

PIDE Monograph Series

**Power Crisis in Pakistan:
A Crisis in Governance?**

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CONTENTS

	<i>Page</i>
1. Introduction	1
2. Power Sector in Pakistan—Historical Perspective	2
3. Existing Structure of the Power Sector	6
3.1. Installed and Generation Capacity	6
3.2. Peak Demand and Consumption Pattern	7
3.3. Governance Structure—Public versus Private Sector	8
4. Major Issues Faced by the Power Sector: Steps Taken by the Present Government	9
4.1. Circular Debt	9
4.2. Pricing Policy	10
4.3. Transmission and Distribution Losses	15
4.4. Fuel Mix in the Power Sector—Shift from Low Cost to High Cost Generation	18
4.5. Limited Capacity Addition	23
4.6. Energy Conservation	28
4.7. Efficiency of Power Plants in the Public Sector	29
5. Situation Analysis—Crisis in Governance	29
6. Conclusion	34
References	37

List of Tables

Table 1. Nominal Tariff in Paisas/Kwh	5
Table 2. Fuel Cost in Public and Private Utilities (Paisa/ Kwh)	6

	<i>Page</i>
Table 3. Installed Capacity by Type in MW	6
Table 4. Electricity Generation by Type in GWh	7
Table 5. Average Cost and Sale Rate of Electricity	12
Table 6. Average Electricity Tariffs (Rs / KWh)	12
Table 7. Transmission and Distribution Losses in DISCOs (%)	16
Table 8. Electricity Generation (Thermal) by Fuel (GWh)	19
Table 9. Fuel Mix in GENCOs	20

1. INTRODUCTION

“Yesterday is not ours to recover, but tomorrow is ours to win or to lose”.

(Lyndon B. Johnson)

Pakistan went through an extraordinary period of having surplus electricity from the late 1990s to 2004-05. But since then, the country has been facing an acute shortage of electricity. The present crisis started in 2006-07 with a gradual widening in the demand and supply gap of electricity. Since then this gap has grown and has assumed proportions which are considered to be the worst of all such power crises that Pakistan has faced since its inception. The electric power deficit had crossed the level of 5000 MW at many points during the year 2011. At one stage in the month of May, 2011 this shortfall had surpassed 7000 MW.

This widening demand supply gap has resulted in regular load shedding of eight to ten hours in urban areas and eighteen to twenty hours in rural areas [FODP (2010)]. Rapid growth in demand, high system losses, and inadequate generation capacity are among the major reasons for this huge gap. Seasonal reduction in the availability of hydropower, reduction in the indigenous gas resources and too much reliance on imported fuel oil for power generation are primarily responsible for the current crisis. The unavailability of this fuel oil given the mounting circular debt problem (a major cause of fluctuating available power generation capacity) has further accentuated the energy crisis.

The persistent shortage of electricity in the country has adversely affected the national economy. Industrial production has been severely hit; and also triggered social unrest which sometimes turns violent thus, creating law and order problems in many urban centres in the country. According to one estimate power shortages have resulted in an annual loss of about 2 percent of GDP [Abbasi (2011)]. Another recent study reports total industrial output loss in the range of 12 percent to 37 percent due to power outages [Siddiqui, *et al.* (2011)].

Moreover, the power sector in Pakistan has created serious problems for fiscal managers given the limited available budgetary resources; a substantial portion of

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revenues has been consumed in subsidies given to the power sector. As much as 7.6 percent of total revenues were used up in providing subsidies to the power sector in the FY 2007-08; while this share stood at 5.9 percent and 8.6 percent in the FY 2008-09 and FY 2009-10 respectively.

It is generally believed that the present crisis is a self-imposed problem ensuing from years of bad management, lack of proper vision for future, and poor policies. Unfortunately, the scale of the problem has now grown beyond any immediate solution. In the last ten years there is no substantial increase in the generation capacity in comparison to a steep rise in electricity demand. To a great extent, failure on the part of previous government to timely react to the situation lead the country into a severe electricity crisis [Asif (2011)].

The present government when took over, recognising the magnitude of the crisis and its effect on the people and the economy, undertook significant reforms including tariff increases to address, manage and reduce the impact of power sector crisis which was crippling the economy. But unfortunately, after the passage of almost four years the situation instead of improving is becoming worse day by day.

The objective in this study is therefore to examine the issues and constraints faced by the power sector in Pakistan. The paper will try to evaluate the reasons behind the current energy crisis despite present government commitment and initiatives taken to solve energy problems. The hypothesis to be tested is whether the reason behind current energy crisis is that 'the government has failed to respond adequately to overcome the energy crises or whether the government has moved in the wrong direction.' The paper will examine the origin of the present crisis; the rising demand supply gap; the problems faced by the power sector; and steps taken by the present government. The plan of the paper is as follows: Section 2 will review the power sector in an historical perspective—bring out the dynamics responsible for the initiation of power sector crisis. The third section will give a brief review of the present state of the power sector in Pakistan. The fourth section will analyse various problems faced by the power sector and the steps taken by the present government. The fifth section will try to do a situation analysis with a focus on governance of the power sector. Section 6 based on the analysis undertaken will come up with an answer to the basic hypothesis being tested.

2. POWER SECTOR IN PAKISTAN— HISTORICAL PERSPECTIVE

The country started with the power generation capacity of 60MW at the time of its independence in 1947. Power infrastructure development gained momentum after the 1970s and installed capacity of 636MW in 1970 rose to 9094 MW in 1990-91. The performance of WAPDA and KESC (two leading public sector utilities at that time) remained satisfactory till the mid-1980s. After that, severe constraints in the availability of capital led to an inadequate generation capacity as well as

transmission and distribution infrastructure. This increase in the supply of electricity was unable to keep pace with demand in that period that was growing consistently at 9-10 percent per annum. In the early 1990s, power supply lagged behind demand resulting in excessive shortage of electricity, especially for the industrial and commercial consumers.¹ Heavy financial losses due to undue political interference, corruption in the management of limited capital resources, overstaffing and bureaucratic delays in handling routine matters in these public utilities, inappropriate and costly investments, poor quality of services, high system losses and poor collection of bills from the customer; all negatively affected the financial health of the industry [Malik (2009)].

On the demand side, there was a weak link between the electricity price and demand, which failed to manage the demand. This overall operational inefficiency in the sector created the need for restructuring. Thus, the Government, under pressure from the international financial institutions (IMF, World Bank and ADB) started the reform process in the sector. The power policy 1994 helped in overcoming load shedding in the country. It in fact, resulted in surplus power as the actual load growth was much less than projected and the projects were contracted beyond what was required. Moreover, the policy attracted only thermal projects resulting in more share of thermal in the overall generation mix.

After a moderate growth of around 4 percent per annum in the 1990s, the growth in the demand for electricity during the first seven years of 2000s was around 7 percent per annum. Electricity demand grew by 3 percent to 4 percent annually up to 2003-04. It increased sharply in subsequent years and reached 10 percent in 2007-08. The increase in the demand however, was an indication of the expansion in the Pakistan economy. Growth in demand required substantial investment to maintain continuity of supplies. But unfortunately, it didn't happen. According to an estimate for every 1 percent of GDP growth in Pakistan an increase of 1.25 percent in electricity supply is required. Thus a GDP growth of 7 percent (as in 2002-07) will require an increase of 8.8 percent.² However, in that period the installed capacity grew at the rate of only 2 percent; although the growth in electricity supply was up to 6 percent in that period but the slow growth in installed capacity in that period leads to the decline in the supply of electricity (generation) in the coming years.

Unfortunately, the growth in demand in this decade was clearly not fully anticipated and sufficient investments were not made to accommodate for this increased demand. Moreover, presence of surplus power in the first half of this decade made the previous government complacent, rather than taking serious policy initiatives. In this decade, not only the growth in the new capacity was slow, it also

¹Load shedding of up to 30 percent of peak demand (NEPRA Annual Report 2000-01).

²Merril Lynch (2007) cited from Energy Sector Assessment for USAID Pakistan prepared by Gordon Weynand, Energy Team, Bureau for Economic Growth, Agriculture and Trade, United States Agency for International Development, June 2007.

lacked in the up gradation of power plants (which could have been accomplished at one-third of the cost of expansion). The share of power sector in the public sector development programmes fell to less than 3 percent of GDP in this decade which used to be relatively higher in earlier decades [Pasha (2010)].

Clearly, high investments are required in response to a continuous increase in electricity demand, directly linked to economic growth. For that, the starting point should be the right pricing of power consumption. The basic consideration for investment decisions by the private sector in any country is the price of electricity that generates sufficient profits to supply electricity in a cost effective manner. But unfortunately, appropriate tariff reforms were not introduced in Pakistan in that period.

Notified electricity tariffs were below cost-recovery level. The previous military government did not allow the rise in electricity prices in line with the steep rise in the international oil prices³ for obvious political reasons. In fact, tariffs were frozen between 2003 and 2007 at a very low level. The cost of electricity generation rose but unfortunately, notified tariffs were not sufficient enough to cover the higher cost. In addition, high commercial and technical losses of distribution companies (DISCOs) also add up to the cost of service. It is interesting to note that the system losses (including transmission and distribution losses and auxiliary consumption) were also very high in the same period when the country had surplus electricity.⁴ This indicates the low level of managerial focus in utilities on the operational efficiency when there was surplus production.

Since there was a huge gap between cost of service and the government notified uniform tariff across all DISCOs; the government had to provide a tariff differential subsidy to power companies to cover the gap between cost of service and the government notified uniform tariff across all the DISCOs. However, the government did not compensate power companies accordingly against the provision of increasingly subsidised electricity at the consumer-end. The power companies therefore were not in a position to make payments to the oil companies; and oil companies in turn were not in a position to import oil needed for thermal power plants.

As a consequence of below cost tariffs, the problem of circular debt first broke out in 2006. This was another blow to an already financially weak power sector. If cost effective electricity tariffs had been introduced at that time it may have suppressed the growth in domestic demand to some extent as well as attracts new investment. Secondly, cost effective prices at that time might had prevented the power sector from inter corporate circular debt problem.

³The price of imported furnace oil which represents about one third of the fuel mix for power generation increased by 76 percent from 2003-04 to 2007-08. Similarly, global gas prices also rose considerably in that period.

⁴More than 25 percent—average for the whole country.

Another issue involved in the tariff levels was the significant presence of cross subsidies, from industrial and commercial consumers to agricultural and small (under 50 kwh per month) domestic consumers. Although nominal tariff increase for domestic and agriculture consumers exceeded that for the CPI (consumer price index) in the period from 1991 to 2008, limited progress had been made in reducing cross-subsidies (Table 1). While tariff charged to the domestic consumers was cross-subsidised from industrial and commercial consumers, the share of electricity sold to domestic consumers had increased from 32 percent in 1988-89 to almost 46 percent in 2007-08.⁵

Table 1

Nominal Tariff in Paisas/Kwh

Consumer Categories	1991	2000	2005	2008	Growth %
Domestic	63.0	233.0	319.0	439.0	12.1
Commercial	217.0	703.0	724.0	873.0	8.5
Industry	106.0	416.0	445.0	569.0	10.4
Agriculture	43.0	231.0	311.0	408.0	14.1

Real Tariff Adjusted for CPI, 2000 Base Year

Consumer Categories	1991	2000	2005	2008	Growth %
CPI	45.1	100.0	127.4	165.9	8.0
Domestic	139.7	233.0	250.4	264.6	3.8
Commercial	481.2	703.0	568.3	526.2	0.5
Industry	235.0	416.0	349.3	343.0	2.2
Agriculture	95.3	231.0	244.1	245.9	5.7

Source: PEPCO (2010) and Pakistan Economic Survey 2009-10.

Another important issue that had a negative impact on the electricity supply chain was the lack of timely and essential maintenance of the existing plants specifically in the public sector. This neglect on the part of authorities reduced the efficiency of the existing plants quite significantly. In other words, power sector in Pakistan had not only failed to make additions in the generation capacity, but it also could not use the existing power plants to their full potential. When we look at Table 2, fuel cost per unit was substantially high in the public sector (GENCOs). In 2000-01, fuel cost was lowest for GENCOs, but in 2007-08 it was highest (468 paisa / kwh) as compared to 264.7 paisa/kwh in the private sector. Thus indicating the inefficiency of power plants used in public sector generation companies (GENCOs).⁶

⁵Phenomenal increase in the use of air conditioners, refrigerators and televisions etc. was noticed in this period.

⁶GENCOs present capability of producing power is almost 20 percent less than the installed capacity mainly due to the aging factor and use of furnace oil (WAPDA Annual Report 2006-07).

Table 2

Fuel Cost in Public and Private Utilities (Paisa/ Kwh)

	GENCOS	KESC	IPPs
2000-01	177.33	221.75	184.1
2003-04	193.29	213.45	178.08
2004-05	214.87	248.38	187.13
2005-06	293.93	320.28	235.31
2006-07	366.31	350.1	288.88
2007-08	468.01	347.99	264.73

Source: Pakistan Energy Yearbook (Various Years).

In other words, no significant investment has been made (in the 2000s) in the existing GENCOS to improve their efficiency. This practice has affected the operational performance of the existing power plants and their capability to supply power to the grid. As a result of this, out of the total installed capacity (522 MW) in the old plants in GENCOS (commissioned in 1960s or in early 1970s), the available capacity has come down to 256MW only [NEPRA (2011)].

3. EXISTING STRUCTURE OF THE POWER SECTOR

3.1. Installed and Generation Capacity

The total installed power generation capacity of Pakistan in 2010-11 was 23412 MW. Out of this, 16070 MW was thermal (69 percent), 6555 MW was hydroelectric (28 percent) and 787 MW was nuclear (3 percent). Since 2007-08, the growth in the installed capacity is at the rate of almost 5 percent (compared to 2 percent growth between 2001 and 2007). The addition in installed capacity in the last four years (2007-08 to 2010-11) is not only because of captive power plants and rental power plants (encouraged by the present regime) but also by IPPs which were commissioned in the previous regime (Table 1). The rental installed capacity which was 336MW in 2008-09 had gone down to 172 MW 2009-10, but recovered again in 2010-11.

Table 3

Installed Capacity by Type in MW

		2000-01	2007-08	2008-09	2009-10	2010-11
Thermal	PEPCO	4830	4899	4900	4885	4885
“	KESC	1756	1756	1846	1946	1821
“	IPPs	5583	6035	6218	7322	8587
“	Rental	0	286	336	172	453
“	CPPs/SPPs connected with KESC	0	239	239	272	324
Hydro	WAPDA	4826	6444	6444	6444	6444
“	IPPs	–	111	111	111	111
Nuclear		462	462	462	462	787
Total		17458	20232	20556	21614	23412

Source: NEPRA (2010), State of Industry Report and Pakistan Energy Yearbook.

The dismal state of affairs on the generation side can be gauged from its slow growth (hardly 2 percent from 2007-08 to 2010-11). However, between 2001 and 2007 the generation capacity grew at the rate of almost 6 percent. The year 2008-09 was the worst in terms of power generation capacity. Although installed capacity increased in this year but power generation declined substantially. The shortage of gas, less water release from Indus River System Authority (IRSA) and annual maintenance shutdown of thermal and nuclear power station were the main reasons behind it (Annual Plan 2009-10).

Overall although installed capacity and generation have shown a positive growth in the last few years, however, the actual addition in the installed capacity, as well as in power generation, has always remained short of the targeted level (as per the Annual Plans).⁷ Thus, indicating the lack of effectiveness of project planning and implementation during the last few years.

Table 4

Electricity Generation by Type in GWh

		2000- 01	2006- 07	2007- 08	2008- 09	2009- 10	2010- 11
Thermal	PEPCO	16835	21617	20508	19536	19612	14110
“	KESC	7990	8169	8663	8262	7964	7828
“	IPPs	24101	33416	34945	34814	38836	42443
“	Rental	0	213	938	1076	684	1681
“	CPPs/ SPPs/other plants connected with KESC and PEPCO	0	176	634	1046	1331	873
Hydro	WAPDA	17194	31846	28536	27636	27927	31914
“	IPPs	–	96	131	547	565	309
Nuclear		1997	2105	2832	1486	2668	3033
Total		68117	97814	97451	94663	99856	102484

Source: NEPRA (2010), State of Industry Report and Pakistan Energy Yearbook.

3.2. Peak Demand and Consumption Pattern

Now turning towards the critical demand side, the maximum demand in NTDC system and in KESC area after growing at the rate of almost 7 percent and 4 percent from 2000-01 to 2006-07 respectively had come down to 3 percent and 2 percent between 2007-08 and 2010-11. The rising ratio between the peak (or maximum) demand and installed capacity from 0.69 to 0.89 (2000-01 to 2006-07) indicates the poor performance of the power sector in Pakistan during the previous government. But unfortunately, this ratio has not improved in the last four years. In fact, in the years 2008-09 and 2009-10, this ratio had gone up to 0.98.

The slowing of GDP growth (3 percent) from average levels of around 7 percent (between 2002-07), lead to a decline in energy consumption (not the peak

⁷For details see Annual Development Plans (Various Years).

demand) in the last four years (to the level of only 1.6 percent) as compared to the 7 percent growth in the period of 2000-07;⁸ however, the growth in energy supply continues to lag behind the growth in energy demand. Although, recently installed capacity has increased to some extent, the actual electricity supply varies during the year due to weather, the age of plants, and the availability of fuel.

3.3. Governance Structure—Public versus Private Sector

The power sector in Pakistan used to be dominated by two vertically integrated (in generation, transmission and distribution) *public sector utilities*, WAPDA and KESC. In 1992, the Government of Pakistan (GOP) prepared the strategic plan for restructuring in the electricity sector to improve efficiency, service, and quality. It was realised that power generation and transmission capacity expansion and efficiency could only be achieved with the involvement of the private sector. In 1994 (then later on in 2002),⁹ the Government formulated a power policy and invited independent power producers (IPPs) to invest in the generation part of the power sector.¹⁰ As a result of attractive government incentives and generous tariff offers, *private power plants (thermal)* started their operations in Pakistan. Private Power and Infrastructure Board (PPIB) was established in 1994, to facilitate private investors. In 2003 hydro power was also opened to the private sector.

Although the installed capacity in the public sector is higher than private sector (about 51.2 percent of total installed capacity) but the private sector generates more as much as 52 percent of total gross production. The load factors of public sector generators are lower than those of IPPs—meaning utilisation of private sector power plants is higher.

Vertically integrated power wing of WAPDA was also unbundled into separate generation, transmission, and distribution companies. The hydroelectric power development and operation functions remained with WAPDA. Pakistan Electric Power Company Private Limited (PEPCO), a separate company, within WAPDA was made responsible for the restructuring and preparation for privatisation of the generation and distribution companies in due course through the Privatisation Commission. In other words, PEPCO was made responsible for public sector four thermal plants (GENCOs), nine distribution companies (DISCOs) and one National Transmission and Dispatch Company (NTDC). The government also privatised two public sector companies: KESC and Kot Adu Power Company. It created National Electric Power Regulatory Authority (NEPRA) to ensure fair competition and consumer and producer protection; and to introduce transparent and judicious economic regulation in the power sector of Pakistan.

⁸Due to priming the economy through easy credit for consumer products.

⁹With additional tax incentives for investors.

¹⁰It was in 1986, GOP encouraged private sector on BOO (built-own-operate) basis but the response was not encouraging. GOP then later in 1994 announced a comprehensive policy package.

4. MAJOR ISSUES FACED BY THE POWER SECTOR: STEPS TAKEN BY THE PRESENT GOVERNMENT

At present power sector in Pakistan is facing number of very serious issues. The key to progress in the power sector lies in the resolution of these issues. This section will reflect in detail on these issues and how the present government has responded to them in the last four years.

4.1. Circular Debt

Issue: The electricity sector has been seriously affected by the inter-corporate debt. Besides creating budgetary problems, this has badly affected the power sector. Such debt is created when the power generation companies under PEPCO and KESC fail to clear their dues to fuel supplier. The fuel suppliers in turn default on their payment commitments towards refineries and international fuel suppliers. Similarly, the IPPs, because of the delay in the payment from the Government¹¹ could not make payment to the fuel suppliers, so they have to produce below their capacity. The failure of PEPCO and KESC in clearing their dues towards fuel suppliers and IPPs is due to their (DISCOs) inefficiency in the collection of revenues, transmission and distribution losses and below cost power tariffs (issues discussed in detail in the coming subsections).

As a consequence, most of the thermal power plants were forced to operate at a very low 'capacity factor' thus massive increase in power load-shedding. The country lost between 2000 MW to 2500 MW of potential thermal power generated by private power companies as they remained off grid due to non-availability of fuel supply coupled with lack of funds due to swelling dues [ADB (2010); Bhutta (2011)].

As discussed earlier, the problem of circular debt first broke out in 2006 when electricity prices were not allowed to rise in line with the steep rise in the international oil prices for obvious political reasons. The problem gets aggravated in 2010 and power outages increased to an alarming level. Increases in oil prices as well as government inability to answer the root causes of circular debt caused Pakistan's oil refineries to be operating at only 45 percent of their capacity at the end of 2010.

Since its inception the amount of circular debt has kept on fluctuating from Rs 100 billion to more than Rs 400 billion owing to reduction in recovery and failing to receive fines from power thieves. Till April-2011 the net circular debt was Rs 258.5 billion; compared to Rs 103.9 billion in April 2009 indicating an increase of almost 147 percent. Receivables amounted to Rs 775.2 billion and payables stood at Rs 516.7 billion¹² [Pakistan (2011)]. Only 86.5 percent recovery was made in fiscal year 2010-11 as compared to 104.3 percent recovery in 2009-10.

¹¹IPP's generate power with sovereign guarantees by the government that public sector companies will purchase power from them for onward distribution to different set of consumers.

¹²Receivables keep on piling up as the PEPCO hardly gets 10 to 20 percent of the total receivables while its payables have to be honoured in totality [Asif (2011)].

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)].

Government Response: No doubt the present government has addressed the issue of circular debt but on an ad hoc basis by pumping in money five times (Rs 900 billion) to rescue the system from total collapse; but had not been successful in clearing the total debt stock. The government so far has not worked out a mechanism to curtail the accumulation of debt permanently; nor has it been strict with the defaulters. Instead, the injecting of money demands from the government to borrow billions of rupees from commercial banks through various instruments to make partial payments of the debt to reduce it to a manageable limit. Generally the default amount is more than the government's capacity to pay at a given time with the result that the circular debt is building up.

Finally, after the recent threat received from the IPPs (who are claiming Rs 210 billion in outstanding dues) to suspend 7750 MW of power generation; the government has decided that it would not pump in money for the sixth time without knowing the exact amount of debt stock to clear it permanently. It has also been realised that financial problems in the power sector are not only because of the differential between the cost of production and what the power distribution companies are charging to consumers; but two third of these problems are due to inefficiencies in the system and bad policies (issues discussed in subsequent sub-sections). All of these inefficiencies add up to an expected Rs 332 billion cost for the current fiscal year and does not include the amount of inter-corporate debt from previous years that is still outstanding. Besides increasing tariff¹³ the government is considering taking some tough decisions like withdrawing free electricity facility currently available to WAPDA employees¹⁴ and improving law enforcement in areas where the government is almost completely unable to collect electricity bills.

Circular debt is not only affecting the available capacity; the credit worthiness of the country/sector in the investor's eye is badly affected, as reflected in the higher security demanded for RPPs (rental power plants) payments [ADB (2010)]. This deep rooted problem demands some serious initiatives not only from the government but also from consumers, power (generation and distribution) companies to get it resolved completely.

4.2. Pricing Policy

Issue: As discussed earlier, one of the main factors which aggravated the circular debt problem is the inability of the DISCOs to pass on the cost of electricity

¹³ 14 percent increase in tariff is expected to recover Rs 100 billion of this amount.

¹⁴ As this supply cost a loss of Rs 25 billion to the sector [Khan (2011)].

to consumers. The cost of providing electricity to consumers could not be fully recovered as no real increase in tariff was notified by the Government from 2003-04 to 2006-07. Given the fact that 68 percent of our electricity generation is thermal based (where 99.8 percent relied on imported oil and gas);¹⁵ the impact of almost frozen tariffs was so huge that increase in tariffs in the coming years could not make-up for the cost price deficit.

Even after 2007, Government notified tariffs have always remained below the NEPRA determined (on the basis of cost) tariffs, inadequate to cover the average costs of the power companies (see Table 5 and Table 6). As a result, the companies started to incur losses which continued to build up to unmanageable limits.

In addition to the inefficient and below cost recovery tariffs, the system of electricity subsidies¹⁶ is a major source of the inter-corporate circular debt issue.¹⁷ That is, not only the inability of the distribution companies (DISCOs) to pass on the cost of electricity to customers, also the inability of the government to pay the tariff differential subsidy (difference between the applied tariff and the determined tariff) in a timely manner. In other words, government's inability to finance its commitment to fund subsidies, inefficiencies of the sector including low collections, delays in determination and notifications, and increased cost of fuel imports have significantly contributed to a circular debt problem [Trimble, *et al.* (2011)].

The current mechanism of determining tariff is on the basis of minimum cost of generation.¹⁸ As the government determined tariff is always lower than the tariff determined by the National Electric Power Regulatory Authority (NEPRA). The difference between the actual cost of energy and the domestic charge ends up as a direct subsidy to the DISCOs. This practice serves as disincentive to DISCOs and they continue with their inefficient practices. To avoid political reaction in the smaller provinces, the government is following the uniform tariff principle (despite the fact that some DISCOs have line losses above 30 percent). If the different tariff is charged in different DISCOs, the profitable DISCOs will be in a position to buy more power for its consumers.

¹⁵Domestic resources of gas are depleting therefore, reliance on imported oil is increasing.

¹⁶The government provided subsidies worth of Rs 342 billion to the power sector against the total federal development spending of Rs 280 billion in the outgoing fiscal year.

¹⁷Cost price gap recently reached Rs 20 billion a month and led to the piling up of the circular debt. The government is also paying Rs 7 billion a month as tariff differential subsidy [Khan (2011)].

¹⁸The government issues consumer-end tariff where the minimum consumer-end tariff for a particular consumer category amongst eight DISCOs is adopted for application across the board to all DISCOs. NEPRA determines consumer-end tariff for each DISCO on the basis of its consumer mix, losses and operational cost. The tariff so determined is different for each DISCO because of its peculiar conditions.

Table 5

Average Cost and Sale Rate of Electricity

	2004-05	2005-06	2006-07	2007-08	2008-09
Units Sold (KWh)	55278	62405	67480	66540	65244
Avg. Sale Rate (Rs/KWh)	4.0	4.1	4.5	5.4	7.3
Avg. Cost (Rs/KWh)	4.2	4.7	5.1	6.5	8.2
Excess Cost	0.2	0.7	0.6	1.1	1.0
Loss (Billion Rs)	13	41	39	76	62
Cumulative Loss (Billion Rs)	13	54	92	168	230

Source: NEPRA (2010).

Table 6

Average Electricity Tariffs (Rs / KWh)

Tariff Effective	NEPRA Determined	Notified by GOP	GAP
24 February 2007	5.14	4.25	0.89
01 March 2008	5.60	4.78	0.82
05 September 2008	8.42	5.58	2.84
25 February 2009	8.42	5.63	2.79
01 October 2009	8.42	5.96	2.46
01 January 2010	10.09	6.67	3.39
Feb 2011	9.73	7.78	1.95

Source: NEPRA (2010) and Trimble, *et al.* (2011).

At present, NEPRA determines the base electricity tariff on a quarterly basis for DISCOs which the federal government notifies after taking into account the subsidy. In the absence of extremely heavy subsidy, PEPCO is delaying payments to IPPs and also to the oil companies.¹⁹ Lack of funds to purchase oil is constraining IPPs to produce much less electricity than their capacity (low plant factor).²⁰

Thus, the basic problem in Pakistan is the imbalances in terms of power pricing and some implicit subsidies to those who might be able to afford those subsidies. Determination of appropriate tariff appears to be a simple matter of demand and supply, which could be easily resolved. However, given the nature of

¹⁹For instance, IPPs as on August 08, 2011 warned the shutdown of power plants within ten days unless Government injects Rs 150 billion into the companies who have stock left for maximum three days.

²⁰At present IPPs and GENCOs are averaging about 50 percent plant factor, which means that they are not being used to their potential level. A higher plant factor on these power stations can provide 20 to 30 percent more energy, which will circumvent the present shortages to a certain extent. Improving the plant factor is far more economical than setting up new plants. Plant load factor in India is continuously increasing and has reached almost 78 percent.

this particular product,²¹ determination of tariff has become a complex issue. Appropriate policy decisions by the government in these areas would help improve the tariff imbalances and resolve the implicit subsidy issue, for benefit of most of the stakeholders including the consumers [Trimble, *et al.* (2011)].

Government Response: The government deserves credit for taking a tough decision of regularly revising the power tariffs in line with international oil prices on quarterly basis to recover the cost of power despite political compulsions and severe criticism. Yet and importantly, this increase is insufficient (as government is still paying subsidy to cover the cost), but at least a step in the right direction. Moreover, to pass-on the changes in oil prices more frequently, Government has decided for monthly fuel adjustments to be passed on to the DISCOs. In addition, NEPRA would determine consumer-end tariff on quarterly basis.

Significant feature of fuel price adjustments is whenever there is improvement in the fuel mix, benefit goes to the consumers. For instance, in the year 2010-11, due to favourable generation mix during the months of August, September, October, November, December, 2010 and February, 2011 the actual fuel charges were on the lower side as compared to the NEPRA determined reference fuel charges, therefore, consumers were given relief in monthly electricity bill to the extent of Rs 0.33/kWh, Rs 0.36/kWh, Rs 0.32/kWh, Rs 10.8/kWh, Rs 0.58/kWh and Rs 0.09/kWh based on their consumption during these months. However, due to increase in the refined furnace oil price and unfavourable generation mix, actual fuel charges increased during January, March, April and May, 2011 [NEPRA (2011)].

Last year the government had started increasing power tariff to cover the cost. In the last two years more than 90 percent increase in tariff has taken place.²² The overall expected average cost of service to the end-consumer in 2010-11 was Rs 9.73/kWh, higher by about 1.57 percent over 2009-10. The average cost that a consumer was expected to pay during 2010-11 was Rs 7.78/kWh. The same was Rs 6.85/kWh at the end of 2009-10. The overall expected increase in the different consumer categories range between 12 to 19 percent [Rana (2011)]. One more change made in the tariff structure includes the implementation of GST for electricity consumption of more than 100 units.

Another significant step taken is the elimination of cross subsidy to a certain extent (from commercial and industrial consumers to agriculture and domestic consumers) which existed till last year; as the average electricity tariff for domestic consumers is greater than the average industrial tariff for the year 2010-11. In the year 2009-10, domestic tariff was Rs 5.62/kWh and industrial tariff was Rs 7.12/kWh; but in the year 2010-11, domestic tariff has increased to Rs 9.84/kWh and industrial

²¹For instance, ownership and control of utilities, technology, fuel used for power generation, government taxes on different fuels and on electricity.

²²From March 2010 to September 2011, 125 percent increase in power tariff, in addition to the transfer of fuel costs to consumers every month.

tariff to Rs 8/kwh. It is important as domestic customers consume more than 45 percent of electricity.

There is an incremental block tariff structure for domestic consumers where a unit price increases by the amount of electricity used.²³ As on June 2011, a domestic electricity user was charged Rs 1.87/kwh up to 50 kwh per month. Above this amount, the user faced a charge of Rs 4.45 /kwh for the first 100 kwh per month; then Rs 6.73 /kwh until 300 kwh per month; then Rs 10.65 until 700 kwh and finally Rs 13.29 /kwh for use above that level. These rates (compared to March 2008 rates) have increased by 34 percent, 44 percent, 65 percent, 66 percent, and 74 percent respectively in nominal terms. But in real terms they have changed only at highest levels of consumption. This means that the tariff structure has generally become more progressive as at higher level of consumption it becomes more expensive.²⁴ It also means that notwithstanding the nominal increases, there have been no real increases in the electricity tariff for approximately 96 percent of all domestic electricity consumers (as 60 percent consumed in the 1-100 Kwh /month block and 36 percent consumed in the 101-300 kwh/month block²⁵ [Trimble, *et al.* (2011)]).

The difference between the average cost of supply and the unit price of supply represents the level of subsidy. For domestic consumers, the price of electricity is now greater than the cost of supply in the two highest slabs. However, this does not reduce the fiscal burden significantly; the extent of cross-subsidisation (among different slabs) is minimal due to the low volume consumed at the higher slabs (only 4 percent).

The rising cost of electricity generation because of the increase in the global energy prices, along with the technical and commercial losses of DISCOs, means notified tariffs are not able to cover costs. In turn, the fiscal difficulties faced by the government in covering this difference have been a growing source of serious financial strain. Over the last five years, the actual cost of subsidies has been greater than budgeted, although the actual cost as a percentage of GDP has varied. *The main reason being the delay in important policy decisions to adjust electricity tariffs or (if taken) these decisions have not been implemented at all.* For example, the initial projected gap or subsidy for 2009-10 was Rs 110 billion of which Rs 55 billion was budgeted as tariff differential subsidy and the remaining was to be covered through quarterly increases of 6 percent, 12 percent and 6 percent, applicable at the beginning of second, third and fourth quarters respectively. In addition, variation in fuel price was to be covered through monthly adjustments. Despite an approximate 6 percent increase in October, and an approximate 12 percent further increase in January, and

²³The main rationale for this tariff structure is to protect lifeline user.

²⁴Thanks to media for making unnecessary hue and cry.

²⁵World Bank's estimate based on PSLM data.

notification of monthly fuel price adjustments by NEPRA, tariff differential subsidies jumped to Rs 188 billion²⁶ [Trimble, *et al.* (2011)].

One of the major drawbacks in tariff differential subsidy is that they are not appropriately targeted. Poor customers have least benefited from this subsidy. This is because the majority of rural customers are lifeline customers (extremely small users) and experience load shedding for up to 20 hours but the allocation of tariff differential subsidy to them is only 0.42 percent of the total. More than 60 percent of the subsidy is allocated to consumers of more than 100 kwh [FODP (2010)].

The IMF had demanded as part of the Standby Agreement, an end to the subsidy to the power sector to make it a financially viable sector. They require an increase in power tariff in the range of 20–25 percent in 2011-12. But this is only a partial solution as is argued that only increasing the power tariff has not worked, is not working and will not work in the future, unless the inefficiencies in the power system are removed. Solely relying on tariff increase will just lead to more inefficiencies—theft and corruption [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)].

Despite all the measures the government has taken, they have just not been sufficient to solve the problem of circular debt which still persists with the same magnitude. As suggested in the report of FODP (2010) there is a need to eliminate untargeted energy subsidies. In addition, “electricity pricing on a full cost recovery basis is necessary to re-establish the financial sustainability of the energy sector, to revitalise progress towards a liberalised 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.” Further, the government should take all necessary steps to revamp the whole system of collecting power bills within time from all the consumers in order to resolve the financial issues effectively.

4.3. Transmission and Distribution Losses

Issue: Consumer end tariffs are highly sensitive to the losses in the transmission and distribution systems. With every percentage increase in losses the tariff increases exponentially (as the cost of production goes up). Safe and reliable transmission and distribution of electricity has remained a major problem in Pakistan. The situation of huge power losses (from transmission and distribution networks and auxiliaries

²⁶Factors that contributed to this difference include: additional gas (assumed while estimating financial gap) was not provided to the power sector and its exclusion from NEPRA determination raised the level of determined tariffs; delay in determination and notification also had financial implications; NEPRA determination included carry over cost of Rs 51 billion not factored into the initial estimate (this emerged as a result of delay in determination and notifications). Monthly adjustment did not include the impact of T&D losses on the power purchase price, which was transferred to quarterly determinations.

consumption) over the years has hardly improved. In fact, it deteriorated in the early half of 2000s. In the year 2009-10, these losses stand at around 22 percent.

In comparison to other Asian countries, these losses are extremely high. For instance, in South Korea T& D losses are only 3.6 percent; China T&D losses are 8 percent; while for OECD countries T&D losses are just 7 percent.²⁷ These losses it is argued are due to unreliable and old-age generation plants, low-voltage transmission and distribution lines, weak grid infrastructure as well as its inappropriate location, inaccurate metering and billing, default payments, un-metered supplies, and theft from illegal connections [Alternative Energy Development Board (2005) and Ghafoor and Weiss (1999)]. All the commercial factors are basically due to the weak governance structure in the power sector [Shah (2002)].

In the T&D losses, distribution losses are almost 68 percent while the rest of them are transmission losses. And in the 68 percent of the distribution losses significant portion is that of electricity 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.

Since high system losses and poor collection of bills from the customers was one of the major reasons behind the initiation of the reform process in Pakistan [NEPRA (2008)]; its high magnitude shows how little the efforts (including various technical measures) adopted in the past have been effective to bring down these losses.

The following Table 7 shows losses claimed by various DISCOs and KESC in their transmission and distribution systems.

Table 7

Transmission and Distribution Losses in DISCOs (%)

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; LESCO (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).

²⁷ Although in the neighbouring country India the situation is more or less similar to Pakistan as the T & D losses are close to 27 percent.

It seems that the distribution companies (DISCOs) have failed to control their inefficiencies. Except for IESCO, LESCO, GEPCO, and FESCO; the rest of DISCOs (with a combined 30 percent consumption of the total) have extremely high losses. The major part of these losses is due to theft in these DISCOs. No progress has been made to minimise power theft or to overcome technical constraints—such as overloading of transformers and limited capacity of transmission lines to transfer power to consumers efficiently. Companies with high system losses also suffer from low recoveries (60 to 70 percent of the billed amount); whereas the recovery in the case of IESCO, LESCO, GEPCO and FESCO is about 98 to 99 percent. These inefficiencies in the distribution companies have not only affected their financial position but leads to an additional unjustified cost to those consumers who are paying their bills regularly or to the Government in the form of tariff differential subsidy.

The difference of roughly around Rs 2/kwh between the NEPRA approved average tariff and average tariff charged to consumers is because of system losses. According to one estimate the country loses 29 billion units of electricity annually due to heavy losses in the system. Moreover, recently Chairman Independent Power Producers Advisory Council (IPPAC) with reference to circular debt issue questioned successful operation of any system in the presence of heavy losses and leaks, while referring to PEPCO's 23 percent distribution losses and a total loss of Rs 170 billion in 2010-11 [cited from Bhutta (2011)]. Therefore, all efforts must be genuinely applied to reduce the losses. If losses are reduced by even 5 percent, the saving will be over Rs 30 billion.

Government Response: Although government made some progress in the beginning on improving line losses but abandoned the initiative after coming under pressure of vested interests, who allegedly were making billion of rupees by stealing electricity and fuel and overcharging the consumers [Rana (2011)]. According to a very recent official estimate the overall system losses of DISCOs have increased to 24 percent—up by one percent from the last year's 23 percent.²⁸ Running default is increasing with every passing day owing to deferment of even current bills, instead of recovery of arrears [Kiani (2011)].

The present government has held an Energy Summit (on 19 April, 2010 chaired by the Prime Minister of Pakistan and attended by all the Chief Ministers of the Provinces). Among other recommendations one proposal of the summit was to reduce the power-sector deficit and the reduction in the losses of distribution companies by 2 percent within six months. However, instead of decreasing, losses have increased. *This reflects the weaknesses of the government as far as the implementations of important decisions are concerned.*

²⁸Average losses in July and August period of 2011 were 23.9 percent, which in the same period of 2010 were at 22.9 percent.

In the view of Ministry of Finance, successive cash injections by the government have impeded the efforts of power companies to improve their governance, efficiencies and reduce their losses. The officials in the Ministry are of the view that whenever the power companies faced problems, the Federal Government extends financial help out of the national budget or by increasing tariffs, resulting in more inefficiencies and system losses.

The economic managers in the country/officials in the finance and energy sector are busy in discussing various strategies to cope with an extremely serious threat of circular debt. The Minister of Water and Power has ordered “mass disconnections” of electricity to consumers who were in prolonged default for more than 60 days.²⁹ Implementation of this order will reflect the seriousness of the government. The government has also brought in people from the private sector and civil society representation to take charge of distribution companies. As one per cent system loss translates into Rs 6.5 billion—all DISCOs (excluding KESC) are losing about Rs 150 billion a year only because of system losses; despite increase in consumer tariff.³⁰

4.4. Fuel Mix in the Power Sector—Shift from Low Cost Generation to High Cost Generation

Issue: At present, in the total installed generating capacity, about one third is hydro and two third is thermal (while nuclear power has a very minor share). Over the last three decades, a sluggish approach towards building large dams together with the 1994 Power Policy that attracted only thermal power plants has caused the share of hydro power to fall in the national electricity supply mix; its contribution in the total electricity generation mix has decreased from 60 percent in 1962-63 to less than 30 percent in 2009-10.³¹ The remaining almost 70 percent has been filled by thermal power. This has increased the overall cost of generation in Pakistan.

Hydroelectric power stations are classified as the most efficient power plants as they can have an operational efficiency of up to 90 percent given the availability of water. This source of energy is environment friendly. It is the cheapest source of producing electricity (as on 2010, cost of generation from WAPDA hydro sources was Rs 1.03/kwh, while from public sector thermal plants, cost of generation was Rs 8.5 /kwh).³² Pakistan has the potential of more than 40,000 MW of hydro power but

²⁹Unfortunately, the amount of running default had risen to Rs 79 billion, as the defaulters pay a paltry amount to keep electricity supplies and get remaining amounts postponed with the approval of distribution companies.

³⁰Since March 2010, increase in power tariff is more than 125 percent.

³¹Even in 1990-91, the share of hydro in total generation mix was 45 percent. It was after the introduction of IPPs in the system that the share of hydro declines drastically as no substantial addition in hydro potential is made since the initiation of power sector reforms in the mid of 1990s.

³²Cited from Salman Khalid and Kamal Munir, “Is circular debt the real issue?” *DAWN*, October 10, 2011.

unfortunately, we have the installed capacity of only 6555MW, that is, roughly 16 percent of the total potential. Moreover, 6,555 MW can only be available provided the hydro generating units work to their full potential.³³ Sometimes, around one-third hydro-electricity is generated because of the shortage of water in dams. It is unfortunate that after the construction of Mangla Dam and Tarbela Dam, political differences have prevented the construction of large dams. Ghazi Barotha is the only exception.

There is a need to exploit the remaining untapped hydro power potential. This can effectively contribute in meeting Pakistan's ever-increasing demand for electricity in a cost-effective way. There are many countries in the world where hydropower plays a predominant role in the electricity supply mix. For example, Norway produces 99 percent of its electricity from hydropower while Brazil produces 92 percent, Iceland 83 percent, Austria 67 percent and Canada 70 percent [Asif (2011)].

Among the fuels used in thermal power plants, oil is at the top with the share of more than 50 percent (Table 8). Whereas Pakistan meets more than 80 percent of its oil demand through imports. There was a shortage of more than 5000 MW of electricity in the summer season of 2011. These figures keep on changing not only because of changes in peak demand (seasonal variation) but more so because of variation in supply given the availability of furnace oil.

Table 8

<i>Electricity Generation (Thermal) by Fuel (GWh)</i>						
	2000-01	2006-07	2007-08	2008-09	2009-10	2010-11
Coal	241	136	136	113	139	131
% of Total	0.5	0.21	0.21	0.17	0.20	0.20
Oil	26904	26449	29928	25513	35641	35847
% of Total	55	41.59	45.56	39.41	52.09	55.07
Gas	21780	37006	35624	39108	32647	29118
% of Total	44.5	58.19	54.23	60.41	47.71	44.73
Total	48925	63591	65688	64734	68427	65096

Source: Pakistan Energy Year book (Various Years).

Note: Oil includes Furnace oil and Diesel oil.

At present, almost one third of the country's total imports are made up of oil. Of the total oil consumption of over 20 million tons, furnace oil consumption stands at about 10 million tons. Currently, price of furnace oil has increased to Rs 64000 per ton from around Rs 21000/tonne as on January, 01, 2007 (meaning roughly 200 percent increase in four years) and the cost of electricity based on furnace oil plants

³³In 2010-11, although the installed hydro capacity remains the same but the share of hydro in generation increased by 3 percent.

has crossed Rs 14 per unit [Bhutta (2011)]. Almost 5,000MW of oil-based power projects are currently in the pipeline, which combined with existing oil-based projects will put an unrealistic burden on the national economy. Oil based plants at present require 36000 tons per day. Between 3000-4000 tons per day is produced locally. While the port capacity to handle oil import is less than 25000 tons;³⁴ even this much of oil could not be imported because of circular debt issues, resulting in higher electricity shortfalls [Kiani (2011)].

In other words, the shift from hydropower to thermal power implies that the country is now depending on imports to meet its energy requirements. With limited oil production and low refining capacity, imports of crude oil and oil products accounted for 83 percent of oil supplies during 2009-10. The high dependence on imported oil for electricity production places considerable strain on the economy by raising the external account deficit and worsening the country's balance of payments position [Trimble, *et al.* (2011)].

The share of electricity generation based on natural gas is going down drastically because of depleting resources of natural gas in the country (also obvious in Table 8). The preference is now to have gas for the domestic consumers and for the industry. Its availability for power generation is now minimal. Power generation based on natural gas costs Rs 4.32 per KWH (in 2010-11); much less than the generation cost using furnace oil or high speed diesel (Table 9). To generate electricity using gas require new gas reserves to be discovered.

Table 9

Fuel Mix in GENCOs

	Gas		Furnace oil		H.S.D		Coal		Average Cost (Paisa/ kwh)	
	Generation (GWh)	Cost (Paisa/ kwh)	Generation (GWh)	Cost (Paisa/ kwh)	Generation (GWh)	Cost (Paisa/ kwh)	Generation (GWh)	Cost (Paisa/ kwh)	GENCOs	KESC
2000-01	11711	164.14	4824	262.40	65	950.77	240	61.29	-	-
2006-07	13368	268.13	8093	532.26	4	1507.96	136	161.06	366.31	379.80
2007-08	12474	256.45	7816	811.5	1	1805.24	136	202.92	466.72	448.67
2008-09	11120	362.83	8240	918.74	48	1350.90	113	211.87	597.55	453.28
2009-10	9968	386.22	9324	1127.66	185	1611.17	116	248.52	748.33	466.86
2010-11	7129	432.17	6859	1355.93	35	1840.24	88	278.26	883.71	648.00

Source: PEPCO (2008) and NEPRA (2010).

But no serious efforts to explore new gas reserves are in sight.³⁵ The efforts to find alternatives like import of LNG have remained slow. Not only was the previous government, the present government is also deliberating on to replace fuel oil with short-term imports of LNG.

³⁴Limited Port capacity is a serious constraint to meet domestic demand.

³⁵Not only new discoveries of natural gas do not keep pace with the consumption, the exploration activity is slow given the unfavourable gas producer prices.

The concept of LNG imports was first envisioned in the National Energy Plan-2005. The focus was on LNG import for short and medium term and transnational gas pipelines like Pak-Iran and Turkmenistan-Afghanistan-Pakistan-India (TAPI) for the long term needs. Sui Southern Gas Company (SSGC) initiated the Mashal LNG Import Project. But regrettably, this project now stands cancelled (as claimed by the unofficial sources). *It is evident that bureaucratic wrangling by various ministries to recast the LNG project and claims of “billion dollar losses” were thrown around—and the real issue of gas/LNG supply was side tracked. Further, it is reported that the whole issue has been incorrectly projected in the media by the Petroleum Ministry that the Supreme Court has cancelled the Mashal project due to irregularities in the tender process. The real irregularity was committed by the Ministry itself by unbundling the Mashal project; in an attempt to award the LNG supply contract to a third party in violation of the SSGC RFP (Request for Proposal) and Public Procurement Regulatory Authority (PPRA) rules [cited from Ahmad (2010)].*

It is crucial to immediately resolve the infrastructural, transportation and pricing issues to allow the imports of LNG. In August 2011, the Economic Coordination Committee of the Cabinet approved the Liquefied Natural Gas (LNG) Policy 2011.³⁶ Some of the salient features of this policy includes: foreign investors having LNG storage capacity of five years can now qualify for bidding as compared with the previous 20 years reserves capacity. Spot purchase of LNG no longer requires government’s permission. Licensees will have to provide guarantee against its committed delivery date. That is, in case the licensee failed, its first right to Third Party Access will stand waived off. SSGCL/SNGPL will not sell gas priced under weighted average cost to industries (selected by government) for re-gasified LNG (RLNG). OGRA’s discretionary rights to grant exemptions from mandatory Regulated Third Party Access or Negotiated Third Party Access requirements have been deleted. The clause relating to the involvement of Coast Guards or any other agency to control activities of entry and exit of shipping traffic and requirement of security escort through Coast Guards at the expense of LNG developer, LNG Terminal Owner/Operator and LNG Buyer have been deleted.

As far as Pak-Iran gas pipeline is concerned, the agreement has been signed to start supply of natural gas from 2014. But independent sources are of the view no gas would be available through this source before 2017; secondly, it will only be sufficient to cover the existing gas shortage rather than providing gas for the new power generation projects which are in the pipeline [Ahmad (2010)].

Given the shortage of gas, our dependence on furnace oil imports for electricity generation has made our electricity supply chain quite vulnerable. Any fluctuation in the international oil market directly affects the average cost of

³⁶ECC removed anomalies in the LNG Policy 2006 on the basis of experience and bottlenecks mentioned by the potential investors.

electricity generation. Similarly, any interruption in oil supplies may result in power supply interruption. Therefore, it is essential that power generation sources should be diversified to include more indigenous resources like hydro, coal and renewable energy resources like wind and solar which are also known to be abundantly available in Pakistan.

Coal is the cheapest source of fuel in the thermal production (Table 9). At the same time electricity generated using coal as fuel is also lowest and is declining (Table 8). Just like water, we have an enormous amount of coal reserves. The coal resources are estimated to be 185 billion tons. It is estimated that by using only 2 percent of these reserves we can generate around 20,000 MW of electricity for almost 40 years [Ghani (2009)]. A coal based power generation project at Lakhra (150 MW) was added to the system in 1995. However, lack of adequate maintenance resulted in the closure of two out of three units. Only one unit of 50 MW is currently working; but its capacity has also decreased to around 30 MW. The contribution of coal in the total electricity supply in a number of developed economies like UK, USA and Australia is between 60 to 70 percent. China produces 68 percent of its electricity through its coal resources. India has increased its reliance on coal and at present 54 percent of its total electricity production is from coal based thermal power stations and only 1 percent of its total thermal capacity is run on fuel oil.

Why Pakistan is relying on expensive fuels for its thermal generations reflects on the fact that not only *there is lack of incentive to minimise costs; there is also a lack of vision on the part of our decision makers as they rely too much on expensive fuels (imported) instead of exploring cheaper options*. For instance, the development of cheap and indigenous energy sources was discouraged by our policy-makers in the previous governments as sponsors of hydro power producers who offered a tariff of 4.7 cents per unit under the 1997 policy were practically blocked from developing their plants at this tariff rate and offered a much lower rate of 3.3 cents per unit in 1999. The same happened with the development of coal resources. A Chinese firm that had agreed to setup a 600 MW project at Thar for 5.79 cents per unit was forced to quit when the authorities refused to offer a tariff of more than 5.39 cents per unit. But at the same time, the same Government allowed thermal power projects at a much higher tariff of up to 15 cents per unit [examples cited from Kiani (2008)].³⁷

As a result, no power project could be set up in the last ten years or so. In other words, *this reflects a weak governance structures at the decision-making level or it may be, an excellent example of rent-seeking behaviour, as it has been*

³⁷According to another source, it was in 2001, Chinese firm (Shenhua) was about to establish a coal fired power generation plant in Thar with an initial capacity of 100 MW (planned to immediately increase it to 200 MW); when the project was about to be started the proposed price was reduced from 5.75 cents per unit to 5.49 cents per unit by the government. As a result Chinese firm left (for details see Asad Ali, "Raw diamonds Thar coal reserves being overlooked", available at <http://www.utrade.co/Magazine/Utrade-Magazine.aspx?Key=145&Titla=Raw+Diamonds+Thar+Coal+Researves+being+overlooked>)

highlighted that the investment related policies are an alluring target for rent seeking by firms, officials, and other interest groups [World Bank (2005)].

The World Bank estimates that worldwide electricity production is accounted for coal (40 percent), gas (19 percent), nuclear (16 percent), hydro (16 percent) and oil (7 percent).³⁸ Whereas in Pakistan electricity is generated using oil (37 percent), gas (31 percent), nuclear resources (3 percent) and coal (only 0.2 percent) and the rest through hydro resources. Coal and nuclear contribution to electricity generation is extremely limited with a vast potential for growth.

Undoubtedly, for political reasons and to some extent affordability of general masses has always remained a major concern for the government before the notification of any increase in the consumer-end tariff. Among other factors, consumer-end tariffs depend on the cost of generation and wastage in the form of losses at different levels in the system. 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. It requires an increased share of cheap sources of generation in the total generation mix.

Government Response: No significant policy shift can be observed in the last four years. The primary focus of the present government is still on thermal projects (mostly oil based) whether they are IPPs (independent power plants) or RPPS (rental power plants) as a short to medium term response to the energy crisis. Most of the hydro power projects which are in the pipeline had been envisioned by the previous governments. Though, government deserves some credit for resolving disputes behind Diamer-Bhasha dam and its inauguration; signing of Pak-Iran gas pipeline deal; and identification of Thar coal based projects has been initiated (details are discussed in the next sub-section).

Government besides approving amendments in the LNG Policy 2006 in the form of LNG Policy 2011 has finalised its plan to import around 500,000 Mcf/day of LNG from Qatar starting at the end 2012. In 2011, three companies in the private sector have been issued licenses: Pakistan Gasport, Engro Corporation and Global Energy Infrastructure to bring 1.5 billion cubic feet/day LNG into Pakistan and these companies are supposed to build terminals to handle the LNG.

4.5. Limited Capacity Addition

Issue: Pakistan's investment needs in the energy sector cannot be met by the public sector alone. Private sector investment is crucial to bridge the energy gap. Growth in demand suggests that substantial investment will be needed to maintain continuity of supplies. Not only in generation, the most capital intensive segment in the sector, investments are also needed in the transmission and distribution sectors to overcome the huge losses the sector is suffering for the last couple of years.

³⁸Cited from report prepared by WAPDA on Hydro Potential in Pakistan.

Providing adequate supply requires mobilising much more private investment. Besides right pricing, the quality of the regulatory environment along with honest and efficient public sector management is very important for the investor's confidence.

A substantial increase in the share of private investment after 1994-95, can rightly be attributed to the restructuring process started in the mid-1990s. In 1994, IPPs started their operations in Pakistan. But their involvement became controversial in the initial stages [for details see Malik (2009)]. Although the disputes with IPPs were resolved later on; it still has an adverse impact on the future expansion of private participation. Furthermore, as Fraser (2004) has rightly pointed out that until the expected efficiency improvements are achieved, fresh private capital in the power sector in general, and for new generating capacity in particular, is not possible.³⁹

Government Response: Seven new thermal power projects have been commissioned in 2010-11 in the private sector with a capacity addition of 1604 MW to the national grid system. All these projects have been initiated in the previous government. Another significant achievement in the power sector is the addition in nuclear installed capacity. Pakistan Atomic Energy Commission completed Chashma Nuclear power Plant II in collaboration with China National Nuclear Company. Its construction started in 2005. The present government has decided to have a second wave of IPPs with a capacity of 3533 MW.

In the year 2008-09 government announced the National Policy for Power Co-Generation by Sugar Industries (the Co-Gen Policy). To lessen the gravity of power shortage in the country it was also decided to acquire surplus captive power from all Pakistan Textile Mills Association (APTMA) as one of the supply side measures. This captive power was mostly oil based. In reaction to these two policy measures in 2008-09, 182 MW produced by captive power plants (on different fuels) was available for distribution companies. Sugar industry has also offered for sale surplus (bagasse based) captive power.

A number of projects based on Thar coal resources have also been identified in the power plan 2010-11. All of these are in the private sector except for only one project of coal gasification (100 MW) in the public sector.

There are four major hydropower projects under construction in Pakistan in the public sector that will provide an additional 7550 MW of electricity. Four small hydropower projects with a capacity of around 400 MW are expected to be completed in the next five years. In addition, five hydropower projects in the private sector (with a capacity of 1795 MW) are at different stages of development. But no project could achieve financial closing until the last quarter of 2010 except for New

³⁹Circular debt issue and availability of fuel, time and cost involved in tariff determinations by the regulator and below cost tariffs, lack of exploitation of indigenous coal reserves, and critical security situation in the country; all these factors have hampered foreign private investment in Pakistan.

Bong Escape with a capacity of 84 MW. All other private hydropower projects are still in the regulatory approval stages due to political, administrative and security issues.

The main reason for the significant delay in most of the hydropower projects is the absence of any coherent and comprehensive energy policy: Development planning for the hydropower sector by the federal government is essentially left to WAPDA for the public sector and to PPIB for the private sector after the 2002 Power policy. Although both the organisations work under the same ministry, there is no link between their respective priorities resulting in a lack of mutually complementary development plans.

In 2008-09, MOU for construction of Kohala hydropower project (1100MW) was signed with Chinese company M/S China Water and Electric Corporation (CWE) for implementation of project in the private sector. But given the controversies surrounding this project,⁴⁰ this project could not take off even after the passage of three years. Moreover, the raising of Mangla Dam project which can provide an additional 180MW of electricity was expected to be completed by the end of 2008-09, but unfortunately so far no addition has been made in the hydro installed capacity.

The federal government has also decided to upgrade some of the existing thermal power plants which have lost their optimal generating capacity due to inadequate maintenance. Further, the government has decided to build another 960 MW plant at Tarbela Dam using existing reservoir outflows besides the completion of other hydro projects initiated in the previous regime.

Furthermore, in the Annual Plan 2010-11, it was declared that the construction of Diamer-Bhasha Dam 4,500 MW 'is in initial stages'. But the fact of the matter is despite the success of the government in securing the agreement of the Cabinet, the Provinces, the international lenders, and more than 30,000 families who would be affected by its construction, this Rs 1 trillion project may yet be ruined because of a boundary dispute between the government of Khyber Pakhtunkhwa and Gilgit-Baltistan. Despite Prime Minister's directive its inauguration had been postponed by WAPDA many times because of this dispute [Bhutta (2011)]. Finally, in October, 2011 it has been inaugurated expected to be completed in eight years; but how long this project will take time will tell.

⁴⁰WAPDA is accusing decision makers of violating Pakistan Power Regulatory Authority rules and neglecting to ensure transparency and evading international competitive bidding. However, documentary evidence revealed WAPDA had signed a MoU with the CWE for the construction of the project in 2008. Now WAPDA has raised several provocative issues which were not discussed earlier at any level. WAPDA now wants to execute the whole project itself or alternatively become a partner with 51 percent share in joint venture with CWE. While CWE has opted for Build, Own, Operate and Transfer (BOOT) option under which the project would be handed over to AJK government after 30 years. The company will construct the project from its own funds as an IPP in accordance with the 2002 Power Policy [for details see Mughal (2011)].

Most of the hydro projects are planned on the Indus River. The implementation on these projects requires political will otherwise they will keep on delaying. Sharing of water resources has been a major source of dispute among the provinces in Pakistan. It has affected the construction of hydro power projects in both the public and private sector.⁴¹ Availability of sufficient financial resources is another major hurdle in the completion of (of both public and private sector) hydro power projects. The involvement of commercial banks in the IPPs market, and shortage of liquidity have restricted their capacity to finance large hydro power schemes. International project financing has also decreased due to the recent global financial crisis. Further, political and economic instability has also discouraged commercial lenders from entering into large project finance agreements [FODP (2010)].

The most famous and most controversial step taken by the present government was the inclusion of *rental power plants (RPPs)* in the power system as a quick fix solution. The government appeared to believe RPPs as the only short term solution to the power crisis and all other options including thermal, hydro or coal would take at least three to five years to generate electricity. Despite criticism from different quarters the government approved the induction of 14 rental projects with a capacity of up to 2250 MW (mostly oil based), to ensure an end to the power deficits.⁴² The concern raised against rental power programme was its financial viability given its below par efficiency⁴³ and high tariff structure.⁴⁴ Even some functionaries in the government admitted that these plants are not only expensive but are also less efficient in operation in comparison to the existing IPPs.

In September 2009, government through the Ministry of Finance requested Asian Development Bank (ADB) to carry out a Third Party Audit of the Power sector including RPPs. ADB also declared these plants not only expensive but also ineffective.⁴⁵ ADB disapproved the 14 RPPs on the ground that under high demand scenario and low demand scenario, the differential in the cost to be borne by the economy would be Rs 79 billion and Rs 44 billion per annum (starting from 2010-11) respectively; which translates into an additional customer tariff increase of 10

⁴¹The present provincial (Khyber Pakhtunkhwa) government has taken the position that Power Policy 2002 was beyond the powers of the constitution of the country and hence any letter of interest issued under the policy had no legal value. As a result regulatory approval of two major private sector hydro power projects have been delayed until the legal issues are resolved [for details see FODP (2010)].

⁴²The Government approved the RPP programme without evaluating its financial implications. After its approval it went to ADB for its evaluation.

⁴³The project efficiency committed by the sponsors of RPPs was for only 32-35 percent but the government would be legally bound to make payments for 90 percent capacity utilisation [Kiani (2010)].

⁴⁴According to one independent estimate, 2250MW of rental power would have brought a net deficit of Rs 135 billion to the country given the furnace oil price of Rs 26000/ton and offered tariff to RPPs as US cent 13.5/kWh (as claimed by the Minister of that time) [for details see Asif (2011)]. One can imagine the real loss to the economy as the current price of furnace oil is Rs 64000/ton.

⁴⁵In terms of reducing electricity shortfall.

percent and 7.4 percent respectively. Thus, the total increase in consumer end tariff would be about 35.5 percent and 25.9 percent under high demand and low demand scenarios [ADB (2010)].

In the end, the proposed 14 RPP programme had no significant impact on reducing load shedding in 2009-10 (and onwards) because none of the RPP became functional before December 31, 2009 as initially declared by the government.⁴⁶ Even the government in its response to the ADB report could not deny the high cost as well as RPPs inefficiency; though they disagreed with its interpretation. Further, the government could not justify its decision for expensive RPPs given the relatively cheap options, like for instance, the proper utilisation of existing capacity.

The present government's focus on RPPs during the first two years was a complete failure as load shedding instead of promised complete elimination increased. It may be noted that as a consequence of this policy only 62 MWs had been generated by RPPs at the rate of Rs 14.74/kWh as opposed to Rs 1.3/kWh for hydro, Rs 8.74/KWH for GENCOs and Rs 9.07/KWh for IPPs [Khan (2011)].

Most of these RPPs are oil based. Their effectiveness thus depends on the sufficient availability of fuel, something which has not happened during the last couple of years. Even the existing thermal power generation has not been fully utilised due to the shortage of gas or furnace oil. As discussed earlier the present crisis of electricity has been aggravated mainly because of the circular debt problem. As its outcome, power plants whether they are in the public sector or in the private sector (IPPs) are not in position to operate on full capacity because of the lack of fuel. In these circumstances it seems ridiculous on the part of policy-makers to go for expensive RPPs—100 percent thermal.

These RPPs would have lead to an unhealthy impact on the already weak economic condition of power sector. The substantial rise in electricity prices that rental power brings would further promote corruption and electricity thefts. Another major implication of the RPPs is further imbalance in the shares of thermal power and hydro power, where thermal power in Pakistan is mainly based on imported fuels. Serious reservations were also being raised in electronic as well as in print media regarding behind the scene wheeling and dealing. There were reports of nepotism and corruption in the rental power project deals [Asif (2011)]. WAPDA officials have been quoted in print media that the installed power generation capacity is sufficient to meet the current requirements but is not being fully capitalised in order to create an artificial shortfall so that a demand can be created for new power plants.

Asif (2011) has highlighted number of more practical and sustainable options to bridge the immediate gap between demand and supply. For instance: fully utilising the existing thermal power plants as it could reduce the current deficit by

⁴⁶ADB also pointed out to the government that the contracts with these RPPs lacks sound clause in case of non-performance by the RPPs.

over 80 percent. Secondly, resolution of the circular debt issue to achieve the optimum level of performance by the existing power plants. Thirdly, number of plants in GENCOs can be upgraded/ renovated to produce around 3000-4000 MW of electricity more quickly and cheaply. Fourthly, through a stringent check and balance programme systems losses can be controlled. Finally, the implementation of serious energy conservation and management programme can reduce the consumption of electricity in all the sectors substantially.

4.6. Energy Conservation

Issue: Efficiency in the use of energy can generate substantial gains in supply, thus reducing the supply demand gap. Pakistan's total energy savings potential is estimated at 11.16 MTOE. Savings from energy efficiency could reach 18 percent of total energy consumed in the country. This corresponds to a 51 percent reduction in net oil imports. Pakistan is very energy intensive as a consequence of high energy losses, wastage throughout the supply chain and insufficient investment in replacing obsolete infrastructure [FODP (2010)].

Energy consumption per unit of GDP in Pakistan is more than double to that of the world average and more than five times to that of Japan and the UK. Furthermore, for each dollar of GDP Pakistan consume 15 percent more energy than India and 25 percent more than the Philippines [FODP (2010)]. The 23 percent of T&D losses is not a small amount. It has a significant impact on the cost of electricity and contributes to power shortages. Therefore it is essential that apart from setting up of new power generation plants, a serious initiative towards the conservation of energy should be in place to use the available capacity more effectively.

There is margin of over 20 percent saving in electricity consumption across all sectors. But unfortunately, proper management such as improving energy efficiency and loss reduction programmes which have the least incremental cost are not getting the same priority as new supply side initiatives. The energy saved by the proposed Compact Fluorescent Lamp programme would have reduced electricity demand by over 1280 MW country-wide and 1133 MW in the PEPCO system. Similar programmes have been successfully implemented in other countries [ADB (2010)].

Generally speaking the legislative framework for energy conservation is weak in Pakistan. A small effort (that is by avoiding the unnecessary consumption) can reduce energy consumption by more than 10 percent. For instance, by controlling cooling or heating by 1 degree centigrade can reduce heating or cooling load by around 7 percent. Moreover, to switch off the lights and other appliances when not in use is not a difficult task to implement. Similarly, unnecessary and wastefully lit shops can easily reduce their consumption. Also in industrial applications, the idle running time of production lines and machines can be reduced by incorporating motion sensors. A further saving of 10 to 15 percent can be achieved by introducing

the second and third levels of energy conservation practices [for details see Asif (2011)]. When Brazil experienced energy crisis in 2001-2, the first thing they did was the strict demand reduction programmes⁴⁷ and achieved the goal of reducing 20 percent reduction in consumption.

Government Response: In the Energy Summit held in Islamabad on 19 April, 2010 it was decided to immediately initiate a number of energy conservation measures including two days weekly holidays, setting the time for closure of markets, encouraging energy saver bulbs etc. As claimed by the former Chairman PEPCO, PEPCO saved around 1,000 MW of electricity per day as a result of the energy conservation campaign launched in 2010 through closure of markets by 8pm and load management announced by the government. These energy conservation measures were strictly enforced only for one year. Later on, no serious efforts were made to continue these policies.

4.7. Efficiency of Power Plants in the Public Sector

Issue: As discussed earlier, power sector in Pakistan has not only failed to make significant additions in the generation capacity, but it also could not use the existing power plants to their full potential. Essential maintenance schedules were ignored, specifically for the power plants in the public sector not only by the previous government but also by the present government. As a result, the efficiency and the availability of GENCOs have reached at a very low levels resulting in the closure of many units.

Government Response: According to the NEPRA State of Industry Report, 2011 GENCOs have planned for rehabilitating a capacity of 1220 MW at the cost of 217.708 Million US\$ with the assistance of USAID.

5. SITUATION ANALYSIS—CRISIS IN GOVERNANCE

“The problem, as well as the solution, lies in how the sector is governed”.
(World Bank)

Good governance is a process of making and implementing decisions at the right time. Moreover, not only how decisions are implemented; how performances are regulated and officials are made accountable is also an important component of good governance practices. The challenge for the policy-makers is to build the organisational and institutional capacities and make them compatible to the actual environment of the electricity sector.

⁴⁷Government established a quota system based on historical and target consumption levels, and a corresponding bonus and penalty scheme whereby consumers were rewarded or penalised according to whether they fell within or exceeded their quota.

Currently, there are more than 20 organisations involved in the power sector in different capacities. For example, WAPDA, PEPCO, GENCOs and DISCOs, PPIB, AEDB, the Thar Coal and Energy Board, the Infrastructure Project Development Facility (IPDF) and provincial power and irrigation departments with the responsibility to develop small hydropower projects of under 50 MW and other off-grid renewable energy projects. But unfortunately, power sector suffers from institutional and structural disconnections and fragmentation in the management and in the priority of issues [FODP (2010)].

Controlling or restructuring of the state-owned enterprises is the most difficult challenge faced by Pakistan;⁴⁸ limited private participation, substantial state ownership and above all the same Ministry interfering in regulatory matters (determination of tariff) that also oversees the performance of the state-owned enterprise. In other words, government intervention and market competition go along together and often their different objectives clash with each other. Restructuring has been done in Pakistan but without proper commercialisation and induction of professional management to bring about improvements in the system [Malik (2009)].

The power system (though unbundled to a certain level) as an outcome of first generation reforms in the power sector has again become centralised under PEPCO which continues to hold influence (in financial management, power purchase and sales and in the appointment of senior management) over the operating companies (GENCOs and DISCOs). These companies lack technical and managerial skills to operate independently. The structure of these companies on the basis of corporate governance principles has not been established in a true sense [FODP (2010)].

For instance, DISCOs besides having inferior operational performance, are not aware about their role and need of good governance as a corporate entity. Despite being a corporate entity their attitude is still that of a public sector organisation. Not only they are over staffed; their power purchase contracts are not in place and defaults and delays are considered as routine matters. They are still unable to recover dues especially from the public sector and provincial government departments due to the same bureaucratic style of governance and thus causing high losses in the distribution systems. It may be because the same workforce and professionals are sitting there as was in the previous public entity or they have inherited that behaviour which they don't want to change. It was expected from DISCOs to bring efficiency in the system and bring quality in service; but they have failed to do so and are seeking support from the government. Single-buyer model⁴⁹ accompanied with the delay in the payment of subsidies by the government and the lack of discipline in

⁴⁸Not only in Pakistan, all post-socialist countries with limited tradition of independent public institutions, limited regulatory experience and capacity.

⁴⁹Single-buyer model—under this no direct contractual links exist between GENCOs and DISCOs. Generators sell electricity at regulated prices which is supplied to DISCOs at pooled average power purchase prices.

these DISCOs has forced them to default; significant arrears in payments to GENCOs have resulted in the upsurge of the circular debt problem.

One of the major institutional weaknesses is in the regulatory processes. The weak administrative governance in NEPRA takes the form of lack of autonomy, resulting in the overall institutional inability to carry out the desired function effectively. In addition, NEPRA is lacking in professional expertise⁵⁰ to supervise and control the power sector and establish a rational and equitable pricing regime [Malik (2007)].

NEPRA is often been accused for most of the problems in the power sector including load shedding, system losses and high tariffs. NEPRA has been unsuccessful in developing and pursuing a regulatory framework to guarantee reliable, efficient and affordable electricity to consumers. It is in NEPRA's mandate to attract investment in the power sector but except for thermal power plants, no significant addition has been made in projects that are generating electricity from renewable sources.⁵¹ Its role has so far been limited to tariff determination and issuance of licenses but that too under the influence of the government. Moreover, weak capacity of NEPRA to formulate market rules has delayed the implementation process and formation of independent Central Power Purchasing Agency (CPPA).

Furthermore, lack of uniform regulation in the energy sector as a whole creates distortions between the gas and electricity sectors. Inconsistent regulation between the National Electric Power Regulatory Authority (NEPRA) and the Oil and Gas Regulatory Authority (OGRA) sends confused signals to investors and creates disharmony in pricing strategies between gas and electricity [FODP (2010)].

Another institutional shortcoming in the power sector in Pakistan is the unnecessary delays in the decision-making process. Unnecessary delay in the decision-making is also discouraging for private investment. It is found that the cumbersome bureaucratic procedure and lack of administrative efficiency cause enormous delays in decision-making in Pakistan. Having multiple agencies involved in the power sector is also a certain recipe for delays as it becomes necessary to get overall commitment (or approval) for required changes. For example, delay in the transfer of responsibilities from the government to the private sector or to the power regulator means ministers and civil servants giving up responsibilities they have exercised for many years.⁵² International experience has shown that there is often resistance from interest groups benefiting from market distortions or enjoying special privileges in the form of bribes or other pre-requisites. For the success of reforms a committed government should engage all stake holders to gain public support and

⁵⁰The appointment of Chairman and Members of NEPRA is not on the basis of their proficiency and merit but under political influence.

⁵¹For details see Kiani (2011) "Failure of Electricity Governance", *The DAWN*, February 21.

⁵²Creation of PEPCO (as a separate company of WAPDA) was delayed as some senior staff members in WAPDA have personal interests in the delay of restructuring. Similarly delay in the separate tariff determinations for all DISCOs.

provide some form of compensation to those who are annoyed because of the change in the state of affairs. Further, there is need for an effective institutional framework for sustained and efficient level of output growth and for avoiding unnecessary delays in the decision making.

The institutional and organisational weaknesses in the power sector of Pakistan, which used to be the major problem in the 1980s and the 1990s still persists. No government has made any serious effort to overcome this major hurdle in the progress of power sector. Generally speaking, vested interests in these governments have stalled the due level of competence and commitment that are prerequisite for its progress. They not only lacked the capacity to foresee the emerging challenges but were also not able to respond in an efficient manner. Energy offices are considered to be most lucrative and among the most desirable slots in any cabinet⁵³ [Asif (2011)].

As a result of these problems tariffs, investment and appointment of senior management and staff have largely been politicised. Lack of expertise in the form of financial and commercial skills is a serious impediment in the way of accountability, quick decision-making and commercial orientation. Low production and lack of any effort to reduce theft from line losses are all due to institutional weakness [Shah (2002)]. Therefore, the thrust of any policy change or reform process should be on institutional issues to tackle the issue of efficiency, affordability, minimisation of cost, losses and theft.

It is generally believed that policy makers have caused enormous damage to this sector either by approving and sanctioning public investment in inappropriate projects or by endangering extremely essential projects for their personal interests—which includes corruption, political motives or any other agenda. This sector has always remained in the limelight because of corruption in financial matters; whether it is a IPP programme, privatisation of KESC, or the curtailment of 1000 MW thermal power project that was supposed to be started in 2005 [for details, see Asif (2011)].

According to two reports⁵⁴ (one by Haigler Bailly, Pakistan and second conducted under US-funded power distribution improvement programme) which suggest that Pakistan's power sector (excluding KESC) lost over Rs 391.6 billion every year mostly because of mismanagement. According to these reports power companies have been over-billing consumers and as a result about Rs 110 billion could never be recovered. Furthermore, a generation capacity of about 1500MW has completely been lost because of mismanagement whose capital cost has been estimated at Rs 135 billion. In addition to this capacity loss, another five percent of generation is lost every year because of inefficiency. This translates into an annual

⁵³Whether it is the post of Minister, chief executive of power company or Chairman NEPR—all are done under political influence and not on the basis of professional expertise and merit.

⁵⁴Cited from Kiani (2011).

loss of Rs 9 billion. These reports concluded that besides the 22 percent distribution losses reported by PEPCO, the computed technical losses have averaged around 8 percent and administrative losses of around 2 percent. It is suggested in these reports that about 10 percent of these losses could be reduced in less than a year, resulting in saving of Rs 60 billion every year.

Despite the severity of governance related issues in the power sector, the response from the present government is almost negligible. The current state of affairs as cited in different documents is not different from previous regimes. Hardly any deal or project is undertaken in a fair and transparent manner and without any controversy. For instance, Compact Fluorescent Lamps (CFLs) project worth Rs 6.7 billion has been reported to suffer from serious irregularities; rental power plants/ IPPs programme have also become controversial; and accusations regarding Kohala (1100 MW) Hydro Project that decision makers have violated Pakistan Power Regulatory Authority (PPRA) rules while ignoring transparency and evading international competitive bidding [Mughal (2011)]. Moreover, appointment of inappropriate and incompetent personal for the highest possible energy offices has also been done [Asif (2011)].

Moreover, delay in decision-making and its implementation is also common. For example, the Central Power Purchase Agency (CPPA) with private management; was supposed to be replaced with PEPCO as planned in the power sector reforms package approved by the Cabinet Committee on Restructuring (set up in December 2009); but so far has not been done.⁵⁵

Unless all distribution companies are made accountable for all their decisions and finances, it would not be possible to bring in efficiency in the power sector because inefficient DISCOs like Quetta, Hyderabad, and Peshawar are being indirectly subsidised by some profit making DISCOs like Lahore, Islamabad, and Faisalabad. As discussed earlier, the government is delaying the announcement of separate tariffs for all corporate distribution companies despite separate determinations made by NEPRA. The Government finds separate tariffs as being a politically difficult decision to implement (an example of political capture). They find it difficult to defend if the tariff in Islamabad and in other cities in Punjab remains at the current level but increases in Balochistan, Sindh and KPK (where distribution companies are making losses).

Despite the increase in generation cost, the Government has delayed the pass on of the full cost to the end-consumer that has resulted in a wide gap between the consumer-end rates determined by NEPRA and the rates being charged to the consumers. Similarly GENCOs are running below their net available capacities because the desired maintenance and scheduled outages over the years as per standard industry practices is not in place. The two audit reports (as cited in Kiani,

⁵⁵Ministry of Water and Power along with NEPRA has been blamed for the delay (for details, see Ahmad Faraz Khan, *The DAWN*, August 25, 2011 and *The DAWN*, September 14, 2010).

2011) have revealed that an amount of Rs 102 billion was being lost because of extra use of fuel due to inefficient plants. Finally, the required contracts between GENCOs and NTDC, NTDC and DISCOs, and GENCOs and DISCOs are still not in place. These are essential if these entities are to be ready for privatisation [Siddiqui (2011)].

6. CONCLUSION

Improvement in the processes of decision making and implementation could be an important ingredient in working toward a fair and sustainable electricity sector. Well-functioning governance system will allow for better decision making about the goals of electricity reform and ensure that these goals are modified to local needs. Better governance will allow for making and implementing decisions at the right time, and ensure a means of holding all the stakeholders (government, private sector, public sector organisations and consumers) accountable to their actions. Regrettably, the system badly lacks in all these accounts. The power sector is affected by a number of institutional and organisational weaknesses, with inefficient generation and distribution systems, dependence on expensive fuels, non-optimal tariffs, financial mismanagement and high level of corruption and incompetence.

In other words, the energy sector has been the victim of bad decisions, policies and a serious lack of capacity to take appropriate decisions and the timely implementation of those decisions. These issues can only be addressed if the management of energy sector becomes more professional and competitive. The dilemma in Pakistan is that policy-makers have always focussed on short term goals, disorganised financial strategies and have made wrong choices (like too much emphasis on RPPs by the present government; rather than developing a long term strategy and seriously implementing it.)

Undoubtedly the present government has made some efforts to solve the energy problems in the country but these efforts were not only inadequate (for instance, reluctance to announce separate tariffs for different geographical regions) but sometimes their priorities were in the wrong direction, for instance rental power plants rather than focussing on the refurbishment of already existing plants. Sometimes they were unable to take timely decisions because of political reasons just like the previous governments; and sometimes the bad repute as well as bad governance practices have never allowed the progress in the sector. In fact the problems in the system have aggravated rather than being resolved.

Generally speaking about the power system, the strategic plan for restructuring of the power sector of Pakistan which was developed in 1992 and formally implemented in 1994-95 has not been successful. More than fifteen years have passed but it has failed to achieve its objectives of improving operational or financial efficiency. The status of the power sector in terms of technical, economic and financial efficiency has in fact deteriorated. The institutional weaknesses and governance issues which used to be the main hurdle in the development of the power

sector still persist. The plan for restructuring and corporatisation of WAPDA, including commercialisation, professional management and improvement in the system to bring about reforms, has so far failed to achieve positive outcomes.

There is need to re-examine the process of restructuring in the light of ground realities. New wave of power sector reforms is badly awaited. But one thing needs to be realised that successful power sector reforms depends on a wide group of reforms. That is, not only power sector reforms but also judicial reforms that empower regulators to make reliable decisions; and financial reforms that allow power generators to pay the real cost of capital and are subject to hard budget constraints [Victor (2007)].

The inherent institutional weaknesses in Pakistan's power sector needs to be overcome. Learning from the past experience, it is essential that the power sector utilities be reorganised and managed on commercial lines to tackle the issues of efficiency, availability, affordability and technical and distribution losses. The focus should be more on the indigenous (and cheap) resources and improvement in government capabilities to effectively manage the whole state of affairs.

In both public and private sectors there are thermal power plants with substantial capacities. But they are producing much less than their capacity because of their inability to purchase fuel to run thermal plants. In order to fully utilise the available capacity it is essential that fiscal management of energy sector should be improved on priority basis. This will help in overcoming the shortage of electricity that is causing a lot of inconvenience to consumers in all categories. Rather than focussing on rental power plants (for the reasons discussed in the previous section) as it will lead to more inefficiencies in the system.

Circular debt is a major hurdle in the future projects; and is now affecting the gas and oil sectors as well. In the last two years, despite a substantial increase in power tariffs the problem of circular debt still persists. Given our institutional and organisational fragmentation, this issue has led to an interesting divide within government. Petroleum Ministry has been pushing hard for resolving the circular debt problem (because growth in oil and gas exploration activities has been severely affected owing to lack of cash) but the Ministry of Water and Power is resisting the reforms needed for avoiding crisis in the long term; and Ministry of Finance, despite realising the concerns of Petroleum Ministry is waiting for a positive response from the Ministry of Water and Power.⁵⁶

The issue of circular debt should be resolved once and for all. For this the government needs to find out its exact amount. Improved corporate and operational governance of power sector companies and cost-effective pricing (not dependent on government subsidies) is important for the sustainability of the sector. Given the limited fiscal resources it is difficult to finance for such a huge amount of subsidy from the budget every year (and at the cost of other development activities).

⁵⁶For details, see Zafar Bhutta, "Outstanding liabilities in the energy sector cross Rs 444 billion, no solution in sight", *The Express Tribune*, December 06, 2011.

Good business environment is necessary to encourage private investors in the power sector. For the resolution of circular debt an efficient administrative system needs to be in place that never allows the problem of circular debt to recur, once it is resolved. Some of the measures being initiated by the government to streamline fiscal management of energy sector are steps in the right direction. For instance monthly fuel adjustments by NEPRA for DISCOs and quarterly adjustments for consumers.

The politics of pricing is such that it is difficult to ask people to pay more for a product that is undersupplied. Therefore, it is equally important that line and theft losses that are as high as 37 percent in certain areas should be brought down to a level comparable to other countries. The government should update the system gradually and made every effort to reduce the system's losses. Roughly 1500 -2000 MW of additional capacity can be made available through the reduction in T&D losses which ideally should be in the range of 6-7 percent. Power theft can easily be controlled if there is a will, while technical losses can also be improved through appropriate investment [Asif (2011)].

The government is required to be tough to recover all the outstanding bills from all defaulters (whether in the public sector or private consumers, provincial or federal governments or military) as quickly as possible. When the inefficiencies in the system are removed, the problem of circular debt would be automatically resolved. Otherwise its impact on the liquidity of the entire energy chain would be devastating [Abbasi (2011)].

Complete corporate structure for all DISCOs; and the tariffs for each DISCO based on its efficiency, is must for the progress in the sector. Similarly, the power tariff determination for KESC should be in line with other distribution companies. Instead of subsidising the consumers of KESC, the focus should be on the removal of inefficiencies in the system. T & D losses in KESC are around 35 percent; the focus should be on its reduction as a top priority. Power subsidy provided to the consumers in KESC is also adding to the inter-corporate debt in the system. The government had agreed to Rs 15 per unit tariff during KESC's privatisation. But under political pressures, KESC is forced to charge Rs 9 per unit from consumers and the remaining Rs 6 per unit is being subsidised by the government, amounting to Rs 72 billion per year. For the current fiscal year, the government has allocated Rs 24 billion in subsidy for KESC meaning the remaining amount will add up to the circular debt [Bhutta (2011)].

For the last ten years or so we are talking about least cost options, but nothing significant has been done so far in this direction. Same is the case with the present government. Whatever addition is made in the installed capacity is mostly thermal and that too which relied on an expensive fuel option. It's high time to correct our mistake which we have done as an outcome of 1994 Power Policy and currently ended up with a subsidy of more than Rs 2 per unit. Dependence on imported oil and

gas should be reduced to the minimum because of fluctuating prices of former and depleting resources of latter. We have plenty of indigenous resources like coal, hydro and other renewable resources. The key to good governance is the realisation that every citizen is entitled to get an equitable dividend out of any system. Here it would only be possible when all the efforts are made to minimise the cost of generation.

In our planning strategies for the last eight nine years (not only this government but also the previous government), the utilisation of these resources has always been at the forefront, but unfortunately these plans have not been implemented significantly. All the hydro power projects (under construction) should be completed in time to enhance cheap electricity generation capacity. Focus should be on the exploitation of more hydro resources, not only in public sector but also in the private sector. The government needs to concentrate on those issues⁵⁷ which are discouraging private sector from getting involved in hydro projects. Similarly, coal gasification projects should be seriously pursued. Unless or until we stop relying on oil and gas based thermal power generation and focus on cheap sources of producing electricity the financial problems of the power sector will not be resolved.

Energy conservation measures should be implemented in letter and spirit and on a permanent basis to reduce the consumption of electricity. This demand side strategy has proved to be quite successful in other countries along with all the above listed supply side measures.

To conclude the fundamental hypothesis being tested is proven correct on both counts—poor governance and wrong direction of adopted policies are responsible for the current crisis in the energy sector.

REFERENCES

- Abbasi, Z. (2011) Energy Crisis Costs 2 Percent of GDP Annually. *Business Recorder*, July 07.
- ADB (2010) Islamic Republic of Pakistan: Rental Power Review. Prepared by Asian Development Bank.
- Ahmad, M. B. (2010) Worsening Gas Crisis. *The Nation*, December 05.
- Alternative Energy Development Board (2005) Power Sector Situation in Pakistan. Report prepared by Alternative Energy Development Board in collaboration with Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Islamabad.
- Asif, M. (2011) *Energy Crisis in Pakistan—Origins, Challenges and Sustainable Solutions*. Karachi: Oxford University Press.
- Bhutta, Z. (2011) Government May Hike Power Rates by Rs 0.18 Across Country. *The Express Tribune*, August 20.
- Bhutta, Z. (2011) Power Plants may Shut Down in 10 Days. *The Express Tribune*, August 09.

⁵⁷For details, see Friends of Democratic Pakistan (2010).

- Bhutta, Z. (2011) Power Tariffs to Go Up by 16.5 Percent. *The Express Tribune*, August 03.
- Bhutta, Z. (2011) Rather than Reduce Subsidies, Government Increases Power Outages. *The Express Tribune*, July 18.
- Chaudhry, S. (2011) ECC Approves LNG Policy 2011. *The Daily Times*, August 17.
- FODP (2010) Integrated Energy Sector Report and Plan. Report prepared by Friends of Democratic Pakistan (FODP), Energy Sector Task Force, Asian Development Bank and Government of Pakistan.
- Fraser, J. M. (2004) Lessons from the Independent Power Experience in Pakistan. Energy and Mining Sector Board, The World Bank, Washington, DC. (Discussion Paper No. 14).
- Ghafoor, A. and J. Weiss (1999) Privatisation of Electric Power Sector in Pakistan: Some Important Issues. *The Pakistan Development Review* 38:1, 69–84.
- Ghani, M. O. (2009) Pakistan's Energy Sector Needs Long-term Sustainable Policy. *Business and Finance Review*, February 23.
- Khan, A. F. (2011) *The DAWN*, September 27.
- Khan, A. H. (2011) Power Sector Crisis: Some Recommendations. *The News*, May 24.
- Khan, M. Z. (2011) Plan to Raise Power Tariff, Cut Subsidies. *The DAWN*, July 22.
- Kiani, K. (2008) Energy Crisis: Serious and Worsening. *The DAWN*, January 07.
- Kiani, K. (2011) 15 Percent Raise in Power Tariffs on the Card. *The DAWN*, May 06.
- Kiani, K. (2011) Failure of Electricity Governance. *The DAWN*, February 21.
- Kiani, K. (2011) Government to Ban New Oil Based Power Units. *The DAWN*, March 31.
- Kiani, K. (2011) Minister Orders Mass Disconnection. *The DAWN*, September 22.
- Kiani, K. (2011) Non-stop Power Supply for High Tariff Proposed. *The DAWN*, May 16.
- Malik, A. (2007) Effectiveness of Regulatory Structure in the Power Sector of Pakistan. Pakistan Institute of Development Economics, Islamabad. (PIDE Working Paper No. 25).
- Malik, A., *et al.* (2009) Power Sector Reforms in Pakistan: A Critical Review. *Middle East Business and Economic Review* 21:2.
- Mughal, O. (2007) What is Wrong with KESC? Available at www.pakistaniat.com/2007/08/07/what-is-wrong-with-KESC/.
- NEPRA (2010) State of Industry Report. National Electric Power Regulatory Authority, Islamabad.
- NEPRA (2011) State of Industry Report. National Electric Power Regulatory Authority, Islamabad.
- NEPRA (Various Years) Annual Report. National Electric Power Regulatory Authority, Islamabad.

- Pakistan, Government of (Various Years) *Annual Development Plans*. Islamabad: Planning Commission, Government of Pakistan.
- Pakistan, Government of (Various Years) *Pakistan Economic Survey*. Islamabad: Ministry of Finance, Government of Pakistan.
- Pasha, A. G. (2010) Economic Cost of Power Outages. Available at <http://ippbnu.org/files/CostofPowerOutages.pdf>
- PEPCO (2008) Electricity Marketing Data: Power System Statistics, 32nd Issue. Planning (Power) Department (NTDC), WAPDA House, Lahore.
- PEPCO (2010) Electricity Marketing Data: Power System Statistics, 35th Issue. Planning (Power) Department (NTDC), WAPDA House, Lahore.
- Rana, S. and Z. Bhutta (2011) Government Mulls Monthly Tariff Adjustments. *The Express Tribune*, August 10.
- Shah, M. A. (2002) Private Sector Investment in the Energy Sector: Case of Pakistan. *NIPA Journal* 7:2, 11–32.
- Siddiqui, R., *et al.* (2011) The Cost of Unserved Energy: Evidence from Selected Industrial Cities of Pakistan. Pakistan Institute of Development Economics, Islamabad. (PIDE Working Papers, 2011:75).
- Siddiqui, U. (2011) Power Sector Reforms: Pakistan Struggles to Overcome the Power Crisis. *The Express Tribune*, April 25.
- Trimble, C., N. Yoshida, and M. Saqib (2011) Rethinking Electricity Tariffs and Subsidies in Pakistan. Policy Note, The World Bank. (World Bank Report No. 62971-Pk).
- Umar, A. (2011) Media's Approach to Economic Issues. *The DAWN*, October 20.
- Victor, D. G. and T. Heller (2007) *The Political Economy of Power Sector Reforms*. Cambridge University Press.