power Politics.” Despite excess system capacity, people are deprived of electricity. The 1994 Power Policy introduced privatization for the generation of electricity by bringing Independent Power Producers (IPPs) into the game, at the behest of the World Bank. However, over the years as the policy rolled into place, a number of factors led to the failure of this policy; a drastic change in the fuel mix (30% hydro, 70% thermal), an increase in the cost of producing electricity owing to the increasing short-fall between supply and demand, and a refusal to overturn the 1994 policy by the government. Perhaps the

situation can best be summarized with a direct quote from the article itself:

“The blackout in Pakistan is a policy failure, a result of the disastrous privatization undertaken by the government at the behest of the World Bank. Blaming petty theft, line losses or subsidies is only going to create a bigger hole for the government. The only way to reverse this dire situation, which is crippling industry and plunging homes into darkness, is to reverse the 1994 policy. But for that to happen someone will first need to admit failure. Unfortunately, that possibility looks remote for the time being.” (Khalid & Munir, 2012)

Limited Capacity:

There is a need for both private and public sector investment in Pakistan to bridge the energy gap. A substantial increase in the share of private investment after 1994-95 was seen in the restructuring process of the mid-1990s but the involvement of IPPs became controversial. [Malik (2009)]. Although it was resolved later; it still overshadows future expansion of private sector participation. Moreover, until the expected improvements to energy efficiency have been achieved, a fresh bout of private sector investment in the power sector is not possible. (Fraser 2004).

Energy Conservation:

Pakistan is extremely energy intensive due to high energy losses, losses through the supply chain and neglect in replacement of outdated infrastructure [FODP (2010)]. While there is a margin of almost 20 percent saving in the consumption of electricity across all sectors, unfortunately, measures such as improving energy efficiency and programmes to decrease losses are not getting as much priority as supply side initiatives (ADB, 2010). The legislative framework for conserving energy is not very strong in Pakistan, owing to a lack of strictness on part of the government to ensure proper conservation methods and the absence of a proper energy conservation policy. Thus, it can be seen that even while trying to search for a non-political reason to blame the power crisis on, it does ultimately come down to a failure of the government’s policy, as opposed to, for instance, a purely economic reason.

Situation/Background

Pakistan has been hit by the energy crisis unparalleled in magnitude compared to previous crises¹. As such, this has seriously affected the people of Pakistan very seriously. The demand and supply gap has been constantly widening, but the reasons for this gap are varied, like the unparalleled prosperity that has not made sure that suppliers of energy keep pace with demand. In addition, the acute power outages have seriously paralyzed the economic activity in the country, the most being affected being the commercial sector.

The acute shortage of power perhaps is caused, perhaps, by the myopia of relevant policy makers. The supply of power is considered a necessity, but has, in relation to other priorities of the government, has become a serious policy dilemma. A long term and sustained effort is required, as well as coordination within the government, in the effort to overcome the crisis.

Three different sources are the suppliers of power in Pakistan; with 48% being gas powered 33% from hydroelectric, 17% from oil, 2% from nuclear and 1% from coal power. From these figures, it is clear that Pakistan has been under-utilizing its natural resources. The point here is that the shares of hydel, and

¹ Paktribune, “Energy crisis in Pakistan”, July 26th, 2012.

nuclear can be increased with some effort, and the reward will be worth the effort. (Chaudary, 2012)

Analysis

19500 MW of production capacity of Pakistan, about 60% relies on furnace oil and natural gas power plants. The price of furnace oil was about Rs 2000 per ton in the 90's. An increase was seen 1999 onwards and rose up to 10 000 per ton in 2001. A sharp increase leads to Rs 20,000 per ton in 2006, and in 2008 it reached Rs 30,000 per ton. A drop occurred in 2009, but again increasing trends were seen. In 2010, it rose up to Rs 40,000 per ton and at present it has reached almost Rs 70,000 per ton. In short price has risen 30 times since 1990 and seven times since 2005 (Agha, 2012). This price hike has caused damage to both producers and potential users. Supply of furnace oil to the IPPs and rental plants is the responsibility of the government, since fuel cost under the agreement signed is a pass through item. The government has difficulty in clearing the dues of generating firms leading to shutting down or inefficient running of power plants. As a result of low production the generating firms are unable to pay back to the oil companies this situation has thus created a circular debt. At present the circular debt is around Rs 400 billion (Agha, 2012).

The exact amount of circular debt is not known in order to determine how much more money is required to address the issue once and for all. Current estimates of circular debt (as on August 09, 2011) range between Rs 500 billion to Rs 650 billion as the Ministry of Water and Power, PEPCO and NEPRA have different estimates [Rana and Bhutta (2011)].

The paralyzed activity of the private generating firms is aided by ignorance of the policy makers themselves. A lot of private run firms suffered losses since the biggest consumers (especially provincial and federal governments) had not paid their own electricity bills. The bills that were paid are not enough to cover the cost of generation. (M.S, 2012)

Transmission losses have led to wastage of electricity. They account to 38% loss as opposed to 10% unavoidable loss due to technical inefficiency in the transmission lines. It's the lack of efficient governing bodies that lead to the theft especially the popular 'KUNDA'. Out of the total loss distribution losses account for almost 68 percent while the rest of them are transmission losses. And the major reason for the 68% distribution losses is theft. In the period (1985-86 to 1994-95) units of electricity supplied which were also billed grew at the rate of 9.8 percent, while in the period (1994-95 to 2006-07) units billed grew at the rate of 5.4 percent. In the period (2007-08 to 2009-10) units billed increased at the rate of less than 2 percent. Thus, indicating the poor efficiency to curtail the power theft (Malik, 2012). By reducing the losses up to 10% 300 MW of energy can be saved. (Shah & Bhatti). These losses increase inefficiency and further deteriorate the crisis.

Ineffective policy making has led to the dilemma of pricing electricity. The failure to pass on prices to consumers has also aggravated the aforementioned circular debt problem. No real increase in tariff was seen in the period 2003-04 and 2006-07. Considering the fact that more than 65% of our electricity generation is thermal based where more than 95% oil and gas is imported presence of stagnant tariffs has effected so badly that even large dose of tariffs may not be able to cope up with present cost price deficit.

In addition to the inefficient and below cost recovery tariffs, the systems of electricity subsidies are a major source of the inter-corporate circular debt issue (Malik, 2012). That not only

distribution companies have difficulty to pass on costs to customers, but also government is unable to pay differential subsidy i.e. difference between applied tariff and determined tariff on time. Lack of perfect competition has discouraged the new firms to enter the market. WAPDA and KESC have a monopoly in the business which exhausts the possibility of good price markets.

Table 7

<i>Transmission and Distribution Losses in DISCOs (%)</i>				
Company	2006-07	2007-08	2008-09	2009-10
IESCO	12.17	10.29	10.51	9.81
LESCO	12.71	12.85	13.23	13.78
GEPCO	11.63	11.14	10.72	10.98
FESCO	11.19	11.20	10.59	10.48
MEPCO	19.28	18.49	18.37	18.94
PESCO	35.74	36.06	37.40	36.91
HESCO	36.90	35.86	34.75	34.79
QESCO	21.37	20.79	20.12	20.68
KESC	34.20	34.10	35.86	34.89

Source: NEPRA (2010 and 2011).

Note: IESCO stands for Islamabad Electric Supply Distribution Company; LESKO (Lahore Electric Supply Distribution Company); GEPCO (Gujranwala Electric Supply Distribution Company); FESCO (Faisalabad Electric Supply Distribution Company); MEPCO (Multan Electric Supply Distribution Company); PESCO (Peshawar Electric Supply Distribution Company); HESCO (Hyderabad Electric Supply Distribution Company); QESCO (Quetta Electric Supply Distribution Company); KESC (Karachi Electric Supply Corporation).

Recommendations And Conclusion

- Around 60% production reliance on oil and gas for providing thermal power, Pakistan produces about 81 percent of its electricity through oil and gas. To put it in other terms, that is about 53 percent of our total exports and is the biggest cost on our import bill (Rasool, 2012). Pakistan spends almost 7 billion US\$ on import of fossil fuels annually to congregate its energy needs (Amjid, Bilal, Nazir, & Hussain, 2011). In order to reduce cost of using oil and gas, usage of Nano fuel is recommended. It is a true combustion enhancer and is environmentally friendly as opposed to usage of coal; however coal remains a viable option in the short run only.
- Pakistan should also focus on the growth of greener energy options, ranging from hydropower to renewables. Pakistan also has huge resources of biomass that are available in the form of crop residues, dung and feces, poultry litter, sugarcane bagasse and wood (Asif, 2009). Electricity generation using biomass is one of the most convenient options, approximately 9 Giga Watts of electricity is generated from biomass worldwide (Amjid, Bilal, Nazir, & Hussain, 2011).
- All hydro power projects currently under construction should be completed as soon as possible to enhance cheap electricity generation capacity. The government should recognize that the worsening electricity crisis takes precedence over the political hurdles currently in place.
- National grid is suffering heavy line losses and other technical inefficiencies that lead to inefficient distribution of electricity however if independent stand-alone power projects are initiated by provincial governments this will enable the provincial authorities to set up small scale solar panels and plants in their communities and sell electricity locally. Small wind farms can also be used in areas which are close to wind corridors. Conservation of existing electricity supply needs to be practiced so as not to deplete present resources.
- Pakistan needs a new and workable national energy policy because the current policy document is unresponsive, only partially implemented, and hindered by bureaucratic complexities and political interests. There is a need to formulate a comprehensive plan.

○ Furthermore, Pakistan needs better management of the energy sector, by streamlining the responsibilities and government departments involved in policymaking and implementation.

○ Coordination between the federal and provincial governments should also be strengthened.

▪ Domestically, Pakistan needs to address the issue of circular debt, reform the fuel subsidy structure, reduce transmission and distribution losses, and implement strict laws to counter theft and nonpayment, and introduce and enforce new legislation, with respect to energy efficiency standards and regulation.

▪ Regionally and internationally, Pakistan must cultivate stronger energy relations with its neighbors and other key countries, respectively. There are a number of options, from cross-border energy trading to cross-regional gas pipelines and electricity transmission networks. Also, Pakistan should try to make greater use of forums such as SAARC, to raise the issue of energy security. It must also be considered that the developed, powerful countries can, should they choose, give Pakistan a lot of support within the international community. (Mills, 2012)

▪ Pakistan is presently facing an unprecedented energy crisis hence; the drive to find effective long term energy solutions is stronger now than ever. Renewable energy resources such as wind and solar energy are abundant in Pakistan and show significant potential, however, their development is hindered by political, social, economic, technical, institutional and informational barriers. The solution lies not in just a single solution; rather, a holistic approach must be employed (Javaid et al 2011). Pakistan must consider the long-term social, economic and environmental benefits of renewable energy power generation for its people (Yazdanie, 2010). To conclude, the objective of this research seems to have led us to the government's failure to draw up and implement a working policy as the most significant factor underlying the current energy crisis.

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