

## **Energy Policies of Pakistan; A Comparative Analysis (1994-2013)**

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### **ABSTRACT**

Energy has got significant political concern for the stability of a country. Despite huge indigenous potential and geographical significance Pakistan showed little interests in exploiting its own energy resources to minimize energy crisis. There is a huge gap between demand and supply of energy that has increased the use of imported oil for energy generation in Pakistan. The research study focuses on energy policies of Pakistan since 1994, resulting in energy crisis. Qualitative approach was employed to construct the research design. The results indicate that the use of indigenous energy resources both renewable and nonrenewable would minimize the prevailing energy crisis in Pakistan. So it is concluded that future of energy mix exists, but serious efforts are required to effectively make use of renewable and non-renewable energy source only through the implementation of sound and effective policies.

**Keywords:** *Energy, Energy Policy, Energy resources, Energy crisis, Energy security, renewable and non-renewable energy resources*

### **Introduction**

Access to energy is the most important issue of a state constituting an important strategic aspect. The policies for energy have got primacy after the oil embargo of 1973 in the whole world and at that time economic stability was directly linked with energy security. The industrial growth has been depleting the resources of energy and every state is in a competition for energy security and availability that is a major point of global power politics. Energy policies and planning got attention after the oil embargo of 1970s when the whole world in general and west in particular faced energy crisis. At that time the policies emphasized on the efficient and uninterrupted supply of energy. (Mirjat et al, 2017, p.111)

The energy sector of Pakistan was considered to be the electricity system until the development of industry and transport. WAPDA “Water and Power Development Authority” was established in 1958 to manage water resources to raise the agricultural economy of Pakistan. During early years WAPDA initiated some projects to build small and large dams and reservoirs. The integrated energy planning could not evolve since 1980’s when the rapid growth occurred in other sectors due to urbanization. WAPDA was the only organization with its headquarters at Lahore until 1990’s. WAPDA in its early years got a lot of technical and financial support from international agencies in different mega projects.

Pakistan can meet its energy needs as the country has the availability of indigenous energy resources but if these resources are explored and utilized judiciously with sound policy planning and implementation. The reserves of oil and gas in Pakistan are limited and hydel energy is of political nature. Therefore, Pakistan has to import oil from the Middle East mainly from Saudi Arabia. The consumption of Natural gas usage is about 50% and the country has to import gas from neighbors like Iran, Oman and Central Asian Republics. Pakistan's hydel energy potential is yet to be fully achieved due to local political situation. At present, Pakistan produces almost 80% of electricity generation from Crude oil, 11% from hydel, 6% from coal LPG 1% and Nuclear energy 2%. Pakistan is far behind in the refinery therefore it is dependent on petroleum imports. Pakistan generates 137MW of energy from nuclear energy plants at KANNUP, 325MW from Chashma-I and 325MW and Chashma-II. Some of the renewable energy projects are operational while other projects are not completed yet. 23 wind power projects are producing 1185.07MW of energy. 6 solar projects are generating 430 MW, while 6 sugar mills generate energy of 201.1 MW from bagasse.

The objective of the paper is to present an overview of energy policies of Pakistan from 1994 to 2013. The policy reforms are critical in addressing the energy crisis. These policies must be binding, implementable, and futuristic. The research paper is going to focus on the analysis of these policies that resulted in energy crisis.

### **Historical contextualization of Energy Crisis**

In 1947 the capacity of energy generation of Pakistan was 60MW for 31.5 million people, consuming 4.5 unit per capita. In 1958 WAPDA was established and in 1959 Pakistan's energy generation increased to 119MW. WAPDA executed many hydel and thermal power projects. During that time the rapid industrial growth started that increased the energy demand (Ali, 2013). In 1964-65 WAPDA was capable of 636 MW of power generation and it rose up to 2,500 MW. In 1970 the energy generation was 1331 MW and government of Pakistan installed many hydel and thermal power units. The capacity reached to 3000 MW in 1980 and in 1990-91 the capacity was 6700MW.

The consumption of energy was growing since 60s because of industrial growth. The economic growth and urbanization had a serious impact on energy infrastructure. From 1970 to 1990 energy supply and demand was 9-10% per year and in 90s the difference was 15-20%. The shortfall was almost 2000 MW that resulted in load shedding. It was the beginning of energy crisis that grew gradually since 2000 and was on its peak in 2010 and still it is on alarming condition. In 2010, Pakistan imported 621.64 MTOE of energy to overcome demand of 63.09 MTOE (Energy Book 2010). During that year shortfall was 4522MW and in 2011 the shortfall reached to 7000MW. In 2017 the demand was more than 20,223MW, which was 15,400 to 15,700MW in 2016, again the shortfall was more than 7000MW. So demand is increasing with every coming year.

A large number of industries were closed and some of the industries were shifted to Bangladesh because of energy crisis. Harijan et.al., (2007) predicted that Pakistan's energy crisis could become a security threat if it was not tackled at operating as well as strategic levels in near future. Pakistan's severe energy crisis was the result of lack of planning, lack of coordination, mismanagement and distribution wastage. Pakistan is facing energy sector challenges and institutions are divided into different

entities (Hassan 2013, p.105). The allocation of budget and power management policies both were insufficient for energy demands. Resultantly economic growth rate dropped to 4-5% that was 6% in 80s (Asif, 2012). In 1993 Energy Task Force was created to develop a comprehensive energy policy for the country. In 1994 the government announced "Policy Framework and Packages of Incentives for Private Sector Power Generation Projects". Government offered incentives and fix tariff of 5.57USD/KMW to the investors. The energy policy of 1994 was considered to minimise not only the shortfall but also generated surplus energy.

Energy sector requires vision, sound planning and practical execution and era of 80s was the time for planning of energy policies and projects. In 1983 World Bank did a detailed study on the Kalabagh project and had consensus over Kalabagh dam for Pakistan. Yet there had been no consensus of the stakeholders. The Government then decided to induct the private sector in energy generation. Previously in 1985, the government took some measures to attract private companies into energy sector. The government announced a policy of "Build, Own and Operate", (BOO) for private sector. HUBCO is the milestone of these initiatives.

### **Literature Review**

Duffield (2015) in his book argues that strength of a state and legacy of policies are important and it will help in understanding the response of the nation to energy insecurity. Duffield also evaluates the future of international cooperation in promoting energy security. He also concludes that energy security has a direct bearing on national security. Harijan, Uqaili, & Memon, (2008) conclude that there is huge potential of renewable energy resources that can overcome energy crises and to meet energy needs in future. Sahir (2007) concludes that effective policymaking can ensure the long-term sustainable supply of energy. Mukhtar (2007) in his thesis concludes that good governance and effective policy planning can ensure the energy supplies. Sheikh has concluded that effective policies and planning, modern technologies and renewable energy resource exploitation can be helpful in the development of the country (Sheikh, 2010). Shah et al., (2011) identify that the policy mistakes for the renewable energy resource development are the barriers of sustainable development in the country. Nayyar et al., (2014) attribute that there is lack of energy planning causing energy crisis in the country. They also indicate that conventional energy resources will not be enough to meet the over increasing energy demands and renewable energy sources must be developed with sound planning. Mirza Hassan Said that there should be a comprehensive policy of energy and issues of linkage between different energy resources, the affordable and sustainable energy, and the cost of energy should get attention of makers and planners of Pakistan's energy policy (Hassan, 2010)

Munir and Khalid (2012) Concluded that energy policies of various government were the major cause of energy crisis in Pakistan, as these governments ignored the public interest. For Pakistan adoption of policies of optimal energy mix would be vital in the development of the country. Shaikh et al. (2015) have concluded that the utilization of alternative energy resources would be helpful to overcome energy crisis. Vaqar Ahmad says that Pakistan has renewable energy resources, but there is lack of desired interest and effort that is attributed to the institutional inefficiencies of the energy sector (Ahmed, 2013).

Kessides (2013) says that ineffective energy policies of different government are the major cause of energy crisis that resulted in the failure of institution and government. Rafique and Rehman (2017) have highlighted that institutional infrastructure and technology development are the main challenges of security of energy supply and suggested that renewable energy resources can meet the increasing energy demand. Malik Musadiq says that the shortfall between supply and demand of energy is because of management inefficiencies on governmental, institutional, and political levels (Kugelman, Ed. 2015). Bhutto et al., (2012) identify that energy planning, governance issues, financial constraints, technological challenges, capacity building, are the barriers for the indigenous and renewable energy resources. Hamid Hasan Mirza says that there must be a single regulatory authority and decision-making by government should not be on the ad hoc basis, as it can worsen the energy security issue (Hasan, 2013).

### **Energy Policies of Pakistan (1994-2013)**

#### *Energy Policy of 1994*

In 1994 WAPDA developed a comprehensive power plan (National Power Plan) NPP with the assistance of the Canadian International Development Agency (CIDA). NPP Proposed an energy mix for power generation that included hydel energy 42% from Tarbela extension, Kalabagh, Basha, Kohala and Ghazi Barotha, and thermal energy 32% from gas and coal. NPP offered a plan of indigenous resources of energy for power production. (Mirjat et al., p.116). However, energy policy of 1994 overlooked all these proposals

The first Energy policy was initiated in 1994 that enhanced the facilities and incentives but the focus of this policy was thermal energy. The policy offered a large number of incentives to the investors. The 1994 policy offered many fiscal incentives and concessions (GoP, 1994a p. 5–7). They were offered low fees, low taxes and duties. The investor could choose any insurance company and Foreign Exchange Risk Insurance (FERI) was also offered by the State Bank of Pakistan (GoP, 1994a p. 5–7). Security packages like Power Purchase Agreement [PPA] and the Fuel Supply Agreement were also favouring investors. (GoP, 1994a p.7). The bulk power tariff “the capacity payment” and “energy payment” was also in favour of investors.

#### *Energy Policy of 1994*

These facilities were so profitable for the investors that they considered it a golden investment opportunity. The government was responsible for fuel to the private companies and the government had to purchase their energy at fair price. The private companies also had the freedom to choose the site according to their affordability for the construction of their energy production units. Moreover, the government had the responsibility to balance the fluctuation of currency rates. The investors had the freedom to choose any fuel. IPPs (Independent Power Producers) also had the choice to use any technology and only restriction was Indus River large hydel projects. They could have power plants based on high speed diesel, oil, and natural gas.

#### *Energy policy 1995*

In 1995 the government of Pakistan initiated a new energy policy to take energy proposals for hydel power resources. The fiscal incentives of the previous policy of

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1994 were incorporated in this policy. The policy stated clearly that after 25 years the ownership of the hydropower project would be transferred to the government without demanding any cost. The policy provided protection against natural calamities and specific taxes and duties were also exempted. The main objective of both the policies was energy generation for future demand and to attract the foreign investment in energy sector. (GOP 1995)

### *Energy Policy of 1998*

The government announced another policy for energy in 1998 and NEPRA was also establishment in 1997. The policy opted for open bids and denominated in Pakistani currency. It was mandatory for the bidders to quote the price in two parts, "Capacity Purchase price" and "Energy Purchase Price". This policy exempted certain taxes and duties and restored the protection against natural disaster. IPPs could raise finance in both local currencies and foreign currencies (GOP, 1998). Hydel power projects would be implemented on Build-Own-Operate-Transfer (BOOT) basis and after the concession period these projects would be transferred to the province. The thermal projects would be implemented on a Build-Own-Operate (BOO) basis. The government was the sole guarantor of these agreements.

### *Energy Policy of 2002*

The main objectives of Energy Policy of 2002 were to enable sufficient energy generation with minimum cost and minimum shortfalls and to encourage indigenous resource exploitation. The local engineering and manufacturing capabilities were also being ensured and to obey environmental laws. (GoP 2002, p.3)

The 2002 energy Policy was the realization by the government. The incentives like site selection, Fuel Supply, and bulk power tariff were removed. The government used International competitive bidding process and it could be beneficial for the consumer by low prices of electricity. The criticized elements of previous energy policies such as financial incentives remained incorporated in this policy. The policy encouraged the use of indigenous resources and hydel projects. WAPDA was responsible for the availability of water for plants bigger than 50 MW. Energy was to be produced from Saudi Arabia's imported oil. Once again it was a weak-thought and ill-articulated policy that resulted in energy crisis. The energy policy of 2002 was mainly for thermal and big hydel power projects only. So government of Pakistan decided to issue another policy for renewable energy in 2006, which included small hydel, solar, wind, bagasse and waste to energy sector.

### *Energy policy of 2006*

Pakistan has renewable sources of energy, which can be used for power generation. Since the past policies laid little emphasis on renewable sources of energy, so in 2006, the government announced another policy for development of alternative and renewable energy projects. The 2006 energy policy supported power plants based on small hydro- power, solar, wind energy and biofuel technologies (Amer & Daim, 2011). The machinery used for these projects was exempted from duties and taxes to attract the investment.

Energy Policy of 2008 (National policy for power co-generation by sugar industry 2008)

Pakistan is an agricultural country and its agriculture contributes 42.3% to employment and 19.5% to GDP (GOP 2016, <sup>11</sup> p.19). Sugarcane is one of the major crops and almost 83 sugar mills bio-waste has the potential of 3000 MW of energy generation (PPIB. 2008. p.9). In 2008 when the energy crisis was mounting towards its peak the government announced another energy policy. The objective of this policy was to encourage investment by private sector to minimize energy crisis. This policy offered co-generation energy projects produced from bagasse in the sugar plants during the crushing season of sugarcane as the main fuel, between November to February and on coal from March onward local and imported both as main fuel (PPIB.2008 p. 9). This policy provided a 30 years' liveliest tariff to the 60 MW capacity plants and above with thermal efficiency of 28% (PPIB.2008. P.10). The previous incentives of 2002 energy policy were also the part of this policy to attract the investors.

### *National power policy 2013*

In 2013 the energy crisis was worse and the gap between demand and supply reached to 5,500 MW. As the country was dependent on imported and expensive thermal fuel, energy became unaffordable for the populace. The losses were 23-25% due to mismanagement, inefficient transmission, poor infrastructure, and theft of electricity (GoP 2013, p.3.). After the approval of Council of Common Interest CCI the Government of Pakistan announced "National Power Policy 2013" to address the crisis. The policy was based on three types of objectives that are short, midterm and long-term objectives for sustainable energy. In short term, two issues of inefficient recovery system and control of transmission and distribution losses were to be addressed. The objective of this policy was to develop energy generation to overcome and sustain ever increasing energy demand, to reduce the average cost of generation through less expensive energy mix, to promote the culture of responsibility and energy conservation and also to promote the usage of indigenous resources like hydel and Thar coal for affordable energy production. One of the features of this policy was to encourage a market of energy by shifting from single buyer towards buyer plus for an energy exchange market. The policy proposed competitive bidding and upfront tariff to reduce electricity cost and upon the pressure from international financial institution the policy had reduced the subsidies. Supporting the cheap fuels, the policy also focused on minimizing inefficiencies in distribution, on minimizing financial losses, losses in supply and theft of electricity.

### **Analysis of Energy Policies (1994 – 2013)**

The objective of announcing all these energy policies was to improve public sector performance by providing healthy competition with the private sector. However, the energy policy making remained with the government, the power sector reforms dictated by the World Bank, IMF, and Asian Development Bank, ultimately disintegrate WAPDA into 14 units, generation, transmission and distributions companies without analyzing and identifying the responsibilities of every entity and without preparing the relevant staff to carry out and handle new tasks assigned in the independent entities. WAPDA was divided into 9 distribution companies (DISCOS), 4 thermal generation companies (GENCOS), and 1 National Transmission and Dispatch Company (NTDC). Pakistan Electric Power Company (PEPCO), an independent agency within WAPDA, was established to follow up the reform programme for privatizing the reformed entities. The disintegration of

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WAPDA was taken without considering effective alternatives. It was crucial time when the country needed a strong energy base for the development of industry. The aftershocks of this disintegration were severe and it damaged the whole process of energy generation, transmission and distribution. National Electric Power Regulatory Authority (NEPRA) was established to provide confidence and guarantees to private investors.

The 1994 energy policy enhanced the facilities and incentives but the focus of this policy was thermal energy. The policy attracted thermal projects instead of energy mix like hydel and thermal both. The 1994 energy Policy offered a large number of incentives to the private investors. They could choose the site, fuel and technology of their own choice to set up power projects in the country. This energy policy was a trap that affected the all the sectors of the country. The process of long-distance transmission and distribution from the energy generation unit to the main power grid resulted in severe losses to the government. The income earned from these power projects were exempted from all taxes and duties. These measures to overcome energy crisis resulted as a massive liability for government of Pakistan.

The government had to pay huge payments to the IPPs even when there was no need for the power being generated by them. Julia M Fraser in the Report of World Bank titled "Lessons from the Independent Power experience in Pakistan (2005)" concludes that the 1994 Power Policy projects could not meet the "least cost" generation test because of unsuitable location, small size and reliance on oil instead of using efficient combined cycle plants. (Fraser, 2005 pp. 13-14). The energy policy of 1994 resulted in a decisive shift in diverse energy sources of the country. In 1994 the total installed capacity was 11,000 MW, 60% energy was generated from the hydel sources while nearly 40% from the thermal and nuclear power plants. This ratio reversed from 60:40 to 30:70 to thermal capacity from imported fuel. Every passing year is further taking this ratio down to 20:80 in cold winters as hydel generation reduced due to less flow of water in the rivers. (Mirjat et al., p.121). The guarantee provided by the government for the fuel supply and power take off left no competition in the private sector for performance and cheap energy. Private sector had no incentive to work hard for cost reduction and efficiency improvement. The objective of 1994 and 1995 policies was to develop the energy generation for future demand and to attract foreign investment through the induction of private sector. Nevertheless, there were investments in thermal energy based on imported fuel but hydel power investments were missing.

The Power Policy of 1998 restricted the investment to the projects based on hydel sources and indigenous fuel such as coal. The payment of taxes and duties was obligatory. Now, the tariff was determined through NEPRA or through the process of international competitive bidding. However, the Power Policy of 1998 could not offer a lot to private investment.

The energy Policy of 2002 encouraged indigenous resources like coal and renewable energy resources. The incentives available in the 1994 policy were restored. This Policy added a generation capacity of 3300MW. However, there were no restrictions on oil and gas based energy plants, the projects were carried out on the same unaffordable fuel mix. In some of the private projects the dual fuel plants substitute gas with more expensive High Speed Diesel than oil. Hydel power projects take long time and huge investment to complete, therefore private investors were not

interested in hydel projects with the exception of small projects. The distorted fuel generation mix, power deficit, the system losses and poor recoveries worsened and threatened the sustainability of the energy sector.

Today 51% of energy is generated by the public sector while 49% of energy is generated by the private sector (IPPs) and raised the per unit cost of energy production. This cost was due to the lack of concern for the fuel sources for energy generation in the 1994 and 2002 energy Policies. The government could not pass this cost of energy to the consumers, and poor governance and corruption had thrown the energy sector into disarray. Another failure that added to the crisis of the energy sector was of lack of consensus among the provinces for hydel energy projects.

The 2013 Power policy identified the challenges of the energy sector and laid emphasis to promote energy conservation. The energy policy highlighted the use of diverse energy mix, however over 65 % of the energy generation is through oil and gas, 25 % through hydel energy and 6 to 7% is through coal and nuclear. The use of renewable energy resources in energy mix is 2-3%. This policy also intended to improve the governance between all stakeholders in federal as well as provincial governments through better co-ordination. However, this policy also has some glaring omissions. The policy also has retained the same incentives such as tariff structure and exemption from taxes and duties. If the objective of the policy was to be consumer- centric in true spirit, then it was the right time to review the contract. The consumer tariff was raised but no effective measures were taken to improve recoveries. The policy did not have effective measures to improve the efficiency and a competitive market mechanism. There was no mechanism to overcome line losses and due to the worse distribution system that is leaky and subject to theft, losses are 25 to 30 % of total production.

### **Conclusion**

The policies discussed above were initiated with efforts, but in all the energy policies thorough implementation mechanism was absent. Therefore, new energy policies must have integrated energy framework. The introduction of IPPs could not resolve the issue. Due to IPPs country's petroleum import has increased and exposed the country to critical petroleum market volatility. The use of natural gas as CNG for the transport industry is another proof of these shortsighted policies. The energy policy must have the sound legislation, international treaties, incentives and subsidies for investment, taxation and other policy techniques. It is the right time that populist policies should be substituted with sustainable policies. The country is in dire need of exploitation of indigenous resources such as hydel (45,000MW potential) coal (Pakistan has 7th biggest coal reserves in the world) and renewable resources (solar & wind) to overcome the energy shortfall. The management should be competent and energy policymaking needs improvement to formulate sustainable policies. The focus of energy policy would be energy security and the less reliance on imported fuel with the maximum utilization of indigenous sources, both renewables and nonrenewable.



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