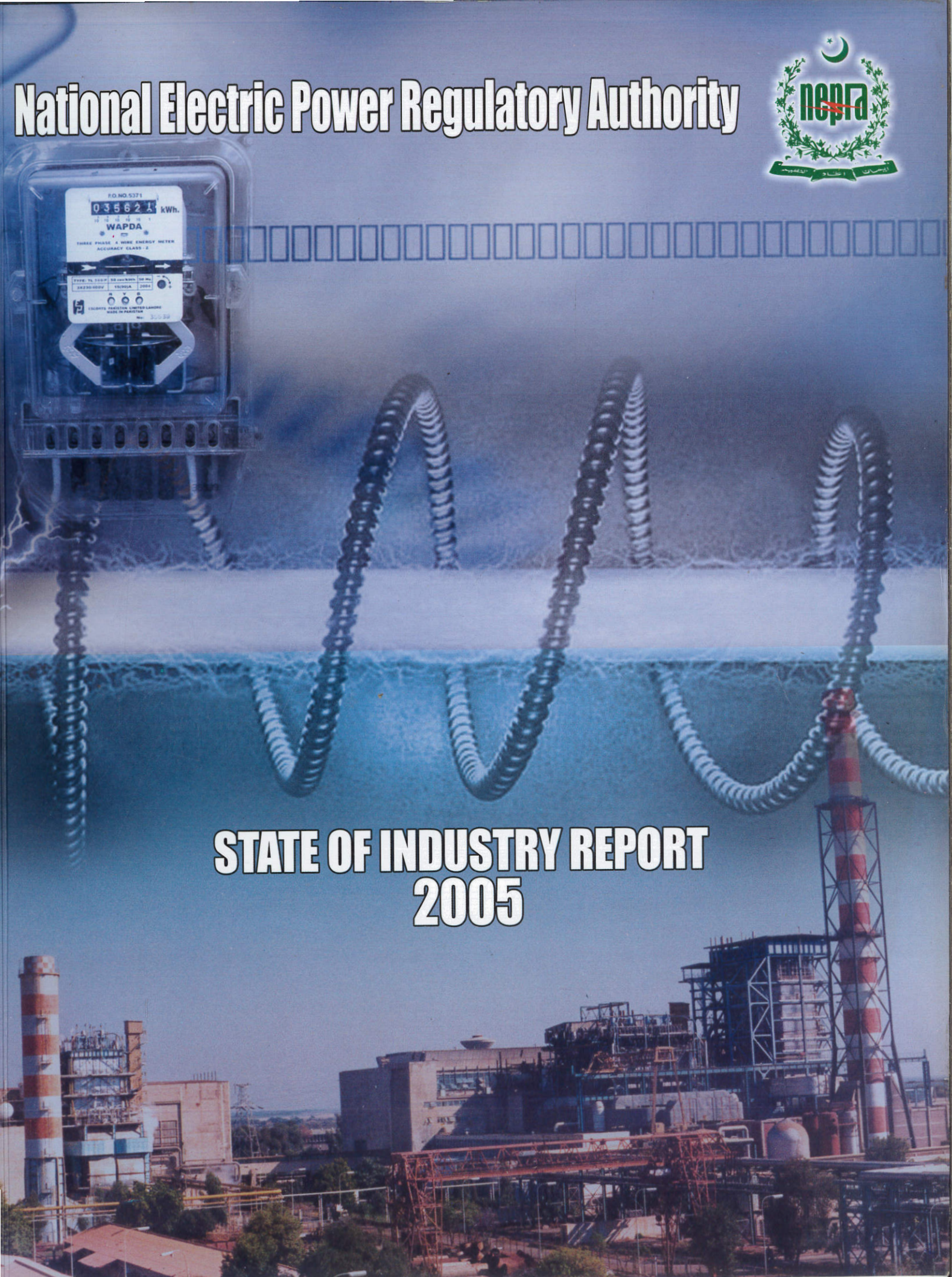
National Electric Power Regulatory Authority



STATE OF INDUSTRY REPORT 2005


بسم الله الرحمن الرحيم

Report

on

STATE OF ELECTRIC POWER INDUSTRY IN PAKISTAN

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

Second Floor, OPF Building, G-5, Islamabad.
Ph: (051) 9207200 (051) 9220902
Fax: (051) 9210215
E-mail: office@nepra.org.pk, info@nepra.org.pk
Website www.nepra.org.pk

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Sources of Information

The following sources of information have been used in the compilation of the State of Industry Report-2005:

i. Ex-WAPDA Distribution Companies.
ii. WAPDA.
iii. National Power Control Center.
iv. NTDC.
v. KESC.
vi. Private Power and Infrastructure Board.
vii. Sarhad Hydel Development Organization.
viii. Pakistan Energy Year Book 2004, Hydrocarbon Development Institute of Pakistan
ix. World Development Indicators, the World Bank.
x. Economic Survey of Pakistan.
xi. Tariff Petitions submitted to NEPRA by Ex-WAPDA Distribution Companies

FOREWORD

NEPRA was established in the backdrop of encouraging the private sector to undertake infrastructure development in the power sector. The purpose of the regulatory framework is to assure investors of a suitable return, ensure consumer protection and transparency in the decision making process. NEPRA is in the process of facilitating the transition towards an electric power market by issuing licences to new incumbents in the power sector and the determining of tariffs based on cost of electricity supply.

Heavy dependence on thermal power generation, in particular imported oil, has led to a significant increase in tariffs. This has adversely affected the poor since they have had to relocate their budget towards payment for electricity at the cost of other essential items of daily use. Realizing this, the government has adopted the long term strategy to enhance the exploitation of hydropower, exploration and production of oil, gas and coal resources, and increase the share of hydel, coal and alternative energy in the overall energy mix to bring down to some extent the cost of electric power supply and consequently the tariffs.

It is the intention of the government to reverse the trend of reliance on more thermal production within five years and meet 70 percent of country's electricity requirements with hydropower. It is focused on completing vital power resources in all the provinces and to provide inexpensive power for increased economic activity. The power generation from Ghazi Barotha to its full capacity would help lower the power tariffs in a couple of years.

Realizing the importance of Renewable Energy in providing electricity to remote rural areas, the Government of Pakistan created the Alternative Energy Development Board (AEDB) in May 2003. A mission of the board is to introduce Alternative/Renewable Energy at an accelerated rate to achieve 10 % share of RE in the energy mix in the country. One of the mandates is to play a pivotal role in establishing international linkages and engaging in the transfer of state of the art know how on renewable energy technologies to local research institutions and industries in Pakistan.

The differential power tariffs of Ex-WAPDA Power Distribution Companies are yet to be notified by the Federal Government. The Government is engaged in finalizing the mechanism for subsidy to be given to distribution companies in future to ensure the unified power tariff for end consumers.

Regulators could have an excellent grasp of technical issues like cost of capital and rate design, but effective decision-making is lacking if the ideas are not communicated effectively or policies are not implemented. Acquiring effective communication strategies as well as developing strategic negotiation skills and good relations with the press is essential for regulators. It is in this spirit and as mandated in the NEPRA Act, this report presents the state of affairs of the electric power sector in Pakistan as of June 2004. The figures for 2005 have been taken wherever the data was available.

Chairman

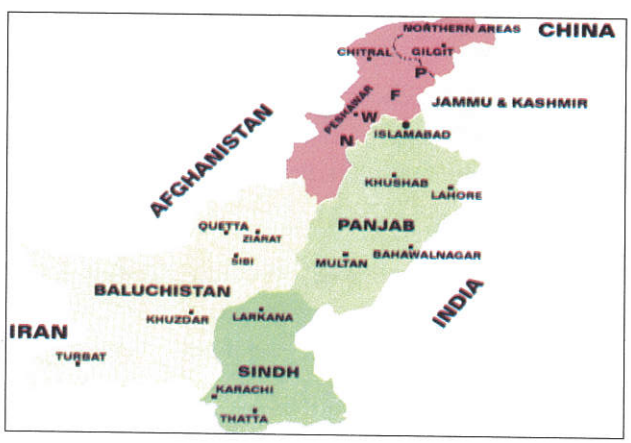
I. Introduction

The National Electric Power Regulatory Authority (NEPRA) was created through an Act of Parliament known as the NEPRA Act passed by the National Assembly in December 1997. The Act provides the framework for regulation of the electricity sector in Pakistan. Under the terms of the Act, NEPRA is exclusively responsible for regulating the power sector. NEPRA is responsible for developing and implementing the regulatory framework in accordance with requirements and obligations set out in the Act, and in Rules and Licences developed under the NEPRA Act.

2. Under the NEPRA Act, NEPRA is envisaged to be an independent and autonomous regulatory institution. Under Section 42 (b) of the NEPRA Act reproduced hereunder, NEPRA is obligated to produce a State of the Industry Report:

> Section 42. Reports of the Authority:- (1)The Authority shall submit, to the Council of Common Interests and to the Federal Government, at the end of every financial year, but before the last day of September of that year-
>
> (a) a report on the conduct of its affairs for that year including anticipated developments for the following year; and
>
> (b) a report on the state of electric power services in the country identifying the ownership, operation, management, efficiency and control of electric power facilities, amount of transmission and generation capacity, present and future demand of electricity, cost of electric power services and other matters.

II. Country Background



MAP OF PAKISTAN

3. The Islamic Republic of Pakistan is located in South Asia, sharing its borders with India in the east, China in the northeast, Iran in the southwest, and Afghanistan in the northwest. The Arabian Sea is Pakistan's southern boundary, with a coastline of

1,064 km.

4. The country has a total area of 796,095 sq km, about four times the size of the United Kingdom. From Gwadar Bay in its southeastern corner, the country extends more than 1,800 km to the Khunjerab Pass on China's border. Pakistan has a population of about 152.1 million, growing at about 2.1% per annum.

III. Economic Overview

5. A comparison of the salient indicators of development for a few countries is given in Table 1.

Table 1

Selected Indicators - 2004

	World	Pakistan	India	Bangladesh	China	Malaysia
Population (Millions)	6345.1	152.1	1079.7	140.5	1296.5	25.2
Per Capita Primary Energy Supply (TOE)	1.55	0.30	0.32	0.11	0.91	2.17
Per Capita Electricity Generation (kwh)	2657	581	561	145	1484	3500
Import Dependence		24%	18%	21%	1%	Exporter

Source: World Bank, Medium Term Development Framework 2005-10

6. Sound macroeconomic policies and implementation of structural reforms in almost all sectors of the economy have transformed Pakistan into a stable and resurgent economy in recent years.

7. Poverty related public expenditure increased substantially during the first three quarters of fiscal year 2004-05, reflecting the Government's commitment to poverty reduction. At Rs. 192.5 billion, they represented a 23.2 percent increase over the same period of 2003-04. As a percentage of GDP, these increased from 2.8 to 2.9. Their share in total public expenditure increased from 24.9 percent to 25.1 percent.

8. The 6.4% growth rate in GDP in 2003-04 was the highest rate recorded since 1995-96. The economy has mounted a strong recovery with a sustained improvement in prospects. The process of economic recovery gained further traction during the fiscal year 2004-05, with the real GDP growth of 8.4 percent being the fastest in two decades and per capita income crossing $ 700 mark. This was ably supported by an impressive growth in manufacturing sector.

9. Pakistan's economy is undergoing structural shifts that are fueling rapid changes in consumer spending patterns. Three years of strong economic growth complemented by record low interest rates and the ongoing structural shift of many households in Pakistan toward higher consumption have injected new life into domestic spending. Real private consumption expenditure grew by 8.2 percent in 2003-04 and further by

16.8 percent in 2004-05. The positive prospect for consumer demand, if sustained, will be a crucial support for the government's major macroeconomic policy target for 2005-06.

10. Per capita income indicates the average level of prosperity in the country or average standard of living of the people in a country. It grew by an average rate of 13.5 percent per annum during the last three years rising from $579 in 2002-03 to $ 657 in 2003-04 and $736 in 2004-05.

11. The privatization programme continued to maintain its robust momentum. The extremely buoyant attitude of the private sector can be viewed by the fact that the cumulative borrowing of this sector during the last three years amounted to Rs.863 billion as against the cumulative borrowing of Rs.580 billion in the previous ten years (1992-2002). More importantly, credit to private sector as percentage of GDP surged from almost 20 percent in 1999-2000 to over 25 percent in 2004-05 almost 5 percentage point's increase in the last six years. The distribution of credit to private sector was highly broad-based as almost all sectors of the economy availed substantial credit.

12. Inflation based on the Consumer Price Index increased to 9.3 percent in 2004-05 from 4.6 percent in 2003-04. A surge in domestic demand on the one hand and supply side shocks emanating from rising commodity and oil prices on the other, have been responsible for the sharp pick up in inflation. The rise in inflation has hurt the poor and fixed income groups the most. In particular, food inflation at high double-digit has put extra-ordinary burden on poor segments of the society as they spend bulk of their income on food items.

13. Pakistan has been introducing reforms to attract the inflow of foreign investment since the early 1980s and FDI crossed the one billion dollar mark once before in 1995-96. Pakistan was successful in attracting $ 1.524 billion in FDI during 2004-05 as against $ 0.949 billion in 2003-04. Over 70 percent of FDI has come into power sector and telecom sectors; chemicals, pharmaceutical and fertilizer; oil and gas; and banking and finance and almost 70 percent of it has come from USA, UK, Switzerland, Japan, UAE and Netherlands.

14. Following a credible strategy of debt reduction and, in particular, with the establishment of the Debt Office in the Ministry of Finance, Pakistan has succeeded in reducing the rising trend in external debt and foreign exchange liabilities. Pakistan's external debt and liabilities have declined by $ 1.24 billion down from $37.9 billion at the end of the 1990s to $36.62 billion by end-March, 2005. The surplus in current account coupled with continued build up in foreign exchange reserves and the higher foreign exchange earnings, pre-payment of expensive debt and debt write-off are the major factors responsible for the reduction in the total stock of debt. The country's debt burden defined as a ratio of external debt and liabilities to GDP stood at around 52 percent in end-June 2000, declined to 36.7 percent in end-June 2004 and further to 33.1 percent by end-March 2005. Similarly, the country's debt burden defined in a

different way, that is, external debt and liabilities as percentage of foreign exchange earnings reached an unsustainable level of 335 percent by 1998-99, was 297 percent in 1999-2000, declined to 164.6 percent in 2003-04 and further to 145.9 percent by end-March 2005.

IV. Structural Reforms

15. To sustain the momentum of economic upturn is indeed a major challenge for the policy-makers. Linked with this are the challenges of job creation, poverty alleviation, improving social indicators and most importantly, strengthening the country physical infrastructure to support 7 8 percent growth in the medium-term. Against the backdrop of the improved economic outlook, the focus of policy efforts should be on medium-term measures that would underpin the sustainability of the recovery while rebuilding room for maneuver to respond to possible future shocks.

16. Structural reforms policy measures that change the institutional and regulatory frameworks governing market behaviour can lead to greater efficiency in the allocation of resources. Structural reforms also boost growth in the short-run by increasing returns to investment and by providing scope for macroeconomic policies to allow the economy to run at higher levels of capacity utilization without inflationary pressures.

17. Wide ranging structural reforms, prudent macroeconomic policies, financial discipline, and consistency and continuity in policies have transformed Pakistan into a stable and resurgent economy. Going forward, sound macroeconomic policies, financial discipline, continuity of policies, political and regional stability will be the key to sustain growth momentum.

V. Investment Climate

18. As part of an integrated investment promotion strategy, the Government has undertaken a comprehensive programme of radical economic reforms including liberalisation, de-regulation and privatisation, to bring the economy into a full market-oriented system, with the aim of capturing the private sector's potential in all areas of economic activity.

19. Several sectors are now open to foreign investment, including electric power, telecommunication, highway construction, port development and operations, oil and gas, services/infrastructure, and the social and agriculture sectors.

20. As the privatization-led inflows boosted the total foreign investment figure to a high level of $1.677 billion in 2004-05 (direct $ 1.524 billion and portfolio $ 0.153 billion), Pakistan hopes to attract huge FDI for infrastructure development in the coming years, particularly in power, oil and gas, telecom and transports sectors.

21. The macroeconomic situation has stabilized. The recent investment boom is strongly aided by a successful privatization programme.

22. According to an official handout of the Private Power and Infrastructure Board (PPIB), the country is in dire need of power in the coming years with power shortages beginning from 2006-07 and reaching to around 5,500 MW by the year 2009-10, if no new investment takes place.

23. The Policy for Power Generation Projects-2002 focuses on exploitation of indigenous resources including hydel, coal and gas. The Private Power and Infrastructure Board (PPIB) is putting in all efforts and playing a proactive role to develop power projects based on local fuel resources in the country, with the help of private sector participation.

24. Pakistan is also likely to face gas shortages from the year 2006-07. Thus, serious efforts are being made to import gas from Iran, Turkmenistan or Qatar.

25. Pakistan also wants to jack up its strategic oil reserves capacity from 21-days to about 45-days over the next few years. Pakistan is hoping to attract energy giants from the Middle East and Europe in this sector.

VI. The Energy Sector

26. Energy is the lifeline of economic development for any country. Adequate energy is to be provided to industry for driving economic growth and creating employment opportunities. The per capita energy consumption with only 14 million BTU is low in Pakistan as compared to 92 million BTU for Malaysia and 34 million BTU for China. The figure below gives a comparison of energy units utilized to produce 1 US $ of GDP for 2003-04.

27. The increasing energy demand and expensive crude oil availability has resulted in a shift in both exploration and production activities towards gas. The country's percentage primary energy mix in 2003-04 in comparison to regional and other countries is given in Table 2 followed by a graphical illustration.

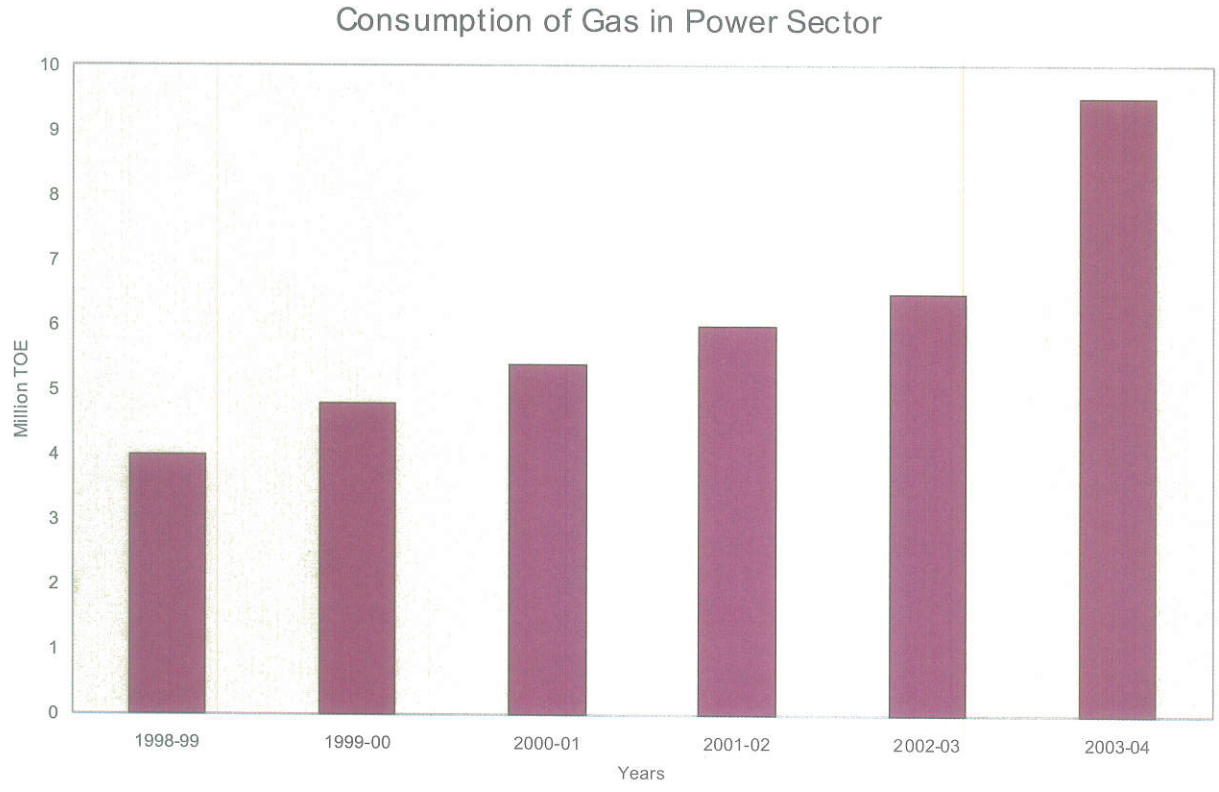
Table 2

Primary Energy Mix by Country
(2003-04)

(%)

	Pakistan	India	Malaysia	UAE	UK	USA	Canada	China
Oil	30.0	35.0	42.0	32.0	35.0	40.0	30.0	23.8
Gas	50.0	7.0	51.0	68.0	35.0	23.0	27.0	2.6
Coal	6.5	55.0	4.0	-	16.0	23.0	24.0	67.0
Others	13.5	3.0	3.0	-	14.0	14.0	19.0	6.6

the largest consumer of gas (35.4 percent), followed by fertilizer (23.4 percent), industrial sector (18.9 percent), household sector (17.6 percent), commercial sector (2.8 percent), and cement (1.5 percent). During the period 1990-2004, the power sector was the second highest consumer of petroleum products (31.1 percent average) after transport sector (48.7 percent average). The following figure gives the consumption pattern of gas in the power sector for the five years 1998-99 to 2003-04.



31. The use of coal in the power sector decreased from a level of 415349 tonnes in 1998-99 to 184992 tonnes in 2003-04. In view of a big shortfall in electricity in the coming years maximum utilization of coal will be most appropriate for power generation. Pakistan should acquire expertise and technology to eliminate hazards and pollution from coal fired thermal power stations.

VII. Overview of the Electricity Sector

32. Electricity constitutes one of the most important components of infrastructure and plays a key role in national growth and development. With only about half of nearly 152.5 million people having access to electricity, a huge population base provides an ideal opportunity for expansion of electricity generation, transmission and distribution. The growing pace of urbanization and industrialization also puts a premium on demand for electricity. Load management has to be carried out due to transmission/transformation constraints.

33. In view of the long lead-time required to bring new power plants on line, particularly

those based on hydro, work on new indigenous fuel based power projects has to be started forthwith.

34. A comparison of electricity production, access to electricity and sources of electricity in various countries for the year 2002 is given in the Table 5.

Table 5

Electricity Production, Access to Electricity and Sources of Electricity

Country	Electricity Production (Billion kwh)	Access to Electricity (% of Population)	Sources of Electricity (% of Total) (2002)				
Source	(2002)	(2000)	Hydropower	Coal	Oil	Gas	Nuclear Power
Australia	222.0	..	7.1	78.3	1.7	11.6	
Austria	60.4	..	66.1	12.3	2.6	15.5	
Bangladesh	18.4	32.5	6.0		8.5	85.5	
Belgium	80.9	..	0.4	15.6	1.2	22.1	58.5
Canada	601.4	..	58.2	19.5	2.4	5.8	12.6
China	1640.5	98.6	17.6	77.5	3.0	0.3	1.5
Denmark	39.2	..	0.1	46.5	10.2	24.4	
Egypt	86.1	93.8	16.3		7.5	76.0	
Finland	74.9	..	14.4	26.3	0.8	15.1	29.8
France	554.8	..	10.9	4.5	0.8	4.2	78.7
Germany	566.9	..	4.1	51.4	0.8	9.5	29.1
India	596.5	43.0	10.7	70.1	4.7	10.5	3.3
Indonesia	108.2	53.4	9.2	39.7	23.3	22.1	
Iran	140.8	97.9	5.7		17.8	76.4	
Italy	277.5	..	14.2	14.6	31.6	35.8	
Japan	1087.7	..	7.6	26.8	13.4	22.5	27.1
Kuwait	36.9	100.0			78.9	21.1	
Malaysia	74.2	96.9	7.1	6.0	9.3	77.5	
Netherlands	96.0	..	0.1	28.0	2.9	59.4	4.1
New Zealand	40.3	..	60.7	4.0		25.1	
Norway	130.1		99.3	0.2	0.0	0.2	
Oman	10.3	94.0			18.0	82.0	
Pakistan	75.7	52.9	29.5	0.3	32.2	35.7	2.3
Phillipines	48.5	87.4	14.5	33.3	13.0	18.1	

Russian Federation	889.3		18.2	19.2	3.1	43.3	15.9
Saudi Arabia	145.6	97.7			65.9	34.1	
Sri Lanka	7.0	62.0	38.7		61.2		
Sudan	2.9	30.0	44.4		55.6		
Sweden	146	..	45.6	2.6	2.0	0.4	46.3
Switzerland	64.9	..	54.2		0.1	1.4	41.9
Turkey	129.4	..	26.0	21.8	8.3	40.6	
UAE	42.2	96.0			7.9	92.1	
United Kingdom	384.5	..	1.2	32.8	1.8	39.6	22.9
United States	3992.7	..	5.8	51.3	2.5	17.8	20.1

Source: World Development Indicators, the World Bank

The symbol (..) means that data are not available or that aggregates cannot be calculated because of missing data in the years shown.

VIII. Privatisation Programme of the Power Sector

35. In 1985, in view of an anticipated gap in the demand and supply of electricity, as well as a shortfall of the fund-raising capacity in the public sector, the Government of Pakistan announced certain measures to encourage private sector participation in the power sector. These measures encouraged the private sector to come forward and submit their proposals for establishing power plants. Keeping in view the difficulties of the protracted negotiations on tariff and other project parameters, a policy and package of incentives for private power sector was announced in March 1994, which was based on a fixed across the board tariff for all power plants. As a result of these private power initiatives and policy announced by the Government, a total capacity of 4,432 MW has been added to the system in the country as of June 2003. In addition, the Kot Addu Power Plant (1,638MW) was also transferred to private sector management in 1996 with initial shareholding of 26% and current shareholding of 36% held by National Power of UK and 64% by GOP/WAPDA. Subsequent to the policy of 1994, the GOP announced other policies in the years 1995, 1998 and 2002.

36 Bidding for the sale of 51% to 73% shares of KESC was held on February 4,2005 at the Privatization Commission. NEPRA was represented at the bidding. Kanooz Al Watan of Saudi Arabia (KAW) offered the highest bid for the purchase of 73% shares of KESC and was declared to be the successful bidder. Siemens Pakistan Engineering Company Limited, the Pakistan arm of the Siemens Group, a worldwide electrical and electronic engineering group, is the technical partner of KAW. The Cabinet Committee on Privatization (CCOP) in its meeting held on February 7, 2005 approved the KAW bid and a letter of acceptance was issued to KAW by the Privatization Commission on the same day reiterating various conditions to be

fulfilled by KAW. Later on KAW declind the offer. Presently, negotiations are underway with the second highest bidder i.e. Hassan Associates Consortium.

37. The privatization of Jamshoro Power Company Limited, Faisalabad Electric Supply Company Limited and Peshawar Electric Supply Company Limited is pending for want of the notification of the tariffs determined for these companies.

IX. The Electricity Sector in Pakistan

38. The Power sector in Pakistan has historically consisted of two major state-owned utilities, the Water & Power Development Authority (WAPDA) and Karachi Electric Supply Corporation (KESC). These two utilities have operated independent of each other, except for a 220 kV double circuit and two 132 kV links. Together, the utilities are responsible for power generation, transmission and distribution to more than 15 million consumers in the country. Both WAPDA and KESC are controlled by the Ministry of Water and Power. Approximately 95% of the grid system is Operated by WAPDA and the balance by KESC.

X. Power System Statistics

39. The installed capacity, energy generation, maximum demand on the system, energy sales and number of consumers for WAPDA, KESC and the country is presented in Table 6.

Table 6
Electric Power Statistics

	WAPDA		KESC		Total	
Fiscal Year Ending 30th June	**2003**	**2004**	**2003**	**2004**	**2003**	**2004**
Installed Capacity (MW)	**15819**	**17367**	**2310**	**2310**	**18129**	**19677**
Public	**9749**	**11230**	**1911**	**1911**	**11660**	**13141**
Hydel	5009	6463			5009	6463
Thermal	4740	4834	1911	1911	6651	6745
Private	**5745**	**5795**	**262**	**262**	**6007**	**6057**
Hydel	30	30			30	30
Thermal	5715	5715	262	262	5977	5977
Nuclear	**325**	**325**	**137**	**137**	**462**	**462**
Addition during the Year (MW)		**1548**		**0**		**1548**
Energy Generation (Gwh)	**63978#**	**69058#**	**10870***	**11600***	**74848**	**80658**
Public	**41837**	**48390**		**9852**		**58242**
Hydel	22253	27372				**27372**

Thermal	19584	21018		9852		30870
Private	**20755**	**19109**		**1702**		**20811**
Hydel	97	105				105
Thermal	20658	19004		1702		20706
Nuclear	**1386**	**1559**		**46**		**1605**
Maximum Demand (MW)	**11044**	**11598**	**1973**	**2073**		
Energy Sales (GWh)	**47421**	**51492**	**7041**	**7907**	**54462**	**59399**
Energy Generated (Gwh)	**63978**	**69058**	**10870**	**11600**	**74848**	**80658**
Energy Loss (Gwh)	**16557**	**17566**	**3829**	**3693**	**20386**	**21259**
Losses (%)						
Transmission	7.7	7.3				
Distribution	16.2	16.1				
Transmission & Distribution	23.9	23.4	35.2	37.8		
No. of Consumers (000)	**13318**	**14091**	**1685**	**1749**	**15003**	**15840**

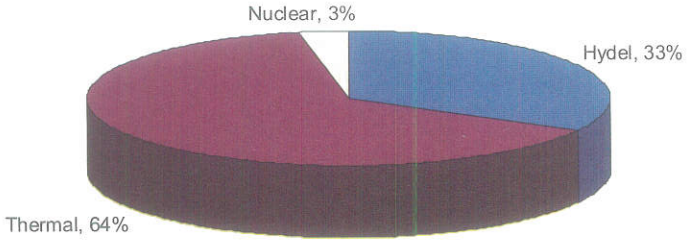
Source: WAPDA/KESC

excludes import from KESC
* excludes import from WAPDA

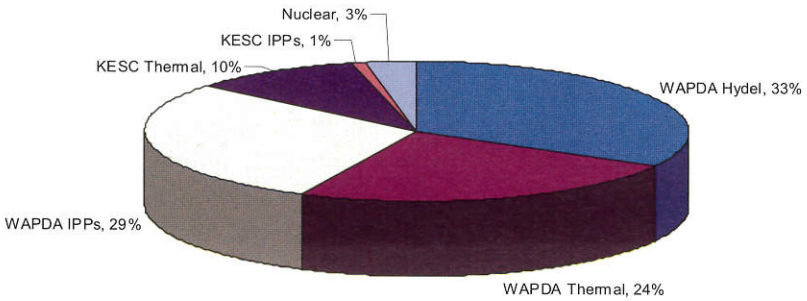
XI. Generation Capacity

40. Pakistan's total installed generation capacity as of June 2004 was 1966 MW which comprised of hydro, thermal and nuclear.

Composition of Installed Capacity (2003-04)
Source - wise



Source / Agency



Source: WAPDA / KESC

Available Capacity

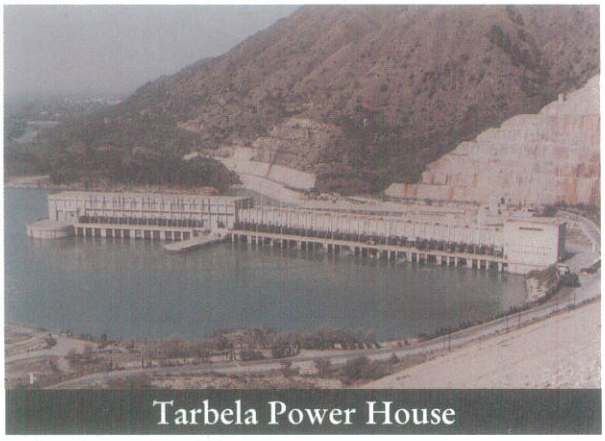
41. Availability of hydro capacity varies with the inflow of water in the rivers and canals. The actual generation, therefore, varies during each year. Details of available month-wise hydro capacity is given in Table 7.

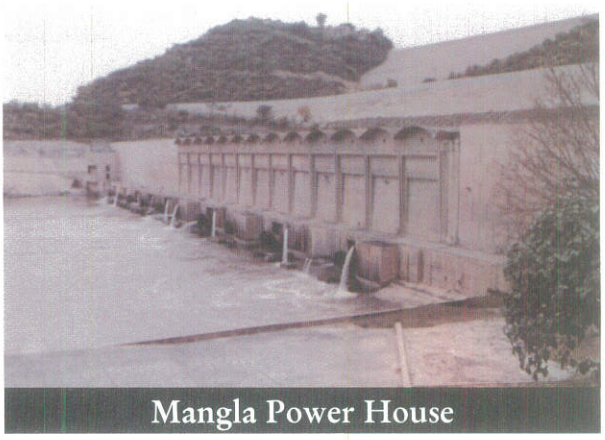
Table 7

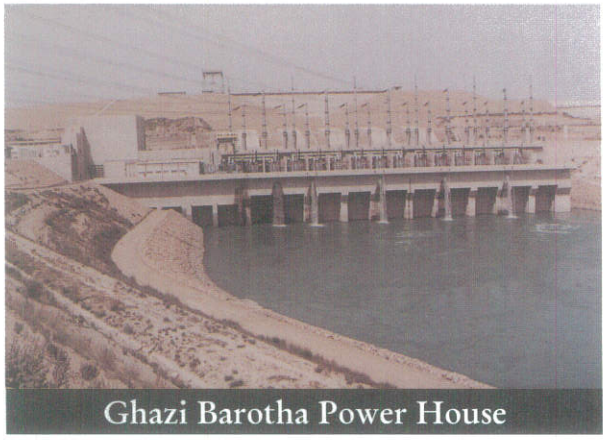
Monthly Variation of Hydel Generating Capability

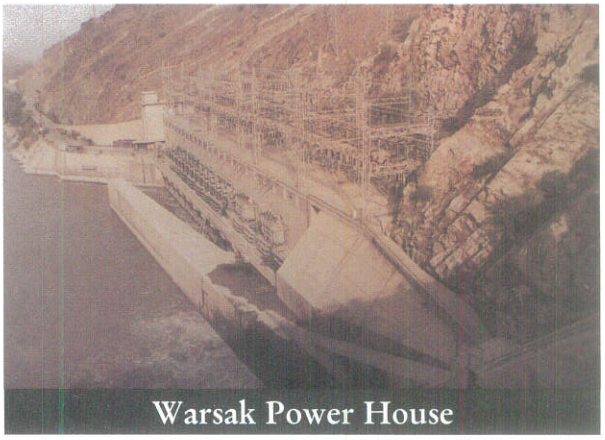
Sr. #	Month	Tarbela (MW)	Mangla (MW)	Ghazi Barotha	Warsak (MW)	Chashma* (MW)	Small Hydels (MW)	Total (MW)
1.	July 2003	3664	1150	290	185	184	67	5540
2.	August	3714	1150	580	205	184	68	5901
3.	September	3714	1150	580	205	184	70	5903
4.	October	3714	1150	900	165	184	68	6181
5.	November	3326	1150	900	145	184	59	5764
6.	December	2989	1087	1000	145	184	56	5461
7.	January 2004	1910	818	600	145	150	42	3665
8.	February	2340	885	900	145	184	63	4517
9.	March	1462	505	900	145	108	61	3181
10.	April	1768	615	900	145	174	60	3662
11.	May	1850	890	1450	215	184	66	4655
12.	June	1744	905	1450	205	184	68	4556

Source: National Power Control Centre


Tarbela Power House


Mangla Power House


Ghazi Barotha Power House


Warsak Power House

42. The available capacity of the thermal units is less than the installed capacity, due to their age and auxiliary consumption.

43. Table 8 below shows the available capacity (annual average) as of June 2004.

Table 8

Available Capacity (June 2004)

	Hydro	Thermal	Nuclear	Total
Installed Capacity (MW)	6493	12722	462	19677
Available Capacity (MW)	4763	9400	20	14183
Available % of Installed Capacity	73	74	4	72

Source: WAPDA/KESC

Load Pattern and Peak Load Hours

44. The peak load hours in Pakistan are generally between 6 pm and 10 pm. This load decreases to its minimum between midnight and 5am.

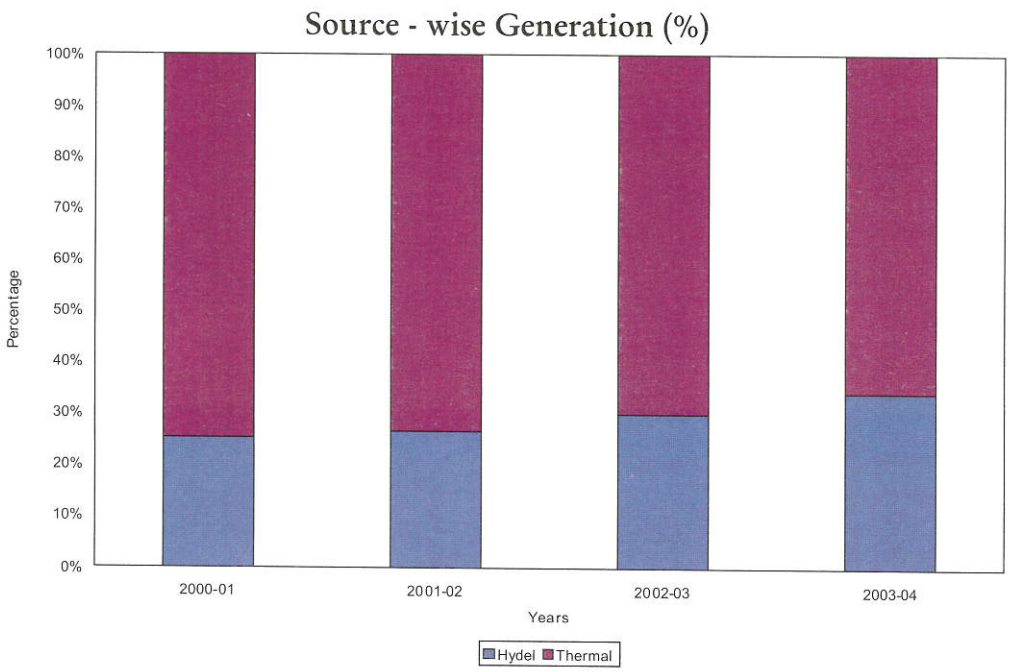
Table 9
Energy Generation by Source

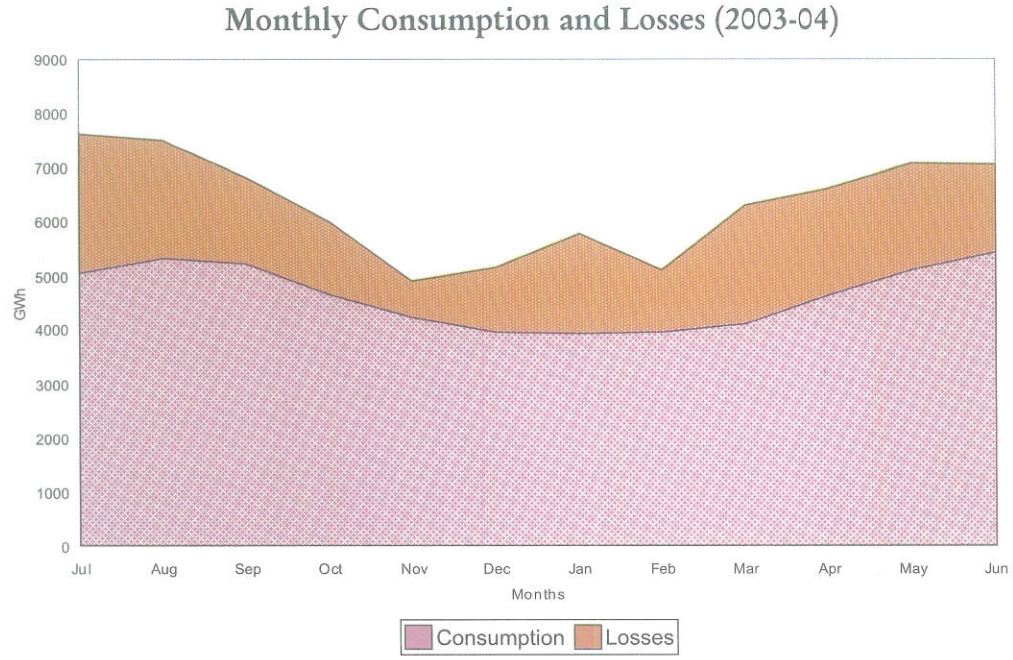
(Gwh)

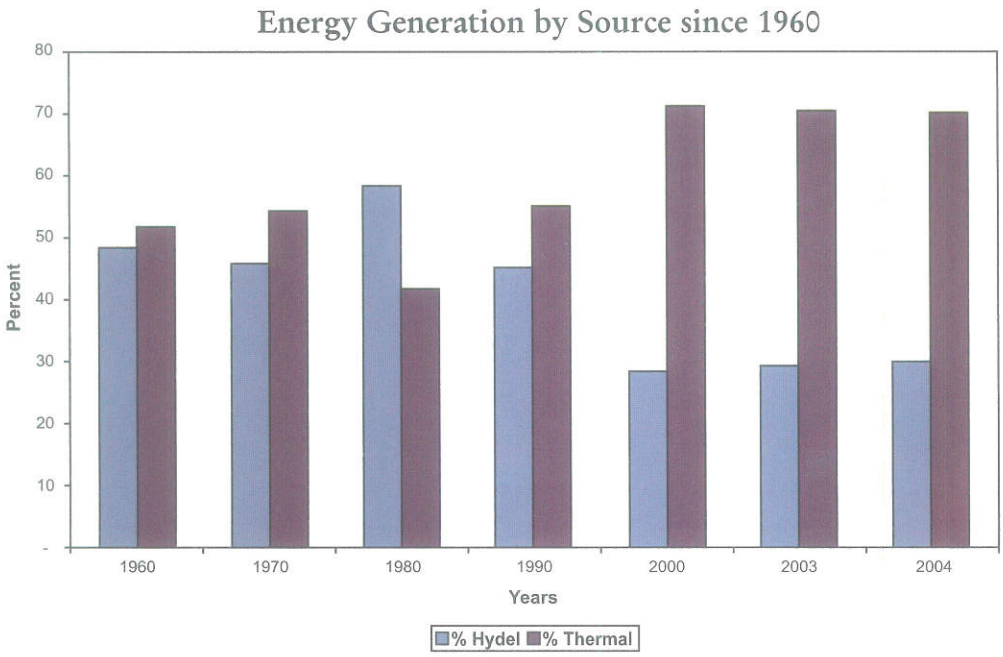
Source of Generation/Years	2000-01	2001-02	2002-03	2003-04
WAPDA				
	58436	60842	63978	69058
Hydel	17259	19056	22350	27477
Thermal	41177	41786	41628	41581
KESC				
Thermal	9920	10826	10870	11600
Total				
	68356	71668	74848	80658
Hydel	17259	19056	22350	27477
Thermal	51097	52612	52498	53181

Source: WAPDA Power System Statistics/KESC

Note: Thermal includes nuclear







Economic Load Dispatch System

45. The economic load dispatch system of WAPDA was commissioned in 1991. This system comprises one National Power Control Center (NPCC) at Islamabad and two Regional Control Centres (RCCs) for North and South areas located respectively at Islamabad and Jamshoro. NPCC is responsible for coordinating the operation of

power plants and 500/220 kV transmission lines/grid stations. The RCCs are controlling 132 / 66 kV systems in their respective areas.

View of a WAPDA Grid Station

XII. National Transmission & Dispatch Company (NTDC)

46. The Government, in pursuing a long-term restructuring and commercialisation of the power sector created a national transmission and dispatch company, NTDC.

47. NTDC was incorporated in 1998 under the Companies Ordinance of 1984 and was granted Transmission License by NEPRA on 31-12-2002. NTDC is responsible to carry out transmission business in its territory. The territory includes whole of Pakistan excluding area served by KESC.

48. The national transmission grid in Pakistan is a fully integrated system anchored by a 500 KV and a series of 220KV bulk transmission lines running from the hydro units in the north to near Karachi. It operates and maintains one of the largest contiguous grid systems of the world. The KESC's system is also connected to the national grid through a 220 kV double circuit and two 132 kV links.

49. As of June 2004, NTDC is operating and maintaining 4268 Circuit Kilometres of 500 KV transmission lines and 6183 Circuit Kilometres of 220 KV transmission lines.

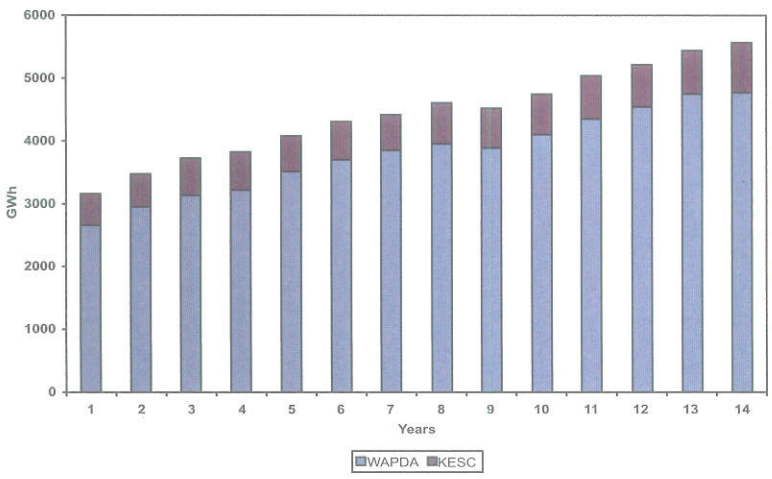
50. The transmission system of KESC consists of 264 Circuit Kilometres of 220 KV, 526 Circuit Kilometres of 132 KV and 213 Circuit Kilometres of 66 KV overhead lines. There are 12 Kilometres of 220kV, 75 Kilometres of 132kV and 6 Kilometres of 66 KV under ground cables. Besides, there are 6 220 kV, 40 132kV and 6 66kV grid stations.

500 KV Transmission Line

XIII. Demand Growth in Pakistan

51. Pakistan's electricity demand has grown at a rapid pace since 1985. Consumption of electricity increased from 17,608 GWh in FY1985 to 55,507 GWh in FY2004, representing an annual average growth rate of 6.2%. The growth in the electricity demand, however, has been uneven over the years. The consumption of electricity grew at a rate of 11% during FY1985-99, the growth rate slowed down to 6.9% during FY1990-1995 and 2.5% during FY1996-2000. Since FY2000, however, the trend has reversed and the electricity demand has picked up, mirroring the overall economic growth in the country. During FY 2001-04, the electricity demand grew at a rate of 3.3%. Electricity consumption of the country since 1991-92 up till 2003-04 is given in the chart below:

Historical Consumption in Pakistan (1990-91 to 2003-04)



Peak Demand

52. For the year 2004-05, the maximum demand for power on the WAPDA system was 12035 MW excluding export to KESC. The maximum demand on the KESC system was 2197 MW. The figures for the year 2003-04 for WAPDA system were 11598 MW including export to KESC of 520 MW while the maximum demand on the KESC system was 2073 MW.

Consumption by Customer Category

53. Residential customers comprise the bulk of the country's consumption (43.2%), followed by industrial consumption (31.2%). Annual consumption of electricity in the residential sector is currently about 1865 kWh per customer, whereas annual consumption per industrial customer is approximately 75,313 KWh per customer. The consumption of the major customer categories in Pakistan is presented in Table 10.

Table 10

Consumption by Customer Category

Customer Category	Consumption in FY2004 (GWh)	Share of Consumption (%)
Residential	**23983**	43.21
Commercial	**3663**	6.60
Industrial	**17322**	31.21
Agriculture	**6596**	11.88
Public Lights	**267**	0.48
Bulk	**2399**	4.32
Other	**1278**	2.30
Total	**55508**	100.00

Source: Ex-WAPDA DISCOs/KESC

54. The Consumption Pattern in percentage is also shown in the figure given below:

Consumption by Consumer Category (2003-04)

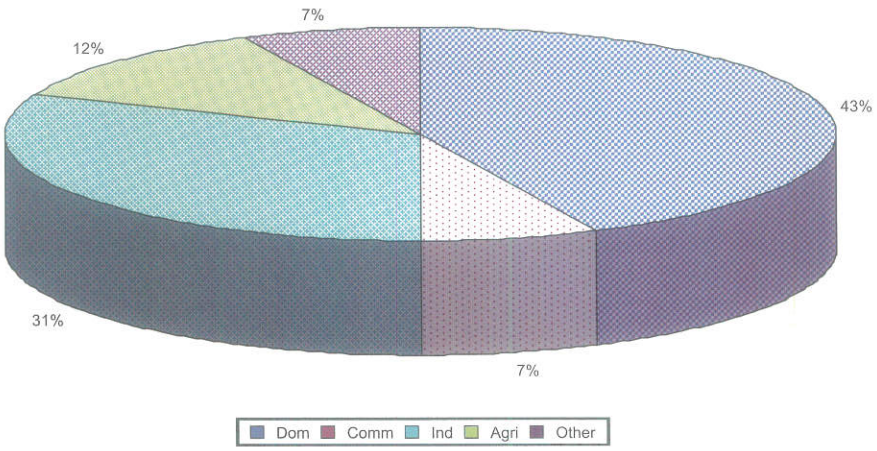


Table 11

Province wise Electricity Consumption by Economic Groups (2003-04)

(Gwh)

	Punjab	Sind#	NWFP*	Balochistan	KESC	Total
Domestic	15802	1747	2944	354	3136	23983
Commercial	2244	248	292	74	805	3663
Industrial	12206	986	1162	78	2890	17322
Agriculture	2900	532	460	2660	44	6596
P.Lights	130	41	24	1	71	267
Bulk Supply	1169	189	250	92	699	2399
Others	915	8	177	0	178	1278
Total	35366	3751	5309	3259	7823	55508
% of Total						
2003-04	63.7	6.8	9.6	5.9	14.1	100.0
2002-03	59.5	10.0	12.4	5.3	12.8	100.0

Source: Ex-WAPDA DISCOs/KESC

excluding export to KESC
* excluding FATA

Table 12

Province wise Electricity Consumption by Economic Groups (%) (2003-04)

	Punjab	Sindh	NWFP	Balochistan	KESC	Total
Domestic	44.7	46.6	55.5	10.9	40.1	43.2
Commercia	6.3	6.6	5.5	2.3	10.3	6.6
Industrial	34 5	26 3	21 9	2 4	36 9	31 2

Agriculture	8.2	14.2	8.7	81.6	0.6	11.9
P.Lights	0.4	1.1	0.5	0.0	0.9	0.5
Bulk Supply	3.3	5.0	4.7	2.8	8.9	4.3
Others	2.6	0.2	3.3	-	2.3	2.3
Total	100 0	100 0	100 0	100 0	100 0	100 0

Source: Ex-WAPDA DISCOs/KESC

Table 13

Electricity Consumption per Consumer

(kWh)

Year	Domestic	Commercial	Industrial	Agriculture	Others	Total
WAPDA						
1999-00	1983	1211	55364	25880	589643	3531
2000-01	1993	1221	60068	27138	562408	3566
2001-02	1960	1267	63233	30326	506216	3566
2002-03	1888	1347	65243	31183	501307	3561
2003-04	1931	1490	68836	33320	500258	3654
KESC						
1999-00	1891	1561	81640	18088	801483	3830
2000-01	2113	1781	85830	17566	755538	4146
2001-02	2027	1873	81769	15151	696291	3992
2002-03	2086	1974	135469	19659	714413	4139
2003-04	2323	2131	143695	27960	816695	4471
Pakistan						
1999 00	1972	1272	58852	25795	617747	3569
2000-01	2006	1318	63529	27054	591993	3636
2001-02	1967	1367	65696	30191	532112	3615
2002-03	1909	1448	71469	31092	524425	3626
2003-04	1972	1595	75371	33275	534195	3744

Source: Power System Statistics, WAPDA

XIV. Village Electrification

55. A total number of 91300 villages had been electrified up till June 2005, leaving 36268 villages to be electrified from the total of 127568. Table 14 shows the Province wise number of villages electrified in 2003-04.

Table 14

Province wise Number of Villages Electrified up to July 2005

	Punjab	Sindh	NWFP	Balochistan	Total
Total Villages/ Settlements Electrified	**67914**	**22426**	**22830**	**14398**	**127568**
Electrified up to July 2005	**49302**	**17953**	**18889**	**5156**	**91300**

Un-Electrified	18612	4473	3941	9242	36268
Villages for which funds are available	5737	515	1079	318	7649
Un-electrified villages for which funds are required	12875	3958	2862	8924	28619
Funds required (Rs. In billions)	9.6	3.2	3.4	3.0	19.2
% of electrification	73	80	83	36	71.57

Source: WAPDA

56. Village electrification promotes installation of agricultural tube wells as well as small agro based industry. However, rural electrification is not commercially viable for the utility and there is the need for the government to provide adequate funds for the purpose.

XV. WAPDA

57. WAPDA was established in 1958 for the integrated maintenance of water and power resources, as well as controlling soil salinity and water logging.

58. Recent reforms have led to the unbundling of WAPDA's Power Wing into separate generation, transmission, and distribution companies. The total WAPDA sytem accounted for and installed generation capacity of 17,350 MW including isolated system at Pasni and Panjgoor, IPPs and nuclear plants with a customer base of 14 million.

WAPDA Unbundling

59. In order to meet the country's substantial power needs and improve the performance of the sector, the Government has been pursuing an estensive restructuring and reform programme since the approval of a Strategic Plan in 1992. As part of this programme, WAPDA;s power assets have been unbundled into 14 separate companies, consisting of (i) 5 generation companies, (ii) the National Transmission & Dispatch Company (NTDC); and 8 distribution companies as shown in the following table:

Table 15

Companies formed out of WAPDA Unbundling

Generation	Date of issuing of Licence
Jamshoro Power Company Limited	1.7.2002
Central Power Generation Company Limited	1.7.2002
Northern Power Generation Company Limited	1.7.2002
WAPDA Hydroelectric	3.11.2005
Lakhra Power Generation Company Limited	18.2.2005
Transmission	
National Transmission & Despatch Company Limited	31.12.2002

Distribution	
Islamabad Electric Supply Company Limited	2.11.2001
Lahore Electric Supply Company Limited	1.4.2002
Faisalabad Electric Supply Company Limited	2.4.2002
Gujranwala Electric Supply Company Limited	23.4.2002
Multan Electric Supply Company Limited	25.4.2002
Peshawar Electric Supply Company	30.4.2002
Hyderabad Electric Supply Company Limited	23.4.2002
Quetta Electric Supply Company Limited	30.4.2002

60 The WAPDA restructuring programme and the transformation of power assets into autonomous corporatised entities have been led by the Pakistan Electric Power Company (PEPCO), which was established for the purpose of completing the above restructuring. While all the corporatised companies continue to function in an integrated manner, PEPCO is aggressively pursuing a plan to establish their autonomy by completing the transfer of employees, registration of assets, and transfer of liabilities.

61. NTDC would remain as a state-owned entity responsible for dispatch, transmission, and system planning in the former WAPDA region. NTDC would also be responsible for entering into the long term Power Purchase Agreements with the new IPPs.

Table 16

Energy Generation by Source (WAPDA)

(Gwh)

Source of Generation/Years	2000-01	2001-02	2002-03	2003-04
	58436	**60842**	**63978**	**69058**
Public	**35600**	**39269**	**43223**	**49949**
Hydel	17196	18941	22253	27372
Thermal	16839	18666	19584	21018
Nuclear	1565	1662	1386	1559
Private	**22836**	**21573**	**20755**	**19109**
Hydel	63	115	97	105
Thermal	22773	21458	20658	19004

Source: WAPDA Power System Statistics

Criteria for Merit Order Dispatch

62. The main criterion for determination of Merit Order Dispatch is economy. In WAPDA system the Merit Order Dispatch is based on the Present Net Heat Rate. The most economical plant in WAPDA system is Liberty Power (Upto 61.904 GWh) and then comes Uch Power (152.375 Gwh).

63. The Merit Order Dispatch as of June 2004 is presented in Table 17 below:

Table 17
MERIT ORDER
WAPDA
Based on the Present Net Heat Rate at 100% Plant Factor
June 22, 2004

Sr No	Plant Groups	Fuel Type	Fuel Cost Rs/kWh	O&M Cost Rs/kWh	Specific Cost Rs/KWh
1	Liberty (Upto 61.904 GWh)	GAS	0.29600	0.14003	0.43603
2	Uch (Upto 152.375 GWh)	GAS (*)	0.28100	0.10090	0.42050
3	Lakhra	COAL	0.75798	0.09498	0.85296
4	AEL	GAS	1.00401	0.29031	1.29432
5	Uch(-152.375 GWh)	GAS (*)	1.23740	0.10090	1.37690
6	KAPCO-1	GAS	1.36854	0.11234	1.48088
7	Guddu CC 3	R. GAS	1.44985	0.05509	1.50494
8	Liberty (+ 61.9004 GWh)	GAS	1.48000	0.14003	1.62003
9	HCPC	GAS	1.40350	0.16574	1.56924
10	Guddu CC 1 & 2	R. GAS	1.51356	0.05509	1.56865
11	KAPCO-II	GAS	1.50106	0.13140	1.63246
12	Muzaffargarh 4	GAS	1.68671	0.01747	1.70417
13	GTPS Kotri CC	GAS	1.68957	0.03319	1.72276
14	Muzaffargarh 1 – 3	GAS	1.70765	0.01747	1.72512
15	GTPS Faisalabad CC	GAS	1.69494	0.03813	1.73307
16	Guddu-3 Steam	R. GAS	1.73307	0.04246	1.77553
17	Guddu-4 Steam	R. GAS	1.74636	0.04246	1.78883
18	Muzaffargarh 5-6	GAS	1.79237	0.01747	1.80984
19	KAPCO-III	GAS	1.55247	0.25329	1.80576
20	Jamshoro 2-4	GAS	1.82711	0.04915	1.87626
21	Guddu CC -3 (OC)	R. GAS	1.84499	0.05329	1.89828
22	Guddu 1-2 Steam	R. GAS	1.89797	0.04246	1.94043
23	Guddu CC 1&2 OC	R. GAS	1.91735	0.05329	1.97063
24	FKPCL	GAS	1.74869	0.31677	2.06546
25	Muzaffargarh-4	MIX.(**)	2.43530	0.01747	2.45277
26	Muzaffargarh-1-3	MIX.(**)	2.46555	0.01747	2.48302
27	Jamshoro 2-4	MIX.(**)	2.53104	0.04915	2.58019
28	Guddu-3 Steam	MIX.(**)	2.36176	0.04246	2.40422
29	SPS Faisalabad	GAS	2.21528	0.02989	2.24517
30	Muzaffargarh 5 6	MIX.(**)	2.58787	0.01747	2.60533
31	Guddu-4 Steam	MIX.(**)	2.37988	0.04246	2.42234
32	NGPS Multan 3-4	GAS	2.30255	0.05219	2.35474
33	Rousch	FO	1.44314	0.11855	1.56169
34	NGPS Multan 1	GAS	2.32464	0.05219	2.37683
35	Jamshoro -1	FO	3.01806	0.04915	3.06721

36	GTPS Kotri 3-4 OC	GAS	2.41496	0.03262	2.44758
37	GTPS Kotri 5-6 OC	GAS	2.42278	0.03262	2.45541
38	KAPCO-1	FO	2.67003	0.19487	2.86490
39	GTPS Faisalabad OC	GAS	2.44428	0.03757	2.48185
40	Muzaffargarh 4	FO	3.18390	0.01747	3.20137
41	Muzaffargarh-1-3	FO	3.22344	0.01747	3.24091
42	Jamshoro 2-4	FO	3.23497	0.04915	3.28412
43	HUBCO	FO	3.08671	0.07161	3.15832
44	AES Pak Gen	FO	3.08072	0.07235	3.15307
45	Muzaffargarh 5-6	FO	3.38336	0.01747	3.40083
46	Guddu-3 Steam	FO	2.99045	0.04246	3.03291
47	Japan Power	FO	2.89313	0.24115	3.13428
48	Guddu-4 Steam	FO	3.01339	0.04246	3.05585
49	Saba Power	FO	3.12290	0.07240	3.19530
50	KAPCO-II	FO	2.93041	0.27430	3.20471
51	GTPS Kotri 1-2 OC	GAS	2.78262	0.03278	2.81540
52	AES Lal-Pir	FO (***)	3.08072	0.07235	3.29682
53	SEPCOL	FO	2.82322	0.36769	3.19091
54	Kel	FO (***)	2.86007	0.28582	3.28964
55	SPS Faisalabad	MIX.(**)	3.11632	0.02989	3.14621
56	NGPS Multan 3-4	MIX.(**)	3.20134	0.05219	3.25352
57	NGPS Multan 1	MIX.(**)	3.23204	0.05219	3.28423
58	SPS Faisalabad	FO	4.01736	0.02989	4.04725
59	KAPCO-I	HSD	4.24292	0.11296	4.35588
60	NGPS Multan 3-4	FO	4.10012	0.05219	4.15231
61	NGPS Multan 1	FO	4.13945	0.05219	4.19163
62	KAPCO-II	HSD	4.65665	0.15187	4.80852
63	KAPCO-III	HSD	4.81597	0.38352	5.19949

Source: National Power Control Center

* Excise Duty (**) 50% FOQ 50 % GAS *** Premium Value

Cost of WAPDA Thermal Plants is based on 100% Plant Factor & cost of IPPs is as per PPA.

Thermal Power Station Guddu

Thermal Power Station Muzaffargarh

Hub Power Turbine

Kot Addu Power Plant

Distribution Network

64. WAPDA sold 55342 Gwh of electricity in 2004-05 as compared to 51492 Gwh of electricity sold in 2003 2004.

65. The ownership, operation and maintenance of 132 KV and 66 KV transmission lines were handed over to the respective DISCOs and are now part of the distribution systems.

Table 18
Ex-WAPDA Distribution Companies' Service Area

Name	Service Area
Lahore Electric Supply Company (LESCO)	Sheikhupura, Kasur, Lahore, Okara
Gujranwala Electric Power Company (GEPCO)	Gujranwala, Sialkot, Mandi Bahauddin, Hafizabad, Narowal, Gujrat
Faisalabad Electric Supply Company (FESCO)	Faisalabad, Sargodha, Khushab, Jhang, Toba Tek Singh, Bhalwal, Mianwali, Bhakkar
Islamabad Electric Supply Company (IESCO)	Islamabad, Rawalpindi, Attock, Jhelum, Chakwal
Multan Electric Power Company (MEPCO)	Rahim Yar Khan, Multan, Khanewal, Sahiwal, Pakpattan, Vehari, Muzaffargarh, Dera Ghazi Khan, Leiah, Rajan Pur, Bahawalpur, Lodhran, Bahawalnagar
Peshawar Electric Supply Company (PESCO)	Whole province of NWFP, except tribal areas
Hyderabad Electric Supply Company (HESCO)	Whole province of Sindh, except Karachi and part of Thatta district where KESC is responsible for distribution of power
Quetta Electric Supply Company (QESCO)	Whole province of Balochistan, except Lasbela where KESC is responsible for distribution of power

Source: WAPDA

Man at Work on the Distribution System

Demand/Consumption

66. The peak demand of the ex-WAPDA distribution companies is given in the Table below:

Table 19

Peak Demand of Ex-WAPDA Distribution Companies

Name of Company	Peak Demand (MW) 2002-03	Peak Demand (MW) 2003-04
IESCO	921	1100
LESCO	2101	1823
FESCO	1232	1292
GEPCO	923	883
MEPCO	1431	1598
PESCO	1503	1485
HESCO	968	1007
QESCO	548	505
Total DISCOs	**9627**	**9693**
Export to KESC	325	590

Source: WAPDA/State of Industry Report 2004

Table 20

Status of Lines and Grid Stations in Ex-WAPDA DISCOs
(2003-04)

Name of DISCO	Lines					Grid Stations			
	132 KV (CKMs)	66 KV (CKMs)	33 KV (CKMs)	11 KV (CKMs)	Total (CKMs)	132 KV (Nos.)	66 KV (Nos.)	33 KV (Nos.)	Total (Nos.)
IESCO	2014	568	139	16093	18814	59	12	4	75
LESCO	1457	591	0	21205	23253	68	12	0	80
FESCO	1449	1419	0	28361	31229	52	32	0	84
GEPCO	1040	447	0	17416	18903	35	11	0	46
MEPCO	2573	1479	45	45750	49847	69	33	1	103
PESCO	1667	986	237	24464	27354	50	23	5	78
HESCO	3484	1681	0	37841	43006	76	36	0	112
QESCO	2743	345	985	12866	16939	44	11	1	56
Total	16457	7477	1406	203996	229336	452	170	11	633

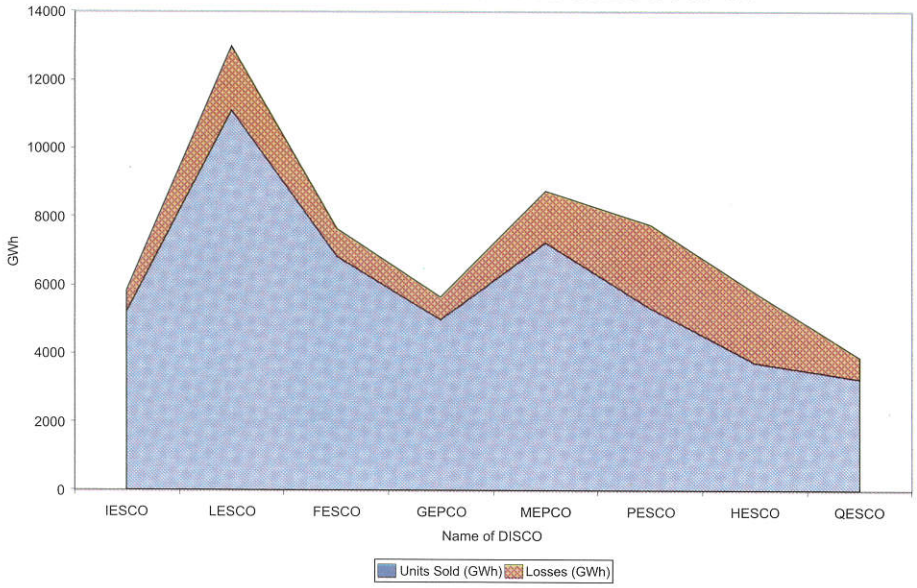
Table 21

Units Purchased, Supplied and Losses of Ex-WAPDA DISCOs
(2003-04)

Name of DISCO	Units Purchased (GWh)	Units Sold (Gwh)	Losses (GWh)	Losses (%)
IESCO	5841	5205	636	10.9
LESCO	12967	11094	1873	14.4
FESCO	7644	6846	798	10.4
GEPCO	5649	4975	674	11.9
MEPCO	8728	7246	1482	17.0
PESCO	7742	5310	2432	31.4
HESCO	5797	3751	2046	35.3
QESCO	3885	3259	626	16.1
Total	58253	47686	10567	18.1

Source: Ex-WAPDA DISCOs

DISCO-WISE LOSSES 2003-04



Ex-WAPDA Distribution Companies' Profiles (2003-04):

IESCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic		42.9	1249939	
Commercial	548	10.5	227296	
Industrial	1111	21.3	9593	
Agricultural	53	1.0	5259	
Public Lighting	45	0.9	1079	
Bulk Supply	449	8.6	689	
Others	766	14.7	100	
	5205	**100.0**	**1493955**	**564**

LESCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic	4298	38.7	1858344	
Commercial	743	6.7	384899	
Industrial	4972	44.8	51212	
Agricultural	739	6.7	35426	
Public Lighting	41	0.4	1220	
Bulk Supply	295	2.7	468	
Others	6	0.1	172	
	11094	**100.0**	**2331741**	**284**

FESCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic	2950	43.1	1695196	
Commercial	324	4.7	243240	
Industrial	2666	38.9	32448	
Agricultural	689	10.1	20766	
Public Lighting	10	0.1	887	
Bulk Supply	200	2.9	423	
Others	7	0.1	84	
	6846	**100.0**	**1993044**	**1349**

GEPCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic	2905	58.4	1651675	
Commercial	257	5.2	233981	
Industrial	1372	27.6	41131	
Agricultural	199	4.0	32651	
Public Lighting	10	0.2	273	
Bulk Supply	109	2.2	114	
Others	123	2.5	24	
	4975	**100.0**	**1959849**	**6329**

MEPCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic	3416	47.1	2127360	
Commercial	372	5.1	306210	
Industrial	2085	28.8	29775	
Agricultural	1221	16.9	37986	
Public Lighting	22	0.3	800	
Bulk Supply	115	1.6	353	
Others	15	0.2	95	
	7246	**100.0**	**2502579**	**2132**

PESCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic	2946	55.5	1685892	
Commercial	291	5.5	220101	
Industrial	1162	21.9	21139	
Agricultural	459	8.6	22778	
Public Lighting	22	0.4	694	
Bulk Supply	251	4.7	774	
Others	178	3.4	22	
	5309	**100.0**	**1951400**	**7380**

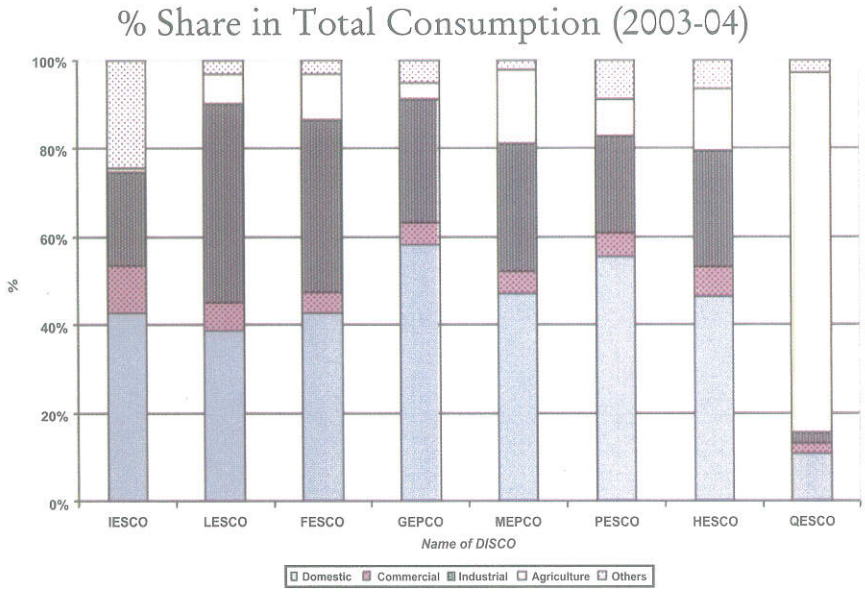
HESCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic	1747	46.6	950391	
Commercial	248	6.6	220762	
Industrial	985	26.3	19669	
Agricultural	535	14.3	21012	
Public Lighting	40	1.1	764	
Bulk Supply	189	5.0	706	
Others	7	0.2	94	
	3751	**100.0**	**1213398**	**1200**

QESCO

Indicators/ Category	Consumption (Gwh)	% Share	No. of Consumers	Villages Electrified
Domestic	354	10.9	292998	
Commercial	74	2.3	73085	
Industrial	79	2.4	2431	
Agricultural	2661	81.6	17254	
Public Lighting	3	0.1	125	
Bulk Supply	89	2.7	165	
Others		-		
	3260	**100.0**	**386058**	**4405**

Source: Ex-WAPDA DISCOs



XVI. KESC

67. KESC is a public limited joint stock company incorporated in 1913. The company, which serves about 1.749 million customers, is a vertically integrated utility that generates, transmits and distributes electricity to Karachi and its adjoining areas (including part of the Balochistan province). KESC has an installed generation capacity of 2310 MW (as of June 2004), which is entirely thermal including 137 MW Karachi Nuclear Power Plant (KANUPP).

68. KESC sold 8416 Gwh of electricity in 2004-05 as compared to 7818 Gwh of electricity sold in 2003-2004.

69. Bin Qasim and Korangi Thermal Power Stations are the most economical plants in KESC system and used as base load power plants.

Table 22

Merit Order Criteria
Based on the Present Net Heat Rate
June, 2004
(KESC)

Plant Groups	Fuel Type	Fuel Cost Rs/kWh	O&M Cost Rs/kWh	Total Cost Rs/KWh
Thermal				
Bin Qasim Thermal Power Station	Gas/F. Oil	2.040	0.226	2.266
Korangi Thermal Power Station	Gas/F. Oil	2.387	0.200	2.587
Gas Turbines				
Site Gas Turbines	Gas/HSDO	2.751	0.145	2.896

Korangi Gas Turbines	Gas/HSDO	2.667	0.192	2.860
Total		**2.138**	**0.218**	**2.356**

Source: KESC

XVII. Future Forecast

Expansion Plan of Installed Generation Capacity in Pakistan

70. The local production of oil and gas would start declining due to depletion of resources from the year 2010. All out efforts are required to explore new fields of gas. In case the gap is not met through indigenous supply, there will be need to import gas, and the requisite infrastructure has to be placed in a timely manner. In the future, it is expected that there will be deficit in the power generation sector. Imported fuel would be required to meet the future demand of power plants operating on oil and gas.

71. The energy mix and demand projections by fuel for the short, medium and long term are given in Table 23.

Table 23

Demand Projections by Fuel

	2004		Short Term 2010		Medium Term 2015		2020		Long Term 2025		2030	
Total MTOE	**50.8**	**%**	**79.39**	**%**	**120.18**	**%**	**177.35**	**%**	**255.37**	**%**	**361.31**	**%**
Oil	15.20	30	20.69	26	32.51	27	45.47	26	57.93	23	66.84	18
Gas	25.45	50	38.99	49	52.98	44	77.85	44	114.84	45	162.58	45
Coal	3.30	6	7.16	9	14.45	12	24.77	14	38.28	15	68.65	19
Hydro	6.43	13	11.03	14	16.40	14	21.44	12	30.50	12	38.93	11
Renewable	-	-	0.84	1	1.60	1	3.00	2	5.58	2	9.20	3
Nuclear	0.42	1	0.69	1	2.23	2	4.81	3	8.24	3	15.11	4

Source: Medium Term Development Framework

72. The energy demand over the next five years is expected to grow at a rate of 7.4 percent per annum. Shifting of the Hydel-Thermal mix towards hydel generation will be encouraged. It is expected that 900 MW capacity would be encouraged through coal based projects. Renewable Energy Projects totalling 800 MW are also envisioned.

73. The Power demand of the country is projected to grow at an Annual compound growth rate of 7.9% during the period 2005-10 and increase from15500 MW in 2005 to 21500 MW in 2010. The sector-wise power demand is given Table 24.

Table 24

Sector-wise Projection of Power Demand

(MW)

Year	Domestic	Commercial	Agriculture	Industrial	Others	Total
2005-06	7199	1216	1763	5891	1035	15500
2006-07	7585	1251	1820	6481	1086	16600
2007-08	8127	1312	1893	7252	1159	17900
2008-09	8783	1354	1979	8181	1243	19600
2009-10	9531	1408	2079	9267	1341	21500

Source: Medium Term Development Framework

74. Energy generation is planned to increase at an average annual compound rate of 7.9 percent to reach 128670 Gwh by 2010. The energy sale is expected to increase at an Annual Compound Growth Rate of 9.4 percent from 66100 Gwh in 2005 to 103500 Gwh in 2010.

75. The following table illustrates the expected expansion plan of installed capacity in Pakistan:

Table 25
Expansion of Installed Generation Capacity in Public Sector in Pakistan

YEAR	Name of Plant	Capacity Of Plant (MW)	WAPDA				KESC			Country	
			HYDEL (MW)	Thermal (MW)	Nuclear (MW)	Subtotal (MW)	Thermal (MW)	Nuclear (MW)	Subtotal (MW)	Additions (MW)	Cumulative Total (MW)
2004-2005			6490	10535	325	17350	1756	137	1893		
2005-2006	Reshun HPP (SHYDO)	2	6491	10535	325	17351	1756	137	1893	2 0	2
2006-2007	GT from UAE	80	6491	10615	325	17431	1756	137	1893	80 0	80
2007-2008	Malakand-III HPP (SHYDO) Pehur HPP (SHYDO) Shishi HPP (SHYDO) Balloki Thermal Project BQPS, KTPS, KTGTPS, SGTPS KTPS Unit-1 Retires (-66 MW)	81 18 2 200	6592	10815	325	17732	1690	137	1827	301 -66	235
2008-2009	Allai Khwar HPP Khan Khwar HPP Duber Khwar HPP Jinnah Low Head Hydel New Bong Escape HPP Intergen Power Project C.C. at Faisalabad BQPS, KTPS, KTGTPS, SGTPS New CCGT Unit-1 at KTPS	121 72 130 96 79 150 450 350	7011	11415	325	18751	2040	137	2177	1098 350	1448
2009-2010	Golen Gol HPP BQPS, KTPS, KTGTPS, SGTPS	106	7117	11415	325	18857	2040	137	2177	106 0	106

Source: National Transmission and Dispatch Company, WAPDA/KESC

Forecast of the Available Future Capacity

76. Table 26 gives a forecast of the installed and available capacity until the year 2009-2010 for the WAPDA system.

Table 26

Forecast of the Installed and Available Capacity

YEAR	WAPDA		KESC	
	Installed Capacity	Available Capacity During	Installed Capacity	Available Capacity During
	(MW)	Peak Demand (MW)	(MW)	Peak Demand (MW) (Including IPPs & Others)
2005-2006	17350	12792	1756	1509
2006-2007	17430	12854	1756	1569
2007-2008	17852	13220	1690	1520
2008-2009	19925	14674	2040	1855
2009-2010	20610	15868	2040	1841

Source: WAPDA/KESC

Projected Supply Demand Gap during Peak Hours

77. Table 27 compares the demand/supply situation for the years from 2004-2005 to 2009-2010 during peak hours and resulting Surplus / Deficit in the supplies at different estimated demand growth rates.

78. However, these figures do not contain any reserve capacity to substitute hydro generation in the extra dry water inflow years and spinning reserves for maintenance/ breakdowns.

Table 27

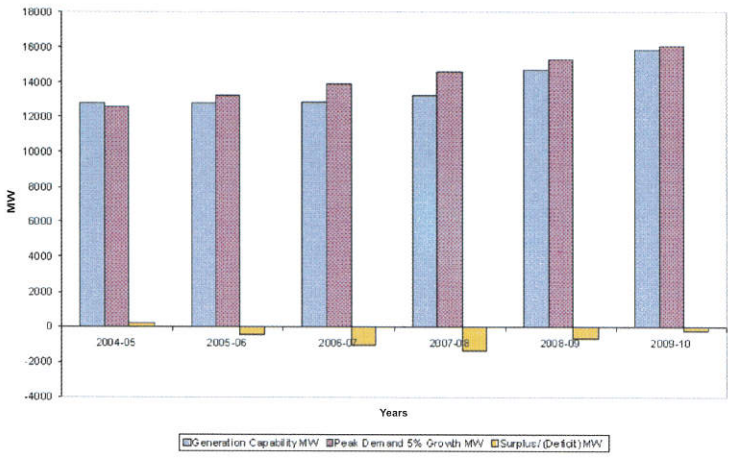
Projected Surplus/Deficit in Demand and Supply during Peak (WAPDA)

YEAR ENDING	Generation Capability	Peak Demand	Surplus/ (Deficit)	Peak Demand	Surplus/ (Deficit)	Peak Demand	Surplus/ (Deficit)
30th JUNE		9% Growth		7% Growth		5% Growth	
	MW	MW	MW	MW	MW	MW	MW
2005	12792	12595	197*	12595	197*	12595	197*
2006	12792	13729	-937	13477	-685	13225	-433
2007	12854	14964	-2110	14420	-1566	13886	-1032
2008	13220	16311	-3091	15429	-2209	14580	-1360
2009	14674	17779	-3105	16509	-1835	15309	-635
2010	15868	19379	-3511	17665	-1797	16075	-207

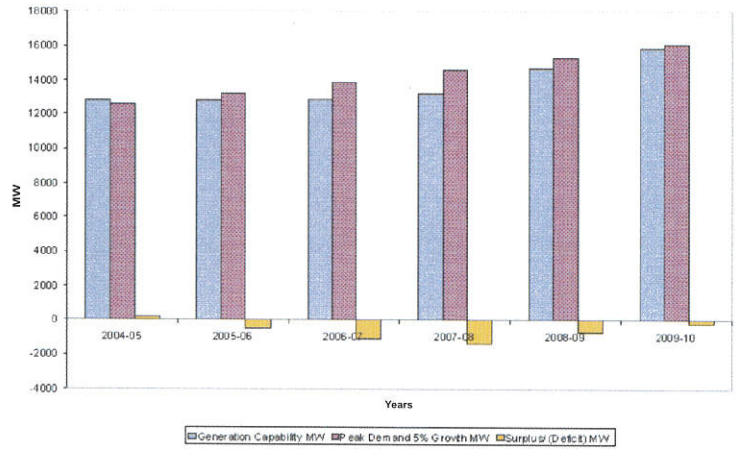
Source: National Transmission and Dispatch Company, WAPDA

* Surplus capacity available. However, load management had to be carried out due to transmission/transformation constraints

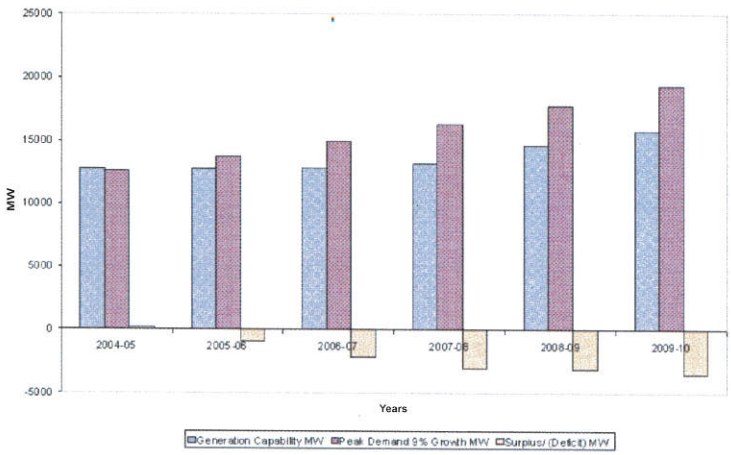
Project Demand Supply Gap at 5% Growth of Peak Demand



Project Demand Supply Gap at 7% Growth of Peak Demand



Projected Demand Supply Gap at 9% Growth of Peak Demand



Projected Surplus/Deficit in Demand and Supply during Peak

KESC

YEAR ENDING	Generation Capability	Peak Demand	Surplus/ (Deficit)	Peak Demand	Surplus/ (Deficit)	Peak Demand	Surplus/ (Deficit)
30th JUNE		9% Growth		7% Growth		5% Growth	
	MW	MW	MW	MW	MW	MW	MW
2005							
2006	1509	2395	-886	2351	-842	2307	-798
2007	1569	2610	-1041	2515	-946	2422	-853
2008	1520	2845	-1325	2691	-1171	2543	-1023
2009	1855	3101	-1246	2880	-1025	2670	-815
2010	1841	3380	-1539	3081	-1240	2804	-963

Source: KESC

79. It is expected that HUBCO will be directly connected to KESC in April 2006 through a 220 Kv transmission line.

XVIII. Investment Plans in the Power Sector

80. Continued economic development and population growth are driving the energy demand faster than the production of electric power. Substantial investment is needed to achieve that level of growth.

81. In order to meet additional power generation requirement of 143310 MW during 2005-2030, an investment of $150 billion would be required. The average Government investment per year is planned at $ 2 billion, with balance requirement of $4 billion per year met through private sector including BOT and public-private partnership modes.

82. The Government of Pakistan has announced a new Policy for Power Generation Projects, 2002 providing attractive incentives for power generation based on indigenous resources. Some of the fiscal concessions offered are:

- Custom duty at rate of 5% on the import of plant and equipment not manufactured locally.
- No levy of sales tax.
- Exemption from income tax including turnover tax and withholding tax.
- Exemption from provincial/local duties and taxes.

83. In order to meet the future load requirement during the period of the Medium Term Development Framework (2005-2010) additional capacity of power will be installed by the commissioning of projects in generation, transmission and distribution.

Investment Requirements in Generation

84. The increasing demand of electric power until the year 2011-2012 would be met through the generation of electricity by public sector as well as private sector power generation projects. The investment requirement for the public sector power generation projects is presented in Tables 29 and 30.

Table 29

Investment Plan for Public Sector Power Generation Projects (WAPDA)

Sr. No.	Name of the Project	Capacity (MW)	Expected Commissioning Year	Estimated Cost (Million Rupees)
1	GT from U.A.E	80	2006-07	4048
2	Malakand-III HPP (SHYDO)	81	2007-08	6600
3	Pehur HPP (SHYDO)	18	-do-	4599
4	Allai Khwar HPP	121	2008-09	6720
5	Khan Khwar HPP	72	-do-	8400
6	Duber Khwar HPP	130	-do-	9900
7	Jinnah Low Head Hydel	96	-do-	7680
8	New Bong Escape HPP	79	-do-	6600
9	Golan Gol Hydropower Project	106	2009-10	6360
10	Kotli HPP	97	-do-	10800
11	Neelum Jhelum HPP	969	2011-12	84000
	Total	**1849**		**155707**

Source: WAPDA

Table 30

Investment Plan for Public Sector Power Generation Projects (KESC)

Sr. No.	Name of the Project	Capacity (MW)	Expected Commissioning Year	Estimated cost (Million Rupees)
1	Korangi Thermal Power Station CCGT Unit-1	350 MW	June 2009	16319
2	Allied Transmission Lines with CCGT Unit 1	2x220 kV	December 2008	1473
3	Korangi Thermal Power Station CCGT Unit-2	350 MW	2010-11	1500
4	Korangi Thermal Power Station CCGT Unit-3	350 MW	2012-13	16800
	Total			**36092**

Source: KESC

85. The cost estimates for the private sector power projects are listed in Table 31.

Table 31

Investment Plan for Private Sector Power Generation Projects

Sr. No.	Name of the Project	Capacity (MW)	Expected Commissioning Year	Estimated Cost (Million Rupees)
1	Orient Thermal Power Project	200	2007	8700
2	Star Thermal Power Project	123	2007	5336
3	Western Electric Thermal Power Project	150	2007	6554
4	Fauji Korangi Thermal Power Project	150	2008	6554
5	Muridke Thermal Power Project	200	2008	8700
6	Sahiwal Combined Cycle Project (Saif Group)	200	2008	8700
7	Mari Thermal Power Project	175	2008	7598
8	Uch-II Power Project	450	2008	19604
9	Faisalabad Power Project	450	2009	19604
10	Attock Thermal Power Project	150	2009	6960
11	Chichoki Mallian Power Project	400	2009	17400
12	New Bong Hydel Power Project	79	2009	5742
13	Kotli Hydel Power Project	97	2009	7018
14	Gulpur Hydel Power Project	120	2009	8700
15	Rajdhani Hydel Power Project	132	2010	9570
16	Habibullah Energy Coal Project	150	2010	8700
17	Dadabhoy Coal Project	200	2010	11600
	Total	**3426**		**167040**

Source: Private Power and Infrastructure Board

Investment Requirements in Transmission

86. In order to cater for power dispersal for new power plants, new power plants, new transmission lines are required to be constructed. The transmission line expansion plan for the NTDC until the year 2010 is given in the Table 32.

Table 32

Power Sector Investment Plan
(NTDC)

(Million Rs.)

Sr. No.	Name of Scheme/ Expected Completion	Date of Approval of PC-I/II		Approved/ PC-I Cost	Expenditure Up to 2004-05	Approved PSDP 2005-06	Estimated Expenditure 2005-06 to 2009-10
	Ongoing Projects (Ph-I)						
1	Power Dispersal from Ghazi barotha	4.6.1996	LCC FCC Total	7137.0 6990.0 14127.0	1546.4 2240.5 3786.9	500.0 1000.0 1500.0	5590.6 4749.5 10340.1
2	Institutional Capacity Building	1.10.2003	LCC FCC Total	20.1 30.8 50.9	3.6 0.0 3.6	10.0 0.0 10.0	9.6 5.8 15.4
	Sub-total (Ph-I)		LCC FCC Total	**7157.1** **7020.8** **14177.9**	**1550** **2240.5** **3790.5**	**510** **1000** **1510**	**5600.2** **4755.3** **10355.5**
	Ongoing Projects (PH-II)						
1	Upgradation of Load Despatch System	7.1.2004	LCC FCC Total	1015.0 1880.0 2895.0	6.8 0.0 6.8	300.0 700.0 1000.0	1015 1880 2895
2	500/220 Kv NTDC-KESC Interconnection	27.9.2003	LCC FCC Total	1340.0 1750.0 3090.0	78.6 0.0 78.6	300.0 300.0 600.0	1340 1750 3090
3	500 Kv Sahiwal Substation	7.1.2004	LCC FCC Total	1161.0 1748.0 2909.0	6.6 0.0 6.6	200.0 300.0 500.0	1161 1748 2909
4	3rd 500/220 Kv Transformer at Rewat Substation	27.7.2004	LCC FCC Total	362.0 591.0 953.0	0.4 0.0 0.4	150.0 250.0 400.0	362 591 953
5	Extension of Eight 220 Kv G/Stations for addition of 160 MVA T/Fs	25.2.2005	LCC FCC Total	1043.0 1297.0 2340.0	7.5 0.0 7.5	200.0 800.0 1000.0	1043 1297 2340
6	500 Kv Muzffargarh-Gatti T/Line & Substation Extension at	4.8.2005	LCC FCC Total	1796.0 4975.0 6771.0	352.5 0.0 352.5	1000.0 0.0 1000.0	1443.5 4975 6418.5

	Sub-total (Ph-II)		LCC FCC Total	**6717** **12241** **18958**	**452.4** **0** **452.4**	**2150** **2350** **4500**	**6364.5** **12241** **18605.5**
	Total (Ph-I+Ph-II)		LCC FCC Total	**13874.1** **19261.8** **33135.9**	**2002.4** **2240.5** **4242.9**	**2660** **3350** **6010**	**11964.7** **16996.3** **28961**
	FUTURE PROJECTS						
1	220 Kv G/Station at Khuzdar with 220 Kv Dadu-Khuzdar T/Line	27.7.2004	LCC FCC Total	1648.0 1253.0 2901.0	10.1 0.0 10.1	100.0 100.0 200.0	1648 1253 2901
2	New 220 Kv G/S at Ghazi Rd Lhr a/with 220 Kv D/C T/Line	25.2.2004	LCC FCC Total	1324.0 1267.0 2591.0	10.1 0.0 10.1	500.0 500.0 1000.0	1324 1267 2591
3	New 220 Kv G/Station at Kassowal a/with 132 Kv Expansion system	25.2.2005	LCC FCC Total	1256.0 811.0 2067.0	0.0 0.0 0.0	200.0 200.0 400.0	1256 811 2067
4	Provision of Secured Metering System at Delivery Point bet Elec.Sup.Co	4.8.2005	LCC FCC Total	496.0 513.0 1009.0	0.0 0.0 0.0	200.0 300.0 500.0	496 513 1009
5	500 Kv Transmission System for Dispersal of Power from Thar	PC-I Submitted on 5.8.2003	LCC FCC Total	2913.0 2599.0 5512.0	0.0 0.0 0.0	100.0 400.0 500.0	2913 2599 5512
6	Dispersal of Power from Neelum Jhelum Hydro Power Project	PC-I Submitted on 1.6.2005	LCC FCC Total	6337.0 4879.0 11216.0	0.0 0.0 0.0	0.0 0.0 0.0	2793 2684 5477
7	Addition of 1x600 MVA, 500/220 Kv transformer at 500 Kv Lahore G/S	Under Consideration	LCC FCC Total	307.0 768.0 1075.0	0.0 0.0 0.0	0.0 0.0 0.0	307 768 1075

8	220 Kv Grid Station near Okara along with Associated 220 Kv T/L	Under Consideration	LCC FCC Total	563.0 1032.0 1595.0	0.0 0.0 0.0	0.0 0.0 0.0	563 1032 1595
9	220 Kv G/S in Lahore to feed LESCO load Centres	Under Consideration	LCC FCC Total	236.0 595.0 831.0	0.0 0.0 0.0	0.0 0.0 0.0	236 595 831
10	220 Kv G/S near Gujrat along with associated 220 Kv T/L	Under Consideration	LCC FCC Total	285.0 628.0 913.0	0.0 0.0 0.0	0.0 0.0 0.0	285 628 913
11	500 Kv G/S at D.G. Khan along with associated T/L	Under Consideration	LCC FCC Total	1127.0 1483.0 2610.0	0.0 0.0 0.0	0.0 0.0 0.0	1127 1483 2610
	Sub-total (Future Projects)		LCC FCC Total	**16492** **15828** **32320**	**20.2** **0** **20.2**	**1100** **1500** **2600**	**12948** **13633** **26581**

Source: National Transmission and Dispatch Company, WAPDA

87. The transmission line expansion plan for KESC is given in Table 33.

Table 33

Transmission Line Expansion Plan (KESC)

Description	2004-05			2005-06			2006-07			2007-08		
	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total
A. Under Financial Improvement Plan												
Trans. System Improvement	20	390	410	2093	1457	3549	3107	2335	5442	283	243	526
SCADA	4	2	5	99	30	129	516	286	802	214	65	279
Total	24	392	415	2192	1486	3679	3623	2622	6245	497	308	805
B. Annual Development												
Short Term Plan	1	100	101	501	323	824	1071	814	1886	140	126	265

System Improvement	0	0	0	0	0	0	156	87	243	1111	578	1688
Total	1	100	101	501	323	824	1228	901	2129	1250	703	1954
C. Grand Total	25	492	517	2693	1809	4503	4850	3523	8374	1748	1012	2759

Source: KESC

Investment Requirements in Distribution

88. Table 34 gives the investment requirements in Distribution for the period 2006-08.

Table 34

Ex-WAPDA DISCO wise Summary of Investment Plan (2006-08)

Sr. No	DISCO		Investment (Rs. in Million)				
		Rural Electrification	Expansion/ Development of Power	Rehabilitation/ Energy Loss Reduction	STG	Grid Expansion	Total
1	IESCO		4006	925	4610		**9541**
2	LESCO		4115	2312	4183		**10610**
3	FESCO	1022	834	1222	4371		**7449**
4	GEPCO	864	3869	2560	5153		**12446**
5	MEPCO	2877	1348	2178	9257		**15660**
6	PESCO	472	1143	407	982		**3004**
7	HESCO		2231	1540	4637		**8408**
8	QESCO		759	1004	5591	731	**8085**
	Total	**5235**	**18305**	**12148**	**38784**	**731**	**75203**

Source: Ex-WAPDA DISCOs

Annexe-I

Thermal Power Station at Lakhra

The Lakhra Power Station is located near Manzoorabad/Khanote in the District of Dadu, Sindh on the right bank of Indus River. Hyderabad city is about 46 kms in North-East and Karachi is about 200 kms South-West of the Power Plant. This Power Station comprises of three units of 50 MW each on "Fluidized Bed Combustion" technology, having total capacity of 150 MW. The installed capacity, rated capability, make and commissioning date is as under:

Unit No.	Installed Capacity	Rated Capability	Make	Commissioning Date
ST-1		40 MW	M/s Dong Fang Electric Co., China	26.6.1995
ST-2	50 MW	40MW	M/s Dong Fang Electric Co., China	27.10.1995
ST-3	50 MW	40 MW	M/s Dong Fang Electric Co., China	3.1.1996
Total	150 MW	120 MW		

ST: Steam Turbine

All the three units are based on coal, which is being recovered by primitive underground mining method from Lakhra coal mines, 25 kms Lakhra Power Station.

Annexe-II

Chashma Nuclear Power Plant (Chasnupp)

Gross Capacity: 325 MW

Net Capacity: 300 MW

CHASNUPP is interconnected with WAPDA System at 220kV Daudkhel Grid Station through a double circuit 220 kV transmission line. It was synchronized with WAPDA System in June 2000 and PAEC completed its testing on 15 September 2000.

The Payments were being made to PAEC on "take and pay" basis at Rs. 2.25/kWh as decided by Economic Coordination Committee (ECC). On PAEC's tariff petition, NEPRA, on 3.12.2004, determined a new two part tariff for Chasnupp as following which became effective after its publication in GOP Gazette on 17.5.2005.

Capacity Purchase Price (CPP) Rs.1197.6777/kW/Month

Energy Purchase Price (EPP) Rs. 0.32/kWh

Comments on draft PPA of PAEC have been submitted to NEPRA. PAEC has planned to install 2nd unit of 325 MW at Chashma for which excavation work is in progress at site.

Annexe-III

Karachi Nuclear Power Plant (KANUPP)

KANUPP is a power producer operating under Pakistan Atomic Energy Commission (PAEC) and providing power to the Karachi Electric Supply Corporation (KESC).

The project details are as follows:

Plant	Nuclear Power Plant of Pressurized Heavy Water Reactor (PHWR) type
Location	20 km west of Karachi on the Arabian Sea Coast near Paradise Point, Karachi
Revised PC-1 Cost	Rs. 428.026 Million
Gross Installed Capacity	137 MW
Net Capacity	125 MW
De-rated Capacity	105 MW
Fuel	Natural Uranium
Commercial Operation Date	December, 1972

Annexe-IV

Profit and Loss Statements of Ex-WAPDA DISCOs

IESCO

(Million Rs.)

	2003-04	2004-05 (Prov.)
Revenue	**22977**	**24359**
Electricity Sales	22745	24109
Revenue from Electricity	22745	24109
Amortization of Deferred Credit	232	250
Operating Cost	**23043**	**25454**
Cost of Electricity	20377	22850
Other Operating Costs excluding Depreciation	2120	2023
Depreciation on Operating Fixed Assets	546	581
Difference (Revenue-Cost)	**-66**	**-1095**
Other Income	**390**	**367**
Net	**324**	**-728**
Financial and Other Charges	**463**	**442**
Profit/Loss for the Year	**-139**	**-1170**

LESCO

(Million Rs.)

Item	2003-04	2004-05 (Prov.)
Revenue	**47102**	**48547**
Electricity Sales	47102	48547
Rental and Service income		
Revenue from Electricity	47102	48547
Amortization of Deferred Credit		
Operating Cost	**47310**	**53913**
Cost of Electricity	43677	49596
Other Operating Costs excluding Depreciation	2932	3498
Depreciation on Operating Fixed Assets	701	819
Difference (Revenue-Cost)	**-208**	**-5366**
Other Income (Including Amortization)	**1159**	**1186**
Net	**951**	**-4180**
Financial and Other Charges	**467**	**419**
Profit/Loss for the Year	**484**	**-4599**

FESCO

(Million Rs.)

Item	2003-04	2004-05 (Prov.)
Revenue	**27813**	**28373**
Electricity Sales	27527	28046
Rental and Service income	43	43
Revenue from Electricity	27570	28089
Amortization of Deferred Credit	243	284
Operating Cost	**27765**	**29543**
Cost of Electricity	24917	26292
Other Operating Costs excluding Depreciation	2267	2612
Depreciation on Operating Fixed Assets	581	639
Difference (Revenue-Cost)	**48**	**-1170**
Other Income	**635**	**835**
Net	**683**	**-335**
Financial and Other Charges	**501**	**451**
Profit/Loss for the Year	**182**	**-786**

GEPCO

(Million Rs.)

Item	2003-04	2004-05 (Prov.)
Revenue	**19978**	**20740**
Electricity Sales	19756	20513
Rental and Service income	76	60
Revenue from Electricity	19832	20573
Amortization of Deferred Credit	146	167
Operating Cost	**20367**	**22901**
Cost of Electricity	17691	20208
Other Operating Costs excluding Depreciation	2263	2218
Depreciation on Operating Fixed Assets	413	475
Difference (Revenue-Cost)	**-389**	**-2161**
Other Income	**461**	**356**
Net	**72**	**-1805**
Financial and Other Charges	**387**	**389**
Profit/Loss for the Year	**-315**	**-2194**

MEPCO

(Million Rs.)

Item	2003-04	2004-05 (Prov.)
Revenue	**28716**	**30849**
Electricity Sales	28273	30330
Rental and Service income	75	116
Revenue from Electricity	28348	30446
Amortization of Deferred Credit	368	403
Operating Cost	**28620**	**33510**
Cost of Electricity	25245	29988
Other Operating Costs excluding Depreciation	2448	2489
Depreciation on Operating Fixed Assets	927	1033
Difference (Revenue-Cost)	**96**	**-2661**
Other Income	**572**	**658**
Net	**668**	**-2003**
Financial and Other Charges	**687**	**730**
Profit/Loss for the Year	**-19**	**-2733**

PESCO

(Million Rs.)

Item	2003-04	2004-05 (Prov.)
Revenue	**22258**	**23050**
Electricity Sales	21318	22037
Rental and Service income	739	775
Revenue from Electricity	22057	22812
Amortization of Deferred Credit	201	238
Operating Cost	**27301**	**28322**
Cost of Electricity	20860	23852
Other Operating Costs excluding Depreciation	5810	3814
Depreciation on Operating Fixed Assets	631	656
Difference (Revenue-Cost)	**-5043**	**-5272**
Other Income		**1044**
Net	**-5043**	**-4228**
Financial and Other Charges	**518**	**504**
Profit/Loss for the Year	**-5561**	**-4732**

HESCO

(Million Rs.)

Item	2003-04	2004-05 (Prov.)
Revenue	**16272**	**16924**
Electricity Sales	15817	16513
Rental and Service income	362	292
Revenue from Electricity	16179	16805
Amortization of Deferred Credit	93	119
Operating Cost	**16879**	**18738**
Cost of Electricity	12490	14348
Other Operating Costs excluding Depreciation	4198	3488
Depreciation on Operating Fixed Assets	191	902
Difference (Revenue-Cost)	**-607**	**-1814**
Other Income	**177**	**185**
Net	**-430**	**-1629**
Financial and Other Charges	**698**	**637**
Profit/Loss for the Year	**-1128**	**-2266**

QESCO

(Million Rs.)

Item	2003-04	2004-05 (Prov.)
Revenue	**10188**	**10568**
Electricity Sales	10078	10464
Rental and Service Income	42	47
Revenue from Electricity	10120	10511
Amortization of Deferred Credit	68	57
Operating Cost	**11198**	**11269**
Cost of Electricity	6880	7795
Other Operating Costs excluding Depreciation	4010	3125
Depreciation on Operating Fixed Assets	308	349
Difference (Revenue-Cost)	**-1010**	**-701**
Other Income	**122**	**175**
Net	**-888**	**-526**
Financial and Other Charges	**232**	**236**
Profit/Loss for the Year before Tax	**-1120**	**-762**

KESC

(Million Rs.)

Item	2003-04
Revenue	**37588**
Electricity Sales	36543
From Other Sources	1045
Operating Cost	**44789**
Cost of Electricity	38340
Other Operating Costs	3557
Depreciation	2892
Difference (Revenue-Cost)	**-7201**
Financial and Other Charges	**1099**
Loss for the Year	**-8300**

Source: Annual Statements of Ex-WAPDA DISCOs,KESC Annual Report

National Electric Power Regulatory Authority

2nd Floor, OPF Building, Shahra-e-Jamhurriat, G-5/2, Islamabad.
Tele: # 92-51-9207200 Fax: 92-51-9210215
Email: info@nepra.org.pk