STATE OF INDUSTRY REPORT 2010

STATE OF INDUSTRY REPORT 2010

NEPRA

NEPRA

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

STATE OF INDUSTRY REPORT 2010

CONTENTS

FOREWORD

In pursuance of Section 42(b) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (XL of 1997) that requires the National Electric Power Regulatory Authority (NEPRA) to submit a report on the state of electric power of the country to the Council of Common Interest and the Federal Government for every financial year, the State of Industry Report 2010 has been prepared by NEPRA.

The power shortages in the country persisted throughout 2009-10, although the Government of Pakistan made hectic efforts to bring new capacity in the system. IPPs were pursued to meet their target dates for commissioning, while fast track handling of new projects continued. However, the overall economic meltdown in the world also affected power industry and as a result slowdown in the sector was witnessed, leading to delays in the completion of projects.

There has been an unprecedented growth in the demand of electricity during the last decade. The current generation capacity needs to be supplemented on war footing. Depleting natural gas reserves have further deteriorated the situation. The need of the hour is to develop a multi-pronged strategy, looking for short term as well as long term solutions.

Some of the key issues facing the power sector as discussed in detail in the current report include the inability of government to pass on the full cost of generation to the consumer and non-payment of the difference between the applied tariff and the determined tariff in the form of subsidy to the power distribution companies and power generating companies in a timely manner: the resultant circular debt due to inability of distribution companies to pay to the generating companies which in turn could not make payments to the fuel suppliers; the adverse changes in the generation mix thereby the proportionate share of hydel power declined from 33.8% in 2008-09 to 32.3% in 2009-10, fast depletion of gas resources and shortage of gas particularly for the power sector as reflected in reduced power generation through gas by 3.9% (from 28.6% in 2008-09 to 24.7% in 2009-10) and increasing and heavy reliance on the imported furnace oil being the most expensive source of power generation; inadequate generation capacity and poor efficiency of the public sector GENCOs; the inefficiencies and governance issues in the public sector distribution companies as reflected in huge transmission and distribution losses ranging from 25% to 35% in some of the worst performing DISCOs. These issues required immediate attention of the concerned entities.

NEPRA has been pointing out the problems being faced particularly by the public sector GENCOs and distribution companies in terms of governance issues and their inability to keep their maintenance schedules and resultant down-gradation of their capacity and has been recommending to the government to address these issues and to improve the performance of the public sector GENCOs.

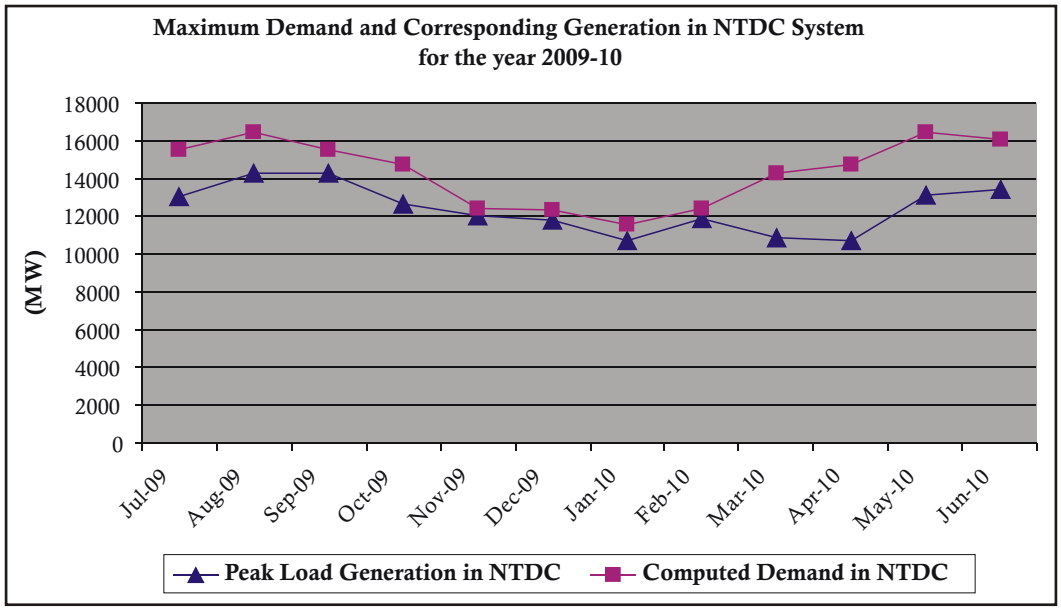
It is strongly recommended that construction of large and small hydro projects and coal-based power generation projects be initiated immediately so that major part of the consumer load demand is always supplied through these two indigenous resources. Natural gas when available will also form a part of the fuel mix. The renewable energy through other sources like wind and solar will replace the energy through expensive fuels like furnace oil. On its part, NEPRA has undertaken a number of measures during the year to encourage the hydel-based and other indigenous resources based generation by offering additional Internal Rate of Return (IRR) for domestic coal as well as hydel resources. More recently, to encourage sugar industry to participate in the power generation through its idle capacity by use of cheap indigenous bagasse, NEPRA has offered a tariff based on determination in one of sugar mills to rest of the sugar industry without going through the time consuming process of scrutiny of their estimates. This tariff is based on 18% IRR and it is expected that it will encourage the sugar industry to come forward and play a constructive role in adding generation capacity to the power sector.

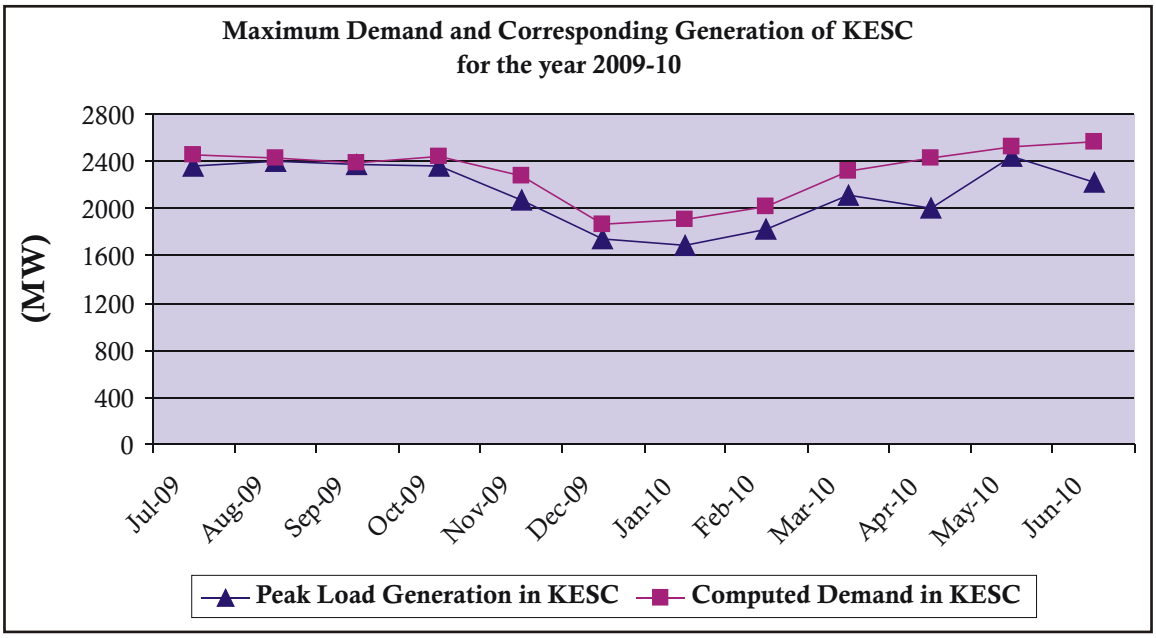
1. An Overview of the Sector

Since the formation of an interconnected grid system in Pakistan, except for a few years around mid nineties, the country remained deficient in supply to meet electricity demand. Load shedding has been a routine and it is the extent of load shedding which is seen as the only measure of the performance of the electricity sector. The current situation is certainly the worst of all times, as power shortages have hit the country. Due to long hours of supply cuts, the effect has been devastating on all sectors of the economy. Since electricity availability is a major driver of the overall economic growth, therefore it is no surprise that economic indicators also reflect dismal performance in the economic growth.

One finds a multitude of reasons leading to the present crisis. The 1994 Power Policy attracted induction of a large number of power plants resulting in surplus power in the country from 1996 to around year 2002. The need for additional capacity was pointed out by planners at regular intervals, however, no major power generation capacity was added to the system. Performance of Transmission and Distribution sectors also deteriorated as timely investment in networks was not made after the 1992 Strategic Plan for restructuring of Water and Power Development Authority (WAPDA), leading to creation of a number of independent entities. In addition to above factors, certain uncontrollable factors such as oil prices and international recession multiplied the problems.

The actual position of demand and supply of electric power for the year 2009-10, in the NTDC's and KESC's Systems during peak hours is shown in the following graphs. Throughout the year the power supply remained short of demand.





Following Independent Power Projects (IPPs) came on bar during early part of 2009 and during the financial year 2009-10;

Project	Installed Capacity (MW)	Actual Commissioning Date
Attock Gen. Limited	165	17 March 2009
Atlas Power Limited	225	18 December 2009
Engro Energy (Pvt.) Limited	227	27 March 2010
Saif Power Limited	229	27 April 2010
Orient Power Company	229	24 May 2010
Nishat Power limited	200	09 June 2010

In addition to the above, Nishat Chunian Power Limited (202 MW) which was scheduled for commissioning on 30 June 2010, has achieved Commercial Operation on 21 July 2010. Five other projects namely Foundation Power Company Limited (179 MW), Sapphire Electric Company Limited (235 MW), HUBCO Narowal Project (224 MW), Halmore Power Generation Company Limited (225) MW and Liberty Power Tech. Limited (202 MW) are expected to achieve Commercial Operation during the year 2010-2011.

Most of these projects have been delayed due to various reasons, however even if they were commissioned as scheduled, the gap between supply and demand would only have narrowed down to

that extent but not eliminated. Similarly, the projects scheduled in 2010-11 would only help in narrowing down the gap, whereas substantial addition of new capacity is needed in the system to meet acceptable level of available generation.

In the KESC's system although there is a gap between supply and demand throughout the year, it is not as large as in NTDC's system. However, it may be observed that KESC's generation resources are barely enough to meet demand.

It has also been observed that any breakdown in the generation facilities or shortage of fuel would result in the widening of the gap in both NTDC and KESC's systems.

The following Table shows projected supply and demand position over next five (5) years, in the NTDC and KESC systems. The gap between supply and demand in the NTDC's system continues to widen. It may be noted that for a reliable system around 2500 to 3000 MW generation capacity over and above already planned is needed to be added every year. KESC's system also requires generation addition as planned to keep pace with the demand.

PROJECTED SUPPLY AND DEMAND IN NTDC SYSTEM

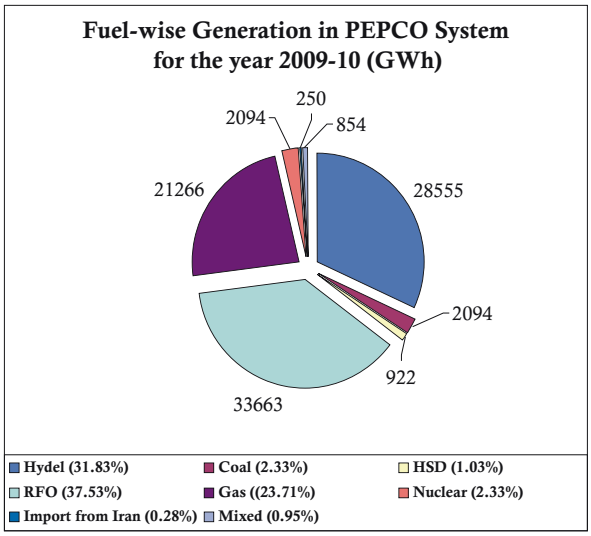
Financial Year ending 30th June	Planned Generation Capability as per NTDC (MW)	NTDC Projected Demand Growth Rate (%)	NTDC Projected Demand during peak hours (MW)	Surplus / (Deficit) (MW)
2011	17367	7.86	20873	-3506
2012	18913	7.60	22459	-3546
2013	21299	7.42	24126	-2827
2014	21668	7.43	25918	-4250
2015	30510	7.70	28029	2481

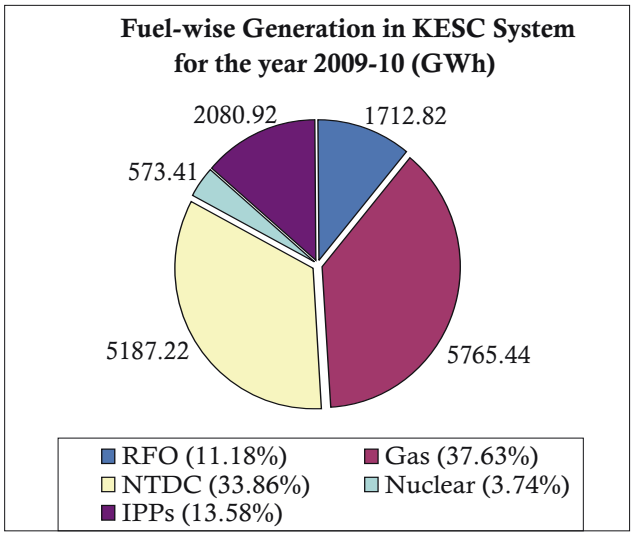
PROJECTED SUPPLY AND DEMAND IN KESC SYSTEM

Financial Year ending 30th June	Planned Generation Capability as per KESC (MW)	KESC Projected Demand Growth Rate (%)	KESC Projected Demand during peak hours (MW)	Surplus / (Deficit) (MW)
2011	2419	5%	2690	-271
2012	2833	5%	2825	8
2013	2913	5%	2966	-53
2014	3413	5%	3114	299
2015	3713	5%	3270	443

Source: NTDC and KESC

Present mix of energy generation with respect to different fuels is presented in the following pictorials.





The total installed hydropower generation capacity of the country as on June 30, 2010 was 6,555 MW which is exactly the same as that of June 30, 2009. The electricity generation of country through hydel source during fiscal year 2009-10 increased by 1.32% and stood as 28,555 GWh as compared to 28,183 GWh same period last year.

The total installed nuclear capacity of the country as on June 30, 2010 remained same i.e. 462 MW as that of the same date last year. The total electricity generated through nuclear power during 2009-10 increased by 79.48% and reached to 2667 GWh as compared to 1486 GWh same period last year.

2. Major Issues confronting Power Sector

The power sector of the country is confronted with major challenges today. Some of the main issues confronting the power sector are discussed in the following paragraphs.

2.1 Availability and Efficiency of Existing Power Plants:

The dilemma of Pakistan Power Sector has been that it not only failed to make additions in the generation capacity, but it also could not use the existing power plants to their full potential. The problem in a way may also be linked to the failure of adding new power generation capacity. In order to avoid power cuts and load shedding, the existing power plants were required to operate round the clock so much so that the essential maintenance schedules were overlooked, specifically for the power plants in the public sector. Such practice which has been continuing over the years has had a telling effect on the operational performance of the existing power plants and their capability to supply power to the grid. The efficiency and their availability have reached alarmingly low levels resulting in frequent breakdowns.

The following Table shows availability statistics in respect of larger public sector generation companies (GENCOs) and KESC.

Month	GENCO-I			GENCO-II			GENCO-III		
	Installed Capacity: 1024 MW			Installed Capacity: 1690 MW			Installed Capacity: 1965 MW		
	Average Available Capacity	Peak Load Sharing		Average Available Capacity	Peak Load Sharing		Average Available Capacity	Peak Load Sharing	
		Average MW	Average % to the available capacity		Average MW	Average % to the available capacity		Average MW	Average % to the available capacity
October, 2009	740.33	574.43	77.85	893.83	837.47	93.74	1183.7	824.6	69.77
November, 2009	638.67	519.60	81.99	925.34	882.79	95.62	912.33	643.52	68.26
December, 2009	630.69	516.31	81.83	953.10	902.28	94.66	1008.31	674.38	66.72
January, 2010	1134.00	650.55	57.37	934.23	870.62	93.00	1300.27	885.58	68.68
February, 2010	695.81	592.30	84.84	913.52	883.44	96.76	1279.3	857.19	67.45
March, 2010	766.27	681.69	88.97	917.41	858.07	93.49	1255.19	776.04	62.02
Average of 6 months	**767.63**	**589.15**	**78.81**	**922.91**	**872.45**	**94.55**	**1156.52**	**776.89**	**67.15**

Source: Daily Operational Data from NPCC

Month	KESC		
	Installed Capacity: 1954 MW		
	Average Available Capacity	Peak Load Sharing	
		Average MW	Average % to the available capacity
October, 2009	1429.67	1016.23	70.83
November, 2009	1301.53	864.10	66.39
December, 2009	1284.97	595.26	46.50
January, 2010	1312.26	864.10	64.25
February, 2010	1184.36	723.21	61.18
March, 2010	1301.94	**863.90**	66.36
Average of 6 months	**1302.45**	**821.13**	**62.58**
Source: KESC Daily Load Despatch Data from KESC			

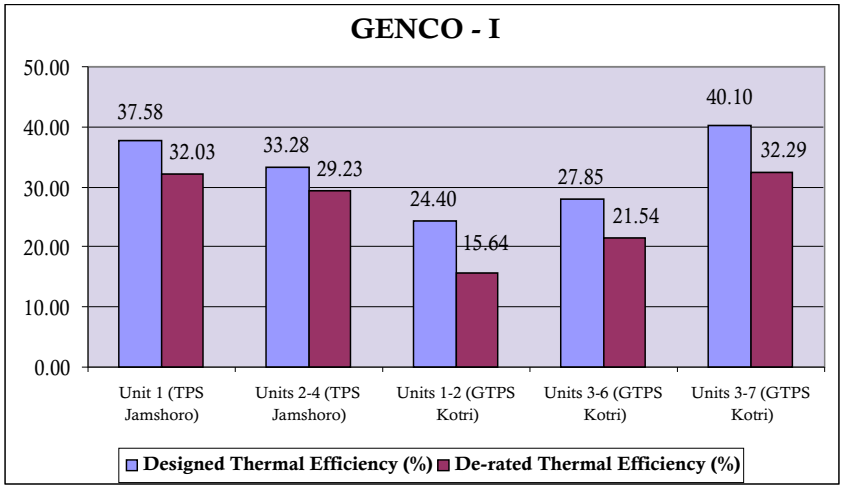
It may be seen that against the available capacity shown (which is already considerably lower than the installed capacity) on an average GENCO-III could make available only 67% of that in meeting the peak load. KESC could make available 62% of its stated available capacity during the peak load period. The average peak load sharing of GENCO-I is slightly higher than GENCO-III however it is much lower than the international averages of close to 90%. The above performance will be even more dismal if the availability of generation capacity during peak load conditions is examined relative to the installed capacity.

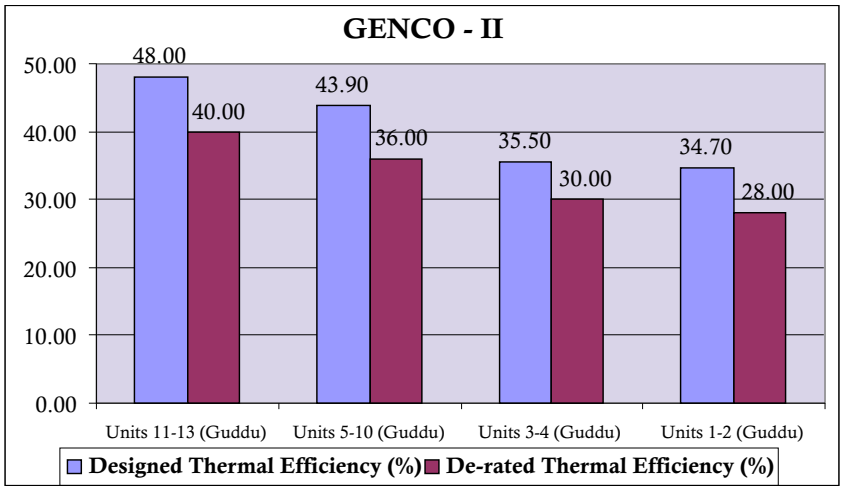
One of the reasons for the low availability of power plants is the non-availability of fuel however, the other reasons contributing to lower availability are as follows:

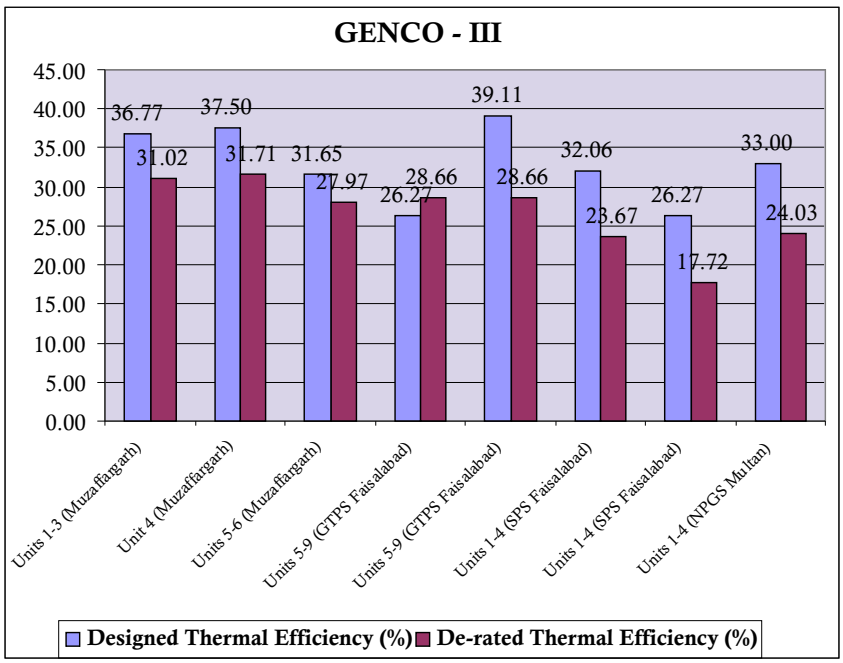
- Shutdowns are not allowed to GENCOs for timely execution of planned maintenance such as Major Overhauling (MOH), Hot Gas Path Inspection (HGPI), Combustion Inspection (CI), Annual Boiler Inspection (ABI), etc.
- Scheduled maintenance of the plant is not executed as per recommendation of the Original Equipment Manufacturer (OEM), therefore, plants run at partial load and frequency of forced outages increases.
- Timely change of spare parts by GENCOs is mandatory which need planned procurement on the basis of available finances. Shortage of funds to GENCOs affects timely procurement of spare parts adding to breakdown times.

The above reasons contributing to inferior operational performance need urgent attention of the management.

The efficiencies of the power plants, specifically in the public sector have also been considerably reduced than their design values. Consequently, the overall requirement of fuel has increased to produce the same amount of energy if the plants had operated at their design efficiencies.


GENCO - I
50.00
40.00
30.00
20.00
10.00
0.00
37.58
32.03
33.28
29.23
24.40
15.64
27.85
21.54
40.10
32.29
Unit 1 (TPS Jamshoro)
Units 2-4 (TPS Jamshoro)
Units 1-2 (GTPS Kotri)
Units 3-6 (GTPS Kotri)
Units 3-7 (GTPS Kotri)
Designed Thermal Efficiency (%)
De-rated Thermal Efficiency (%)


GENCO - II
50.00
40.00
30.00
20.00
10.00
0.00
48.00
40.00
43.90
36.00
35.50
30.00
34.70
28.00
Units 11-13 (Guddu)
Units 5-10 (Guddu)
Units 3-4 (Guddu)
Units 1-2 (Guddu)
Designed Thermal Efficiency (%)
De-rated Thermal Efficiency (%)


GENCO - III
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
36.77
31.02
37.50
31.71
31.65
27.97
26.27
28.66
39.11
28.66
32.06
23.67
26.27
17.72
33.00
24.03
Units 1-3 (Muzaffargarh)
Unit 4 (Muzaffargarh)
Units 5-6 (Muzaffargarh)
Units 5-9 (GTPS Faisalabad)
Units 5-9 (GTPS Faisalabad)
Units 1-4 (SPS Faisalabad)
Units 1-4 (SPS Faisalabad)
Units 1-4 (NPGS Multan)
Designed Thermal Efficiency (%)
De-rated Thermal Efficiency (%)

2.2 Circular Debt:

The electricity sector has effectively become hostage of circular debt. For power sector a circular debt is created when the power generation companies under the control of PEPCO, KESC and IPPs fail to clear their dues to fuel supplier. The fuel suppliers in turn default on their payment commitments towards refineries and international fuel suppliers. PEPCO and KESC have various reasons for their inability to pay to fuel suppliers however it has been noted that inefficiency in collection of revenue from private sector, non-payment of dues by the public sector including the provincial governments and in-effective contractual arrangements between PEPCO and KESC are the major causes for inter-corporate debt. According to the Ministry of Finance figures the position of net circular debt on 30 June 2009 was Rupees 216 Billion which on April 16, 2010 stood at Rupees 115 Billion due to Federal Government support in the form of subsidy.

The receivable and payable position of PEPCO is shown in the following Table and it may be noticed that PEPCO's payables to Gas Companies, IPPs and Oil companies are the cause of concern as default on payments by these companies could lead to stopping of generation power plants unless the government intervenes.

(Billion Rupees)

PEPCO Receivable	181.0	PEPCO Payable	211.00
KESC	38.0	IPPs	110.5
Sindh Government	20.1	Oil Companies (PSO+APL)	27.4
Punjab Government	3.6	WAPDA Hydel	45.0
Khyber Pakhtunkhwa Government	1.7	Rental Projects	8.5
Balochistan Government Tube well subsidy	1.5 7.2	Gas Companies (PPL, SSGC, SNGPL, Mari)	19.6
AJK Government	3.1		
Federal Government Tube well	4.9		
FATA	3.5		
Private	92.5		
Source: Federal Ministry of Finance			

As on April 16, 2010, the Fuel suppliers including PSO, OGDCL, SSGCL, SNGPL, PARCO and PPL had receivables to the tune of Rupees 276 Billion.

The Federal Government had to intervene to save the power sector, however the vicious circle of debt which really started worsening since June 2009 has re-emerged. A number of factors may be identified for the circular debt in power sector:

? Inability of the DISCOs to pass on the cost of electricity to consumers is one of the major reasons for circular debt. The cost of providing electricity to consumers could not be fully recovered as no real increase in tariff was notified by the Federal Government from 2004-05 to 2006-07. The following Table shows relevant statistics about PEPCO controlled distribution companies. It may be noted that the tariffs allowed by the GoP were inadequate to cover the average costs of the companies, therefore the companies started to incur losses which continued to build up to unmanageable limits.

	2004-05	2005-06	2006-07	2007-08	2008-09
Units Sold (MkWh)*	55,278	62,405	67,480	66,540	65,244
Avg. Sale Rate (Rs./kWh)	4.0	4.1	4.5	5.4	7.3
Average 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
** Units Sold include TESCO Energy and Energy Sold to KESC.* *Note: 2009 -10 audited accounts are not yet available.*					
Source: PEPCO Data					

Tariff effective	**NEPRA Determined Average Tariff (Rs./kWh)**	**Notified by GoP Average Tariff (Rs./kWh)**	**Gap Rs./kWh**
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
Source: NEPRA / PEPCO			

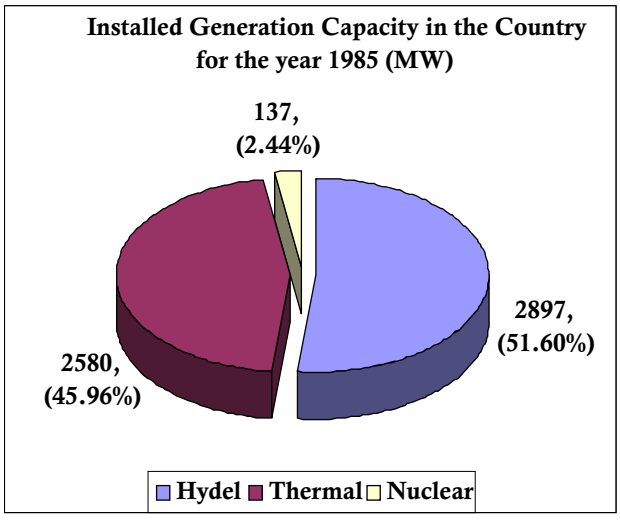
From the above Tables it may be noted that the DISCOs continue to accumulate losses as no real increase in tariff was given uptill 2007. Even after 2007, the Government, due to socio-political and affordability reasons, considered it appropriate to notify lower tariffs than what were determined by NEPRA on the cost of service considerations. The policy, however, affected negatively on the financial viability of the companies as evident from their balance sheets.

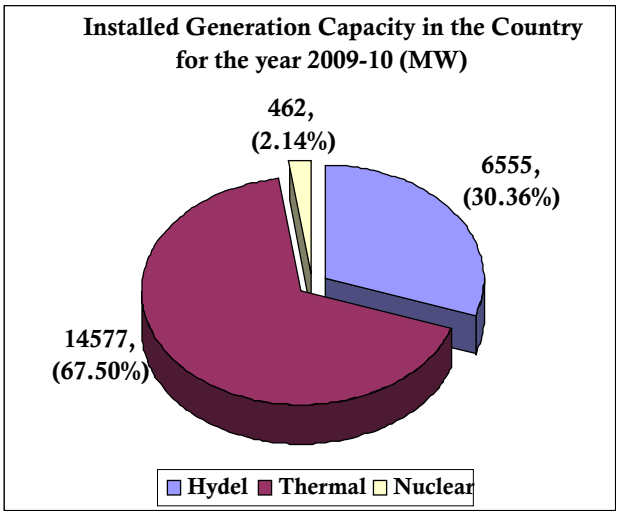
? Externalities like global economic meltdown and extraordinary high oil prices further compounded the circular debt issue. In order to pass on the fuel price variation NEPRA provided adjustments on six-monthly basis, however the oil prices fluctuated so rapidly that the six monthly adjustments could not support DISCOs in their day-to-day operations. As a result DISCOs had to resort to bank borrowing which became tougher under the liquidity position of the financial institutions who considered that their exposure to the power sector has already reached an unsustainable level.

2.3 Shift from Low Cost Generation to High Cost Generation:

Affordability of consumers has always remained a key consideration before the Federal Government in notifying any change in the consumer-end tariff. Among other factors, consumer-end tariffs depend mainly on the cost of generation of electricity and wastage in the form of losses at different levels in the system. Socio-political pressures prevented the government to pass on the cost of power to the ultimate users of electricity; on the other hand, however, it is equally important to keep the cost of generation low. By keeping a generation mix which consists of cheap generation sources the government could have achieved its objective to keep consumer-end tariffs at affordable levels while also passing on the true cost of electricity. A look at the charts of installed generation capacity in 1985 and 2010 shows that in the overall mix of installed capacity, hydro power a cheap source of power, declined from 52% to 30%.

? Hydel power is considered as one of the cheapest and environment friendly sources of energy, however after the construction of Mangla and Tarbela reservoir-based power generation projects, no major project was constructed with the exception of Ghazi Barotha Hydropower Project which is a peaking plant.





- Due to lack of political consensus on building large dams and lack of coordinated efforts of the key stakeholders in building such dams has resulted in inadequate exploitation of huge hydropower generation potential in the Country.

- Rapid depletion of natural gas reservoirs has also contributed in switching to more expensive sources of power generation to replace it. Natural gas has been Pakistan's key input for energy including for power sector. However, against all the forecasts about the volume of gas, the gas reserves have depleted and by the end of year 2011, natural gas continuity to new gas-based power sector plants has not been guaranteed by the Ministry of Petroleum and Natural Resources.

- Gas is also considered a clean fuel for power generation while it is cheaper than oil-based generation. However, efforts to find alternatives like import of gas, and development of LNG terminals for the import of LNG have remained slow which again led to ad-hoc solutions for the induction of new capacity in the form of expensive furnace oil-based power generation.

- Pakistan also failed to exploit and develop its huge reserves of coal, which according to conservative estimates are good for more than 100,000 MW of power generation. A coal-based power generation project at Lakhra 150 MW was added to the system in 1995. However, due to lack of adequate maintenance, out of the three units only one unit of 50 MW is currently operating with a derated capacity of around 30 MW. Consequently the share of coal is negligible in the present generation mix. It is pertinent to mention that coal-based power plants are best suited to provide base portion of the annual load duration curve through relatively cheap and stable power round the year. It contributes 60 to 70% of total electricity supplied in a number of developed economies including UK, USA, and Australia. The huge potential of coal reserves in Pakistan may be developed on similar lines.

- Nuclear power generation is also a clean source of electricity and provides base load of the annual load duration curve. In the developed countries like USA and France, nuclear power generation forms a major share of generation mix. In Pakistan, progress on the nuclear power generation is slow and at present nuclear power makes only 2 to 3% of total generation. For a stable supply to grid, it is important that due emphasis to development of nuclear power generation is given.

2.4 Energy Security Issues:

The electricity generation in the country is heavily dependent on furnace oil imports. Therefore, any fluctuation in the international oil market directly affects power generation costs. Similarly, any interruption in the oil supplies may result in power supply interruption. Therefore, it is essential that power generation sources are diversified to include more indigenous resources. This policy would require induction of more hydro, coal and renewable energy sources like wind and solar which also are known to be abundantly available.

2.5 Transmission Constraints:

Constraints have been reported in the Extra High Voltage (EHV) transmission and transformation system which have resulted in partial outages as well as blackouts of the power supply on a number of occasions to large parts of the country. It has been noted that EHV transmission line tripping due to forced outages increased from 29 in 2006-07 to 80 in 2009-10, pointing to a deteriorating reliability in the system.

It is also noted that a number of new IPPs could not undergo commissioning tests as the interconnection transmission networks were either not available or had inadequate capacity. Such constraints have added to the shortages in power supply position.

2.6 High Losses in Distribution Companies:

As noted elsewhere the consumer-end tariffs are highly sensitive to the losses in the transmission and distribution systems. With every percent increase in losses, the tariff increases exponentially. The following Table shows losses claimed by various DISCOs and KESC in their transmission and distribution systems.

Company	FY 2006-07	FY 2007-08	FY 2008-09
IESCO	12.17%	10.29%	10.51%
LESCO	12.71%	12.85%	13.23%
GEPCO	11.63%	11.14%	10.72%
FESCO	11.19%	11.20%	10.59%
MEPCO	19.28%	18.49%	18.37%
PESCO	35.74%	36.06%	37.40%
HESCO	36.90%	35.86%	34.75%
QESCO	21.37%	20.79%	20.12%
KESC	34.20%	34.10%	35.86%

It may be seen that except for IESCO, LESCO, GEPCO and FESCO whose losses may be defendable, rest of the DISCOs have extremely high losses by any standard. The major part of these losses is due to theft in these DISCOs. At the country level, the average losses are around 22%.

2.7 Low Revenue Collection Efficiencies:

The revenue collection/recovery efficiency of the DISCOs is summarized here;

Percentage Recovery (2009-10)

Company	HESCO	MEPCO	FESCO	IESCO	LESCO	PESCO	QESCO	GEPCO
Recovery	59.81	95.82	97.04	95.92	91.81	85.40	57.67	95.97

A correlation between the high loss companies such as HESCO, QESCO and PESCO exists as these companies also suffer from low recoveries. Therefore in the case of HESCO, out of the total electricity received, it recovers revenue corresponding to 39% only. Similarly QESCO is recovering only 48%. If they had losses in an acceptable range and better recovery ratios as well, they should be able to recover revenues corresponding to around 80 to 85% of the electricity received at their delivery points. For instance IESCO is able to recover the revenues of approximately 86% of the electricity it received. GEPCO also recovers around 86%. Therefore, unless the performance of companies with regard to high loss and low recovery improves, consumer-end tariff will continue to remain at higher levels while the sector would also continue to suffer.

2.8 Governance Issues:

Besides having inferior operational performance, almost all the DISCOs are not aware about their role and need of good governance as a corporate entity. NEPRA expects that the DISCOs would not only make every endeavour to achieve performance targets as given by NEPRA in its determinations, but they would also develop a culture in which all their expenses are restricted to make them financially profitable. However, so far all the DISCOs exhibit a mindset which is still that of a public sector entity without due regard to their rights and obligations as a corporate entity. Their power purchase contracts are not in place and defaults and delays are considered as routine matters.

3. Sector Restructuring and Role of PEPCO

WAPDA's Strategic Plan (Plan) approved by the Government of Pakistan in 1992, provided the roadmap of the future structure of Pakistan Power Sector. The Plan envisaged staged transition from monopoly operations of WAPDA to a competitive electricity market by requiring the GoP to restructure WAPDA into decentralized business units. One of the three goals of the Plan was to improve the efficiency of the Power Sector through Competition, Accountability, Managerial Autonomy, and Profit Incentives.

The Plan recommended forming of a number of generation companies, a government owned corporatized entity responsible for owning and operating large multi-purpose hydel facilities, a National Transmission and Dispatch Company, regulated distribution companies and an autonomous National Regulatory Authority.

As a follow up to the Plan, PEPCO was created in 1998. The Economic Coordination Committee (ECC) of the Cabinet approved the Summary of Ministry of Water and Power vide case number ECC-112/10/98 dated July 27, 1998.

> "PEPCO to be created as a private limited company 100% owned by the Government of Pakistan and with specific mandate to restructure and corporatize WAPDA's power functions into 12 companies, develop and establish formal contractual relationship amongst them, help them become administratively and financial self-sufficient, improve their efficiency and ready them for privatization. PEPCO to do this within approximately two years and, having done so, to disband itself."

Although the unbundling of entities i.e. into a number of generation companies (GENCOs), NTDC and DISCOs was formalized around 2001-2002, when NEPRA granted them respective licences, however their independence as foreseen under the Plan and also required from PEPCO could not materialize at all. The formal contractual relationship between the DISCOs and NTDC, between NTDC and GENCOs, and between DISCOs and GENCOs could not be established.

During various meetings and hearings, GENCOs and DISCOs have persistently complained before the Authority about their inability to take decisions even on the minor issues, restricting their ability to meet NEPRA's performance targets.

The Authority feels that PEPCO's role may be one of the major factors for the slow progress of the reform process and the objectives envisaged under the Strategic Plan 1992. The Ministry of Water and Power is required to take urgent steps on the role of PEPCO for successful implementation of GoP's Plan for the restructuring of Power Sector.

Central Power Purchasing Agency (CPPA) has a critical role as a power purchaser from IPPs and Public sector generating sources as well as supplier to DISCOs. Its role needs to be strengthened for efficient running of the unbundled entities.

4. The Efforts of Federal Government

The Federal Government has taken a number of steps to mitigate the effects of different problems faced by the electricity sector. A few of these efforts are discussed here;

4.1 Addition/up-gradation to Generation Capacity:

In order to overcome supply shortages the federal government decided to take a number of measures. As discussed in the earlier sections Independent Power Plants (IPPs) having a combined capacity of about 1500 MW have been installed in the system over the last 12 to 16 months whereas around 1000 MW is expected over next few months. The federal government has also decided to upgrade some of the existing thermal power plants which have lost their capacity due to in-adequate maintenance. The government has decided to build another 960 MW plant at Tarbela Dam using existing reservoir outflows and induct some Rental Power Plants in the system as a short-term measure. The concept of Rental Power Plants has been successfully used in a number of countries to overcome supply shortages. Rental power plants are based on used machines; however, their major advantage is shorter implementation time as they can start supplying to the grid within six to eight months time. They may be utilized for three to five year periods after which they can be replaced with newer power generation plants as part of long-term supply solutions. Fourteen number RPPs with a total capacity of approximately 2000 MW have been earmarked, however, due to certain procedural bottlenecks the projects could not be brought in the system as scheduled. It is, however, critical that sponsors of Rental Power Plants ensure timely execution of the projects. Government, too, needs to strictly enforce the time schedule as otherwise, there will be no justification for inducting these Rental Power Plants.

4.2 Amendment in NEPRA Act:

To pass-on the changes in oil prices more frequently, it was decided by the Government that NEPRA would conduct monthly fuel adjustments, which would then be passed–on to the DISCOs. In addition, NEPRA was also required to determine consumer-end tariff on quarterly basis. Relevant modifications in the Act are reproduced here:

- **Addition in Section 31 (1)**

  "Provided that the Authority shall, on quarterly basis, determine overall electricity tariff and intimate the same to the Federal Government for notification in the official Gazette."

- **Addition to Section 31 (4)**

  "Provided further that the Authority shall, on a monthly basis and not later than a period of seven days, review the fuel charges in the approved tariff on account of any variation whatsoever and notify such revision in the official Gazette for the purposes of approved tariff applicable with effect from the said notification."

Pursuant to above amendments, NEPRA made monthly fuel adjustments during the year 2009-10 for XWDISCOs as shown in the following Table.

Rupees per kWh

	Jul 09	Aug 09	Sep 09	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10
Actual Fuel Cost	4.09	4.01	4.34	4.76	5.18	6.38	7.76	6.79	6.39	6.69	5.73	5.30
Reference fuel Cost		4.14	4.14	4.14	4.32	5.85	6.45	5.34	5.73	5.65	4.65	4.28
Increase/ (Decrease)		(0.13)	0.20	0.62	0.86	0.53	1.31	1.44	0.66	1.04	1.08	1.02
Cost Disallowed		-	-	(0.11)	(0.35)	(0.13)	(0.29)	(0.42)	(0.09)	(0.27)	(0.17)	(0.38)
Net Increase /Decrease		(0.13)	0.20	0.51	0.51	0.40	1.02	1.02	0.57	0.77	0.91	0.64
Oil Prices (Rs./M.tons)	36,839	40,696	40,668	40,637	44,366	44,542	45,333	43,758	45,271	44,959	46,509	40,922

Although it was expected that with monthly fuel adjustment in place, the tariff would reflect any changes in the oil and gas prices, however it may be noticed from above Table that irrespective of increase or decrease in fuel price the tariff required an increase for eleven months of the year. The following reasons may be attributed to such trends:

? The reference fuel cost worked out at the beginning of the mechanism, was based on the forecasted information provided by the relevant entities and judgment of NEPRA. The estimates for oil and gas prices were also linked to historical and seasonal trends. Actual prices were different.

NEPRA also determined the Consumer-end tariff on quarterly basis for the year 2009-10.

Average Rate for DISCOs for (1st Quarter) Year 2009-10 *Rupees per kWh*

IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO
9.20	9.77	9.48	9.71	9.52	11.99	11.64	10.31

Average Rate for DISCOs for (2nd Quarter) Year 2009-10 *Rupees per kWh*

IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO
9.51	10.29	9.71	10.32	9.96	12.48	11.39	10.23

Average Rate for DISCOs for (3rd Quarter) Year 2009-10 Rupees per kWh

IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO
9.15	10.25	9.83	10.08	9.82	12.36	10.69	9.51

The following monthly fuel price adjustment for the KESC system have been approved by NEPRA up to March 2010, whereas fuel price adjustments for the remaining months have to be announced with due regard to the Sindh High Court's Orders.

KESC System *Rupees per kWh*

July-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10
0.1	0.22	(0.08)	0.26	0.06	0.53	1.77	0.79	1.57

One important aspect to note here is that while the monthly adjustments as approved by NEPRA are reflected in the DISCOs' bills to the consumers, the quarterly determination of tariffs by NEPRA is not notified as such. The federal government notifies (which are applicable to consumers) the quarterly tariffs after examining the affordability of end-consumers, the subsidy amount to support an overall tariff regime and its commitments to relevant stakeholders. The government has notified the following changes in the consumer-end tariff during the year 2009-10.

Effective From: date	Increase/Decrease
1 October 2009	6% increase
1 January 2010	12% increase
1 July 2010	7.6% increase

The increase in tariffs is part of the commitment by the government to make power sector self sustainable and enabling the utilities to recover their costs as they are due. Details about NEPRA's determined quarterly tariffs and the ones notified by the GoP are shown in the Tables in the later part of this Report.

4.3 Energy Summit and Measures of Conservation of Energy:

The federal government recognized that in addition to the efforts to induct new generation capacity the issues related to the efficient utilization of available resources and bringing discipline in the consumption of electricity also need to be addressed at the country level. Accordingly an Energy Summit chaired by the Prime Minster and including all stakeholders including the provincial governments was held in Islamabad on 19th April, 2010 which recommended as follows:

Performance related

- To reduce the power sector deficit. Companies will reduce the losses by 2% within six months.
- Reduction in outstanding receivables.
- An operational and technical audit will be completed by a third party of international repute within six months.
- No tariff-differential subsidy from FY 11.

Conservation Measures

- Five day work week
- Staggering industrial holidays
- Non-supply to tube-wells during peak hours
- Closure of markets after sun-set
- Alternate street lights/non-supply to bill-boards

4.4 Role of the Provinces:

The provinces have increased their efforts in promoting the development of indigenous resources and renewable energy. Punjab and Khyber Pakhtunkhwa have issued power policies to develop power generation projects. The government of Sindh has also created an Energy Department to focus on the development of renewable energy resources. Thar Development Board is also quite active to push the development of huge coal reserves identified in Thar.

5. Initiatives by NEPRA

NEPRA, as the power sector regulator, has been taking various steps to facilitate induction of more power to reduce the supply-demand gap in an expeditious manner. Some of the important measures taken by NEPRA include:

? Facilitating Hydropower

NEPRA announced a multi-stage tariff mechanism for hydropower projects in the country, which provides an opportunity of three-stage tariff, i.e. tariffs at the feasibility stage, the EPC stage and final adjustment in tariff at Commercial Operation Date (COD).

? Encouraging Indigenous Resources

To encourage the hydel and coal-based power projects in the country, the Authority has allowed 17% IRR to hydel and indigenous coal and 16% to imported coal power projects as against the 15% IRR for oil and gas-based thermal power projects.

? Supporting Bagasse-based Cogeneration Projects

During the period under review, NEPRA has processed the tariff petition in respect of 80 MW Co-generation Power Project based on bagasse & imported coal on fast track basis. This project is the first of its kind in the country, and determination of the same has been made on 2nd April 2010 (within a period of around three and a half months only). The tariff offered has been made available to the entire sugar industry and offers an IRR of 18% on bagasse-based generation.

? Efficient Communication with Licensees

In view of the standardization of Tariff Petition Forms, the format on which tariff petition would be filed has been finalized by the Authority. It is expected that such standardization will bring efficiency in filings and licensees communication.

? Safeguarding Consumer Interests

The Consumer Service Manual has been finalized and approved by the Authority for implementation by all the distribution companies, whereas, modifications in the existing Regulation to facilitate supply/resale of power for Housing Colonies, Shopping Plazas and High Rise Buildings are in the advance stage of process and will be approved by the Authority shortly.

? Development of Regulatory Instruments

During the period, NEPRA prescribed/approved the following Rules, Regulations and also made amendments in the existing Rules & Regulations, details of which are as under:

- Amendment in NEPRA Performance Standards (Generation) Rules, 2009;
- Amendment in NEPRA (Uniform System of Accounts) Rules, 2009;
- Amendment in NEPRA (Review Procedure) Regulations, 2009;
- Amendment in the Regulation of Generation, Transmission & Distribution of Electric Power Act, 1997 (XL of 1997);
- Amendment in NEPRA (Fees pertaining to Tariff Standards and Procedure) Regulations, 2002;
- Amendment in NEPRA Licensing (Application & Modification Procedure) Regulations, 1999;
- Amendment in NEPRA Consumer Eligibility Criteria, 2003 (Regulations) with respect to an additional regulation regarding 'Removal of Dedicated Distribution System (DDS)'.
- Amendment in NEPRA Interim Power Procurement (Procedures & Standards) Regulations, 2005 with respect to additional sub-clauses/ regulations under 'Power Acquisition' and 'Power Acquisition Permission'.

Advisories to GoP relating Power Sector

In its role as a regulator, to safeguard the interest of investors and the consumers NEPRA has time and again extended advisories to all concerned/relevant entities, including the Government of Pakistan (GoP), to make country's power sector efficient in order to make the electricity price more affordable. Some of the advisories sent to Federal Government are listed here:

S#	Advisory Subject	Advisory Date	Sent to
1	NEPRA's Role in Power Crises	11th September, 2009	Cabinet Division
2	Power Crises and GENCOs Role	3rd November, 2009	Ministry of Water and Power
3	Pakistan Integrated Energy Model (Pak-IEM) Project Advisory Committee	20th January, 2010	Planning Commission
4	Pakistan Power Sector Reforms and PEPCO's Role	4th February, 2010	Ministry of Water and Power
5	Standardized Request for Proposed RFP for Fast Track IPP Projects to be processed through International Competitive Bidding	1st April, 2010	Private Power and Infrastructure Board (PPIB)
6	High Electricity Generation on HSD-Fuel Price Adjustment for the month of January, 2010 for Ex-WAPDA DISCOs	14th April, 2010	Ministry of Water and Power
7	Amendment to NEPRA Act subsequent to meeting with World Bank	25th May, 2010	Ministry of Water and Power

In order to encourage and to reduce the financial burden of prospective sponsors of the power projects interested in obtaining generation, transmission and distribution licenses and determination of tariff, NEPRA has reduced its fees for various categories of licensees on a number of occasions.

The first downward revision was made by NEPRA in August, 2006. Fees were again reduced as a minimum of 40% in December, 2008. Recently, NEPRA has reduced fees further by 60% in May, 2010 which were to be applicable on 1st July, 2010.

STATISTICAL DATA ABOUT ENERGY & ELECTRICITY SECTOR

6. Energy Sector Overview

Primary commercial energy supplies in Pakistan comprise of oil, natural gas, coal, hydro and nuclear electricity. The primary energy supplies of the country during fiscal year 2008-09 decreased by 0.60% and reached 62.5 MTOE as compared to 62.9 MTOE during the same period last year. The overall contribution of gas in primary energy supplies of the country, during 2008-09, was the highest with 30.24 MTOE (48.4%) followed by the Oil 20.10 MTOE (32.1%), Hydro Electricity 6.63 MTOE (10.6%), Coal 4.73 MTOE (7.6%), Nuclear Electricity 0.39 MTOE (0.6%), LPG 0.40 MTOE (0.6%) and Imported Electricity 0.05 MTOE (0.1%).

6.1 Oil:

The balance recoverable reserves of crude oil of the country as on June 30, 2009 were 314.391 million barrels while the production during fiscal year 2008-09 was recorded as 24.033 million barrel. The total oil refining capacity of the country as on June 30, 2009 was 12.95 million tonnes per year while the total crude oil processed in the refineries of the country were 10.736 million tonnes. The total import of the crude oil of the country during 2008-09 was 8.060 million tonnes which cost an amount of 4243.71 million US$ while during 2007-08 the total import of crude oil was 8.423 million tonnes with total cost of 5740.86 million US$. The consumption of petroleum products (Furnace Oil, Light Diesel Oil, High Speed Diesel and motor spirit) in power sector during 2008-09 was recorded as 7.570 million tonnes while during 2007-08 it was recoded as 7.083 million tonnes.

6.2 Gas:

The balance recoverable reserves of natural gas of the country as on June 30, 2009 were 28.902 trillion cft while the production during fiscal year 2008-09 was recorded as 1.460 trillion cft. The consumption of natural gas in power sector during 2008-09 was recorded as 404,140 million cft while during 2007-08 it was recoded as 429,892 million cft. The total network for distribution of natural gas in Pakistan as on June 30, 2009 was 111,198 km. The total number of natural gas consumers in Pakistan, as on June 30, 2009, was 5,612,268 of which the share of domestic, commercial and industrial consumers were (5,527,001), (75,510) and (9,757), respectively.

6.3 Coal:

The estimated total coal reserves of the country as on June 30, 2009 were about 186 billion tonnes while production of coal during 2008-09 was recorded as 3.73 million tonnes. The total coal imported by the country during 2008-09 was 4.651 million tonnes which cost an amount of 47,321 million rupees. The total coal consumption in power sector during 2008-09 was 112,520 tonnes as compared to 162,200 tonnes, same period last year. However, the electricity generated through coal during fiscal years 2007-08 and 2008-09 was 136 GWh and 113 GWh respectively.

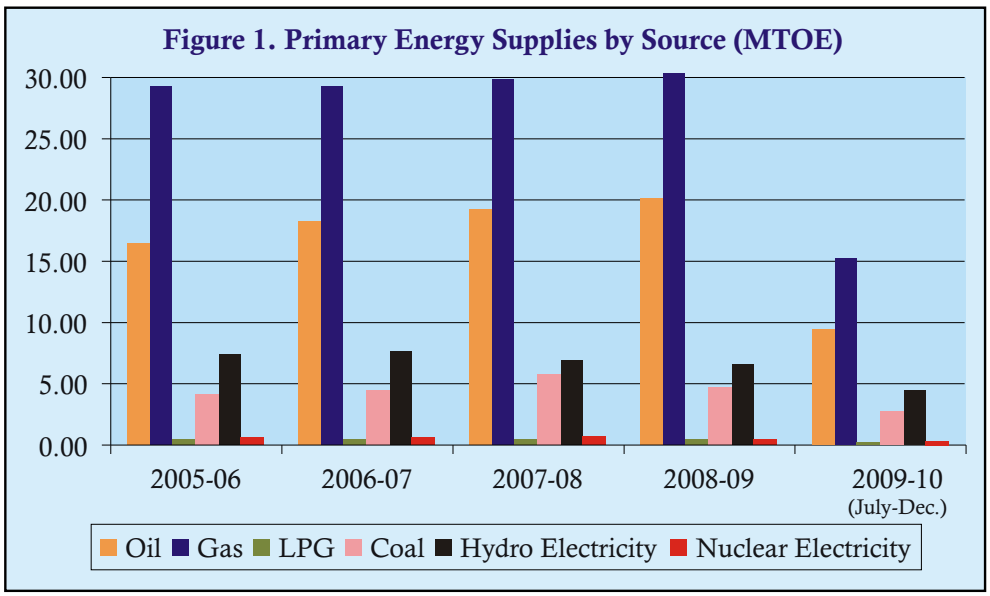
6.4 Primary Energy Supplies:

The main primary energy production of the country consists of oil, gas, coal, nuclear electricity net generation (converted to Btu using the nuclear plants heat rate); and conventional hydroelectricity net generation (converted to Btu using the fossil-fueled plants heat rate). The primary commercial energy supplies by source is given in Table 1.

TABLE 1
Primary Energy Supplies by Source (MTOE)

Fiscal Year	Unit	Oil	Gas	LPG	Coal	Hydro Electricity	Nuclear Electricity	Imported Electricity	Total	Annual Growth Rate (%)
2005-06	MTOE	16.41	29.20	0.40	4.05	7.37	0.59	0.03	58.06	4.45
	% share	28.3	50.3	0.7	7.0	12.7	1.0	0.1	100.0	
2006-07	MTOE	18.19	29.32	0.47	4.43	7.63	0.55	0.04	60.62	4.42
	% share	30.0	48.4	0.8	7.3	12.6	0.9	0.1	100.0	
2007-08	MTOE	19.21	29.87	0.42	5.78	6.85	0.73	0.05	62.92	3.78
	% share	30.5	47.5	0.7	9.2	10.9	1.2	0.1	100.0	
2008-09	MTOE	20.10	30.24	0.40	4.73	6.63	0.39	0.05	62.54	-0.60
	% share	32.1	48.4	0.6	7.6	10.6	0.6	0.1	100.0	
2009-10 (July-Dec.)	MTOE	9.44	15.15	0.20	2.30	4.23	0.40	0.03	31.75	n.a.
	% share	29.7	47.7	0.6	7.2	13.3	1.3	0.1	100.0	

Source: Pakistan Energy Yearbook



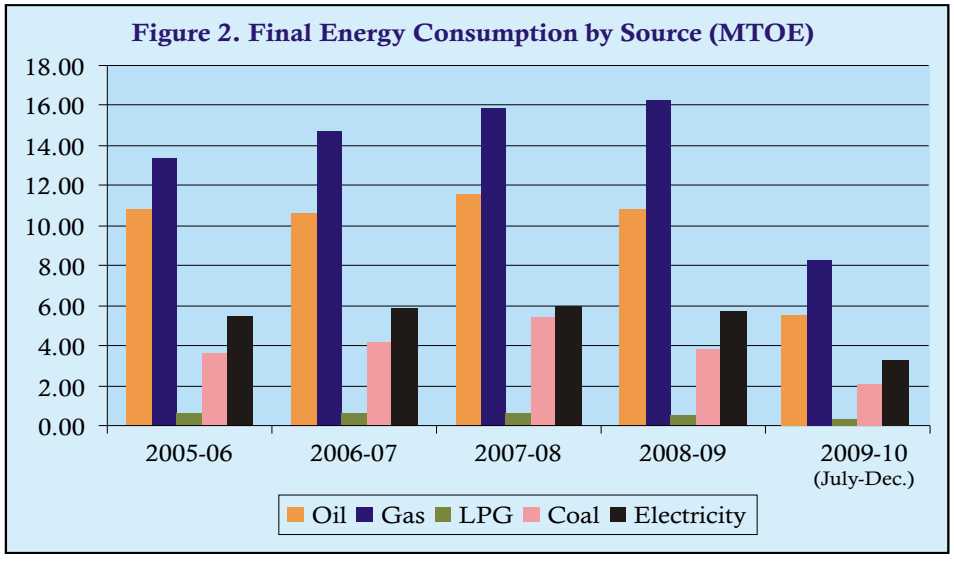
6.5 Final Energy Consumption:

Final energy is a form of energy available to the user following the conversion from primary energy. Gasoline or diesel oil, purified coal, purified natural gas, electricity, mechanical energy are different forms of final energy. When going from primary energy to final energy, there are always loss of some energy which depends on the efficiency of the conversion device. The final energy consumption by source is given in Table 2.

TABLE 2
Final Energy Consumption by Source (MTOE)

Fiscal Year	Unit	Oil	Gas	LPG	Coal	Electricity	Total	Annual Growth Rate (%)
2005-06	MTOE	10.88	13.33	0.63	3.61	5.51	33.95	5.74
	% share	32.0	39.3	1.8	10.6	16.2	100.0	
2006-07	MTOE	10.58	14.70	0.66	4.15	5.92	36.01	6.07
	% share	29.4	40.8	1.8	11.5	16.4	100.0	
2007-08	MTOE	11.53	15.88	0.62	5.40	5.98	39.41	9.46
	% share	29.3	40.3	1.6	13.7	15.2	100.0	
2008-09	MTOE	10.84	16.31	0.57	3.89	5.73	37.34	-5.26
	% share	29.0	43.7	1.5	10.4	15.3	100.0	
2009-10 (July-Dec.)	MTOE	5.41	8.37	0.30	2.17	3.20	19.45	n.a.
	% share	27.8	43.0	1.5	11.2	16.5	100.0	

Source: Pakistan Energy Yearbook



6.6 Fuel Consumption in Power Sector:

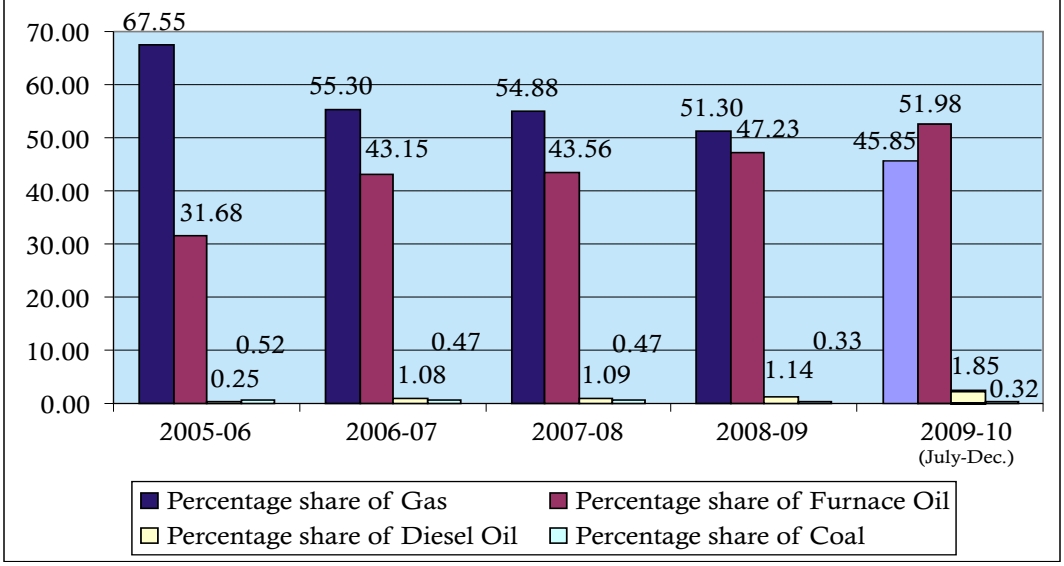
The share of installed generation capacity of thermal power plants using oil, natural gas and coal to the total installed generation capacity in the country, during 2009-10, was about 67.50% while the electricity produced by the thermal power plants, during 2008-09, to the total electricity generated in the country during same period was about 68.38%. The statistics of different fuel used and their percent share to the total fuel used for thermal electricity generation of the country are given in Table 3.

TABLE 3
Fuel Consumption for Thermal Power Generation (TOE)

Fuel	2005-06	2006-07	2007-08	2008-09	2009-10 (July-Dec.)
Gas	8,694,561	8,640,101	8,492,919	7,830,065	3,545,420
% share	67.55	55.30	54.88	51.30	45.85
Furnace Oil	4,076,897	6,741,614	6,741,614	7,210,211	4,019,429
% share	31.68	43.15	43.56	47.23	51.98
Diesel Oil	32,176	168,449	168,449	173,947	143,396
% share	0.25	1.08	1.09	1.14	1.85
Coal	66,812	73,551	72,568	50,341	24,642
% share	0.52	0.47	0.47	0.33	0.32
Total	**12,870,446**	**15,623,715**	**15,475,550**	**15,264,564**	**7,732,887**

Source: Pakistan Energy Yearbook

Figure 3. Fuel Consumption for Thermal Power Generation (%)



ELECTRICITY SECTOR OVERVIEW

7. Electricity Sector Overview

7.1 Installed Capacity:

The total nominal power generation capacity of Pakistan as on June 30, 2010 was 21593 MW; of which 14576 MW (67.50%) was thermal, 6555 MW (30.36%) was hydroelectric and 462 MW (2.14%) was nuclear. The installed power generating capacity of Pakistan from 2005-06 to 2009-10 is given in Table 4.

TABLE 4
Installed Generation Capacity by Type (MW)

		2005-06	2006-07	2007-08	2008-09	2009-10
THERMAL						
GENCOswith PEPCO		4,834	4,834	4,899	4,900	4,885
KESC Own		1,756	1,756	1,756	1,846	1,946
IPPs	Connected with PEPCO	5,754	5,754	5,773	5,956	7,039
	Connected with KESC	262	262	262	262	262
Rental	Connected with PEPCO	0	150	286	286	122
	Connected with KESC	0	0	0	50	50
Others (CPPs/SPPs)	Connected with KESC	0	0	239	239	272
Sub-Total		**12,606**	**12,756**	**13,215**	**13,539**	**14,576**
Percentage share		64.44	64.78	65.32	65.86	67.50
HYDEL						
WAPDA Hydel		6,463	6,444	6,444	6,444	6,444
IPPs Hydel		30	30	111	111	111
Sub-Total		**6,493**	**6,474**	**6,555**	**6,555**	**6,555**
Percentage share		33.19	32.88	32.40	31.89	30.36
NUCLEAR						
CHASNUPP		325	325	325	325	325
KANUPP		137	137	137	137	137
Sub-Total		**462**	**462**	**462**	**462**	**462**
Percentage share		2.36	2.35	2.28	2.25	2.14
Total Installed Generation Capacity of the Country		**19,561**	**19,692**	**20,232**	**20,556**	**21,593**

Source: Electricity Marketing Data / KESC

Figure 4. Installed Generation Capacity by Type (MW)

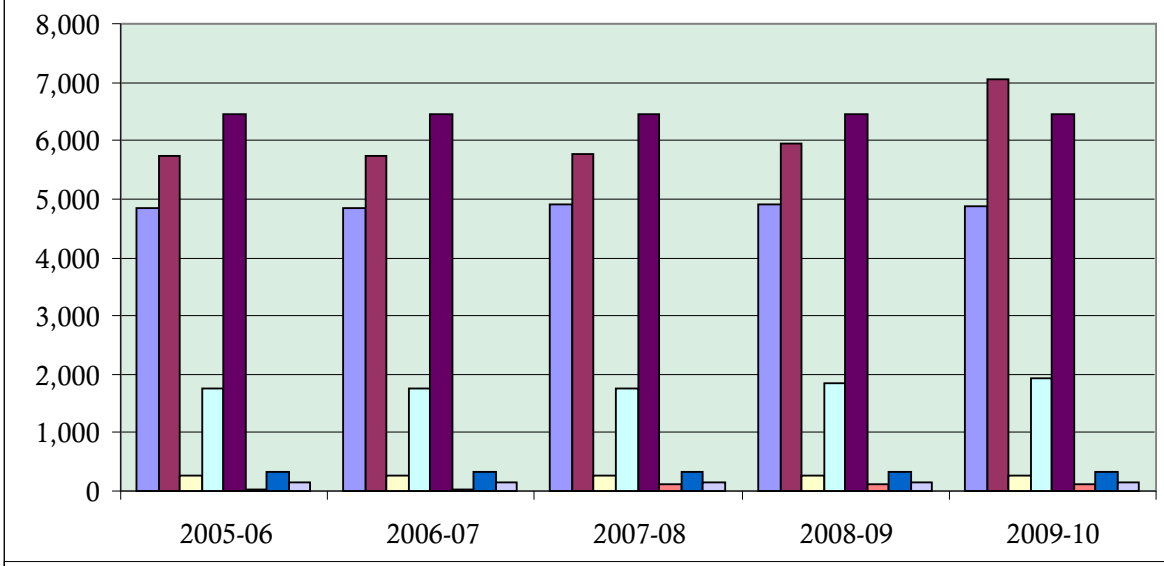


TABLE 5
Installed Generation Capacity by Systems (MW)

	2005-06	2006-07	2007-08	2008-09	2009-10
PEPCO SYSTEM					
Total Installed Generation Capacity in PEPCO System	17,406	17,537	17,838	18,022	18,926
% Share (Installed Capacity in PEPCO System)	88.98	89.06	88.17	87.67	87.65
KESC SYSTEM					
Total Installed Generation Capacity in KESC System	2,155	2,155	2,394	2,534	2,667
% Share (Installed Capacity in KESC System)	11.02	10.94	11.83	12.33	12.35
Total Installed Generation Capacity in the Country	**19,561**	**19,692**	**20,232**	**20,556**	**21,593**

Source: Electricity Marketing Data / KESC

Figure 5. Installed Generation Capacity by Systems
(in Percentage)

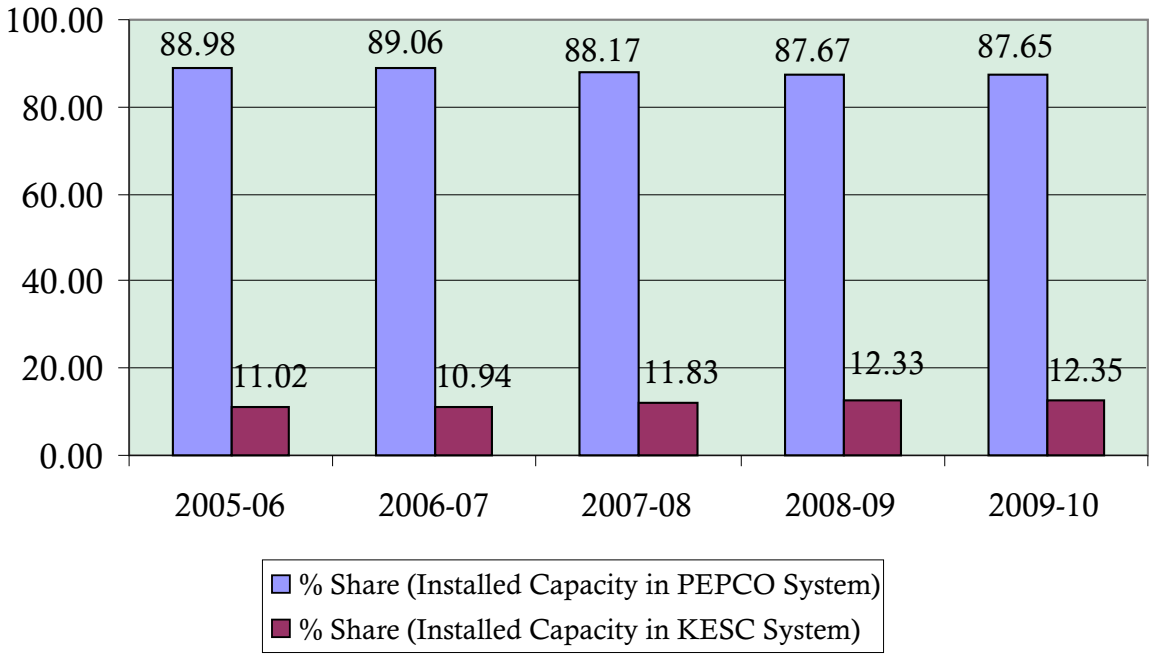


TABLE 6 Installed Generation Capacity by Sectors (MW)					
	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**
PUBLIC SECTOR					
Total Installed Generation Capacity in Public Sector	11,622	11,603	11,668	11,669	11,654
% Share (Installed Capacity in Public Sector)	59.42	58.92	57.67	56.77	53.97
PRIVATE SECTOR					
Total Installed Generation Capacity in Private Sector	7,939	8,089	8,564	8,887	9,939
% Share (Installed Capacity in Private Sector)	40.58	41.08	42.33	43.23	46.03
Total Installed Generation Capacity in the Country	**19,561**	**19,692**	**20,232**	**20,556**	**21,593**
Source: Electricity Marketing Data / KESC					

Figure 6. Installed Generation Capacity by Sectors
(in Percentage)

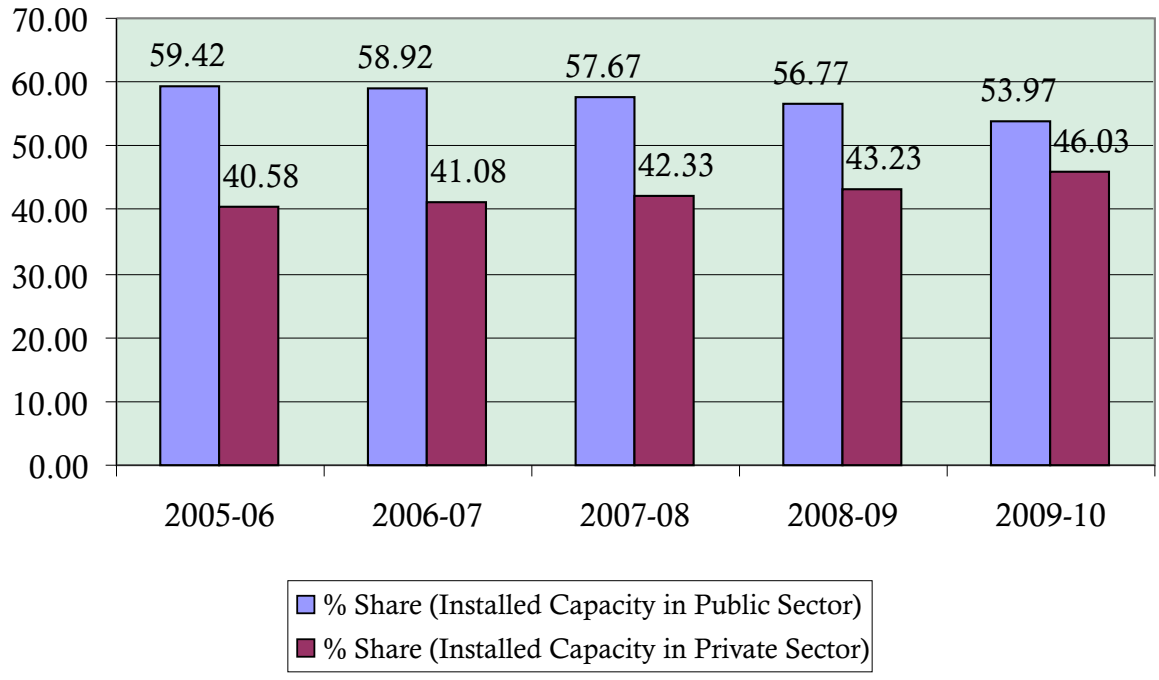


TABLE 7
Plant-wise Installed Generation Capacity as on 30th June (MW)

Power Station	Type of Power Station	Primary Fuel	2006	2007	2008	2009	2010
A1: Hydel (WAPDA)							
Tarbela	Reservoir	Hydel	3,478	3,478	3,478	3,478	3,478
Mangla	Reservoir	Hydel	1,000	1,000	1,000	1,000	1,000
Ghazi Barotha	Power Channel	Hydel	1,450	1,450	1,450	1,450	1,450
Warsak	Reservoir	Hydel	243	243	243	243	243
Chashma	Low Head	Hydel	184	184	184	184	184
Others Small Hydel	Canals	Hydel	108	89	89	89	89
Total Hydel (WAPDA)			**6,463**	**6,444**	**6,444**	**6,444**	**6,444**
A2: Hydel (IPPs)							
AJK Jagran	-	Hydel	30	30	30	30	30
Malakand-III	-	Hydel	0	0	81	81	81
Total Hydel (IPPs)			**30**	**30**	**111**	**111**	**111**
Total Hydel (A1 + A2)			**6,493**	**6,474**	**6,555**	**6,555**	**6,555**
B1: Thermal (GENCOs in PEPCO system)							
TPS Jamshoro	STs	Dual	850	850	850	850	850
GTPS Kotri	GTs (CCPP)	Gas	174	174	174	174	174
TPS Guddu	STs+GTs (CCPP)	Dual	1,655	1,655	1,655	1,655	1,655
TPS Muzaffargarh	STs	Dual	1,350	1,350	1,350	1,350	1,350
SPS Faisalabad	STs	Dual	132	132	132	132	132
NGPS Multan	STs	Dual	130	130	195	195	195
GTPS Faisalabad	GTs (CCPP)	Dual	244	244	244	244	244
FBC Lakhra	STs	Coal	150	150	150	150	150
Total Thermal (GENCOs in PEPCO system)			**4,685**	**4,685**	**4,750**	**4,750**	**4,750**
B2: Others (Operating under GENCOs)							
GTPS Shahdara	GTs	Gas	59	59	59	59	44
TPS Quetta	GTs	Gas	35	35	35	35	35
TPS Pasni	STs	Dual	17	17	17	17	17
GTPS Panjgur	GTs	Gas	38	38	38	39	39
Total Thermal (Operating under GENCOs)			**149**	**149**	**149**	**150**	**135**
B3: Thermal (IPPs connected with PEPCO system)							
AES Lal Pir	STs	FO	362	362	362	362	362
AES Pak Gen	STs	FO	365	365	365	365	365
Altern Energy	GE	Gas	10.5	10.5	10.5	31	30
Fauji Kabirwala	GTs	Gas	157	157	157	157	157
Habibullah	GTs (CCPP)	Gas	140	140	140	140	140
HUBCO	STs	FO	1,292	1,292	1,292	1,292	1,292
Japan Power	DE	FO	135	135	135	135	135
KAPCO	GTs (CCPP)	Dual	1,639	1,639	1,639	1,639	1,639
Kohinoor Energy	DE+STs	FO	131	131	131	131	131
Rousch Power	GTs (CCPP)	Gas	450	450	450	450	450
Saba Power	GTs + STs	FO	134	134	134	134	134
Southern Electric	DE	FO	117	117	136	136	135
TNB Liberty Power	GTs (CCPP)	Gas	235	235	235	235	235
Uch Power	GTs (CCPP)	Gas	586	586	586	586	586

Contined … next page

Power Station	Type of Power Station	Primary Fuel	2006	2007	2008	2009	2010
Attock Gen.	STs	FO	-	-	-	163	163
Atlas Power	DE+STs	FO	-	-	-	-	219
Engro Energy	GTs + STs	Dual	-	-	-	-	216
Saif Power	GTs + STs	Gas	-	-	-	-	225
Orient Power	GTs + STs	Gas	-	-	-	-	225
Nishat Power	STs	FO	-	-	-	-	200
Total Thermal (IPPs)			**5,754**	**5,754**	**5,773**	**5,956**	**7,039**
B4: Rental (connected with PEPCO system)							
GE150 MW	GT	Gas	-	150	150	150	0
Alstom 136MW	GT	Gas	-	-	136	136	0
Gulf Power	GT	Gas	-	-	-	-	62
Techno Power	GT	Gas	-	-	-	-	60
Total Rental (connected with PEPCO system)			**0**	**150**	**286**	**286**	**122**
Total Thermal in PEPCO system (B1+B2+B3+B4)			**10,588**	**10,738**	**10,958**	**11,142**	**12,046**
C1: Thermal (KESC own)							
Bin Qasim TPS	STs	Dual	1,260	1,260	1,260	1260	1260
Korangi TPS	STs	Dual	316	316	316	250	250
Korangi Town GTPS	GTs	Gas	80	80	80	80	20
Korangi Town GTPS-II	GTs + STs	Gas	-	-	-	-	88
Korangi CCPP	GTs + STs	Gas	-	-	-	194	220
GTPS Site-I	GTs	Gas	100	100	100	40	20
GTPS Site-II	GTs	Gas	-	-	-	22	88
Total Thermal (KESC own)			**1,756**	**1,756**	**1,756**	**1,846**	**1,946**
C2 :Thermal (IPPs connected with KESC)							
Gul Ahmed	DE	FO	136	136	136	136	136
Tapal Energy	DE	FO	126	126	126	126	126
Total Thermal (IPPs connected with KESC system)			**262**	**262**	**262**	**262**	**262**
C3: Thermal (Others connected with KESC)							
DHA Cogen	-	-	-	-	94	94	94
International Industries	-	-	-	-	19	19	19
Engro Polymer	-	-	-	-	0	0	18
Anoud Power	-	-	-	-	12	12	12
PASMIC	-	-	-	-	110	110	110
IIL (4 MW)	-	-	-	-	4	4	4
Al-Abbas (Coal)	-	-	-	-	0	0	15
Aggreko (Rental)	-	-	-	-	0	50	50
Total Thermal (Others connected with KESC)			**0**	**0**	**239**	**289**	**322**
Total Thermal KESC (C1+C2+C3)			**2,018**	**2,018**	**2,257**	**2,397**	**2,530**
D: Nuclear							
KANUPP	STs	Uraniam	137	137	137	137	137
CHASNUPP	STs	Uraniam	325	325	325	325	325
Total Nuclear			**462**	**462**	**462**	**462**	**462**
Grand Total (A+B+C+D)			**19,561**	**19,692**	**20,232**	**20,556**	**21,593**

TABLE 8
Electricity Generation by Type (GWh)

		2005-06	2006-07	2007-08	2008-09	2009-10
THERMAL GENERATION BY:						
GENCOs		22519	21617	20508	19536	19826
KESC Own Power Plants		9130	8169	8663	8262	7964
IPPs	PEPCO system	26535	31869	33195	33702	36988
	KESC system	1398	1547	1750	1112	1245
RPPs	PEPCO system	0	213	938	913	299
	KESC system	0	0	0	163	358
CPPs/SPPs/ Other Plants	PEPCO system	0	81	306	725	868
	KESC system	19	95	328	321	410
Total Thermal Generation in PEPCO System		49054	53780	54947	54876	57981
Total Thermal Generation in KESC System		10547	9811	10741	9858	9977
Total Thermal Generation		**59601**	**63591**	**65688**	**64734**	**67958**
% share of thermal electricity generation to total electricity generation in the Country		64.16	65.01	67.41	68.38	68.33
HYDEL GENERATION BY:						
Public Sector		30751	31846	28536	27636	27960
Private Sector		104	96	131	547	595
Total Hydel Generation		**30855**	**31942**	**28667**	**28183**	**28555**
% share of hydel electricity generation to total Electricity generation in the Country		33.22	32.66	29.42	29.77	28.71
NUCLEAR GENERATION BY:						
PEPCO system		2170	1944	2455	1058	2094
KESC system		117	161	377	428	573
Total Nuclear Generation		**2287**	**2105**	**2832**	**1486**	**2667**
% share of nuclear electricity generation to total Electricity generation in the Country		2.46	2.15	2.91	1.57	2.68
IMPORT IN PEPCO SYSTEM:						
From Iran		146	171	199	227	250
From KESC		3	5	65	33	20
Total Imported Electricity		**149**	**176**	**264**	**260**	**270**
% share of imported generation to total energy generation in the Country		0.16	0.18	0.27	0.27	0.27
Total Electricity Generation of the Country		**92892**	**97814**	**97451**	**94663**	**99450**

Source: Electricity Marketing Data / KESC

Figure 8. Electricity Generation (GWh)

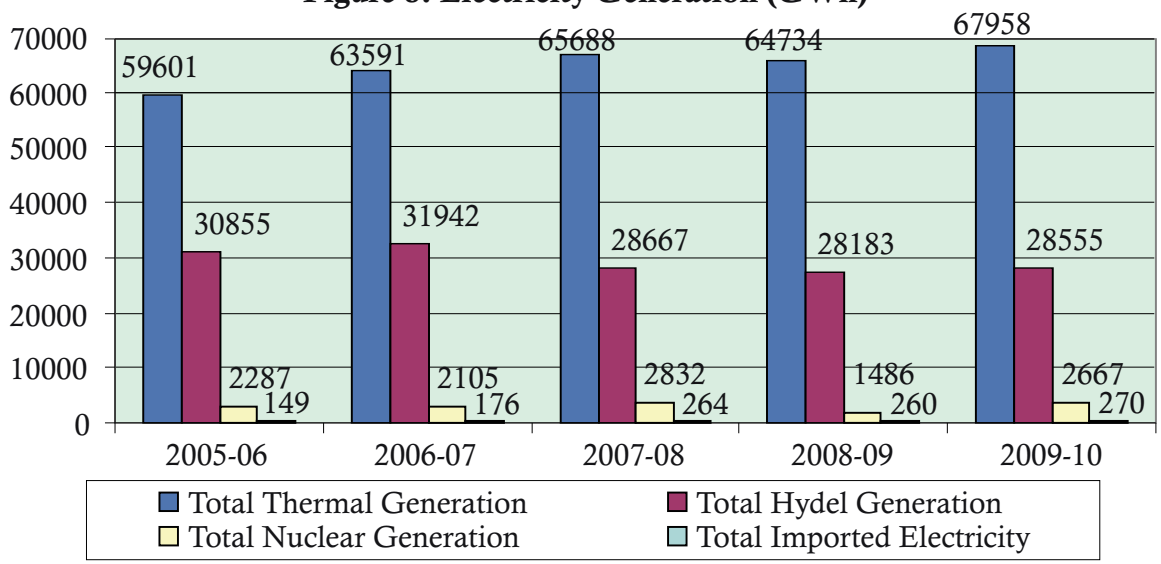


TABLE 9
Electricity Generation by Systems (GWh)

	2005-06	2006-07	2007-08	2008-09	2009-10
PEPCO SYSTEM					
Total Electricity Generation in PEPCO system	82225	87837	86268	84344	88880
% to the total Generation in the Country	88.52	89.80	88.52	89.10	89.37
KESC SYSTEM					
Total Electricity Generation in KESC system	10667	9977	11183	10319	10570
% to the total Generation in the Country	11.48	10.20	11.48	10.90	10.63
Total energy supplies in PEPCO and KESC system	**92892**	**97814**	**97451**	**94663**	**99450**

Source: Electricity Marketing Data / KESC

Figure 9. Electricity Generation by Systems (in percentage)

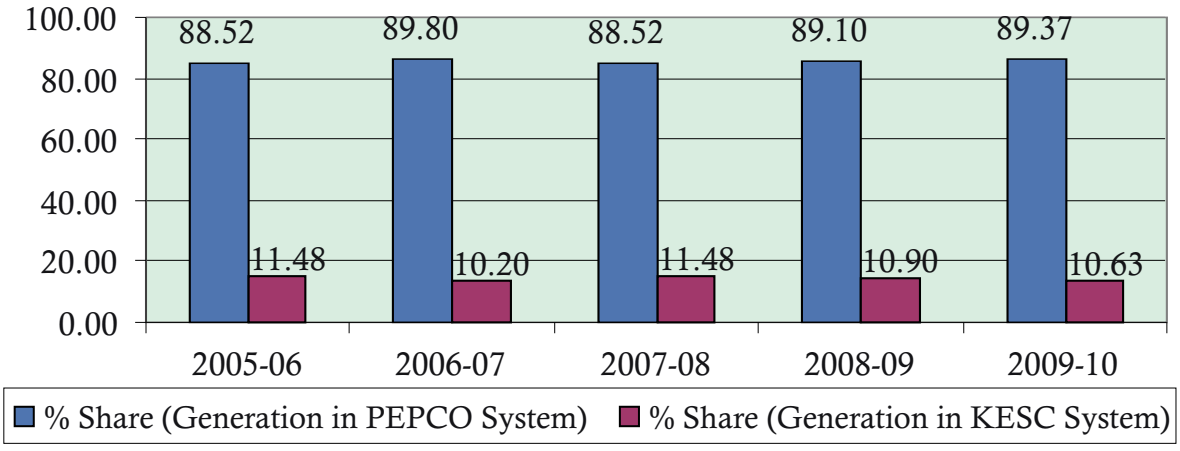


TABLE 10 Electricity Generation by Sectors (GWh)					
	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**
PUBLIC SECTOR					
Total Electricity Generation in Public sector	55557	55568	51876	48658	50453
% to the total Generation in the Country	59.81	56.81	53.23	51.40	50.73
PRIVATE SECTOR					
Total Electricity Generation in Private sector	37335	42246	45575	46005	48997
% to the total Generation in the Country	40.19	43.19	46.77	48.60	49.27
Total Electricity Generation	**92892**	**97814**	**97451**	**94663**	**99450**
Source: Electricity Marketing Data / KESC					

Figure 10. Electricity Generation by Sectors (in percentage)

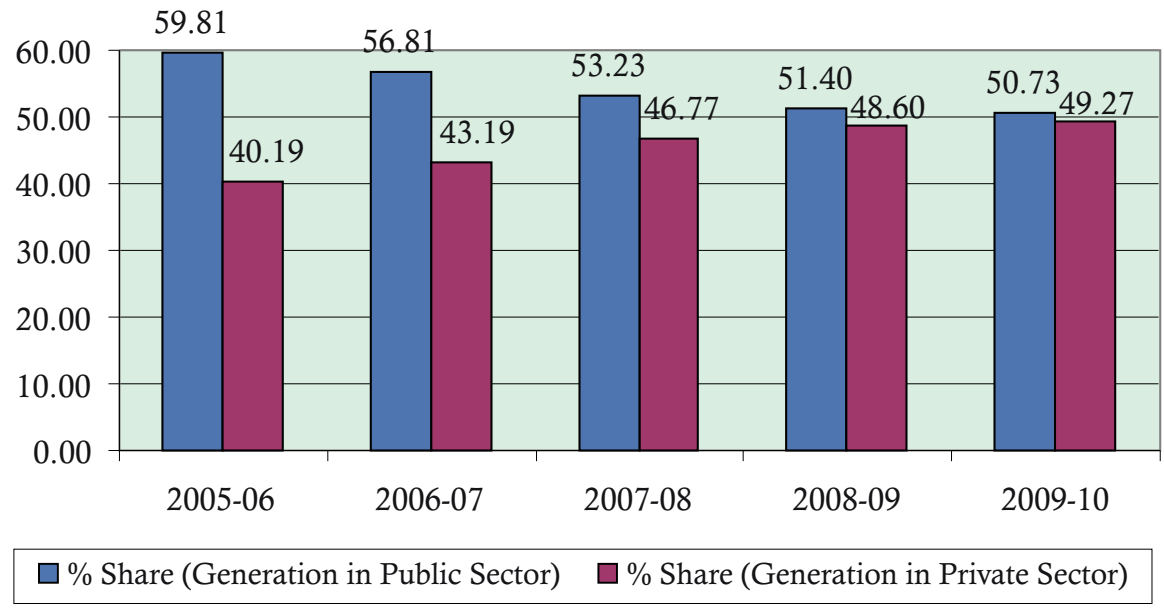


TABLE 11
Electricity Statistics of KESC

1	**Units Generated by KESC (GWh)**					
	Name of Plant	**Year**	**Units Generated**	**Auxiliary Consumption**		**Units Sent Out**
				GWh	**%**	
1.1	Bin Qasim Thermal Power Station (BQTPS)	2005-06	7232.45	535.51	7.4	6696.98
		2006-07	6535.76	505.53	7.7	6030.23
		2007-08	7304.74	559.29	7.7	6745.44
		2008-09	6396.56	488.39	7.6	5908.17
		2009-10	5506.00	455.68	8.3	5050.00
1.2	Korangi Thermal Power Station (KTPS)	2005-06	1114.99	118.04	10.6	996.95
		2006-07	887.48	99.93	11.3	787.55
		2007-08	729.28	75.75	10.4	653.52
		2008-09	921.81	84.20	9.2	837.61
		2009-10	222.00	25.44	11.5	197.00
1.3	Korangi Town Gas Turbine (KTGT)	2005-06	358.46	14.98	4.2	343.48
		2006-07	362.72	17.42	4.8	345.3
		2007-08	269.36	14.07	5.2	255.28
		2008-09	310.08	14.85	4.8	295.23
		2009-10	66.00	3.7	5.6	62.00
1.4	Korangi Town Gas Turbine-II (Commissioned during August, 2009)	2009-10	464.96	11.99	2.6	453.00
1.5	Korangi Combined Cycle Power Plant (Commissioned during 2007-08)	2007-08	0.69	0.72	103.0	-0.02
		2008-09	330.28	18.80	5.7	311.48
		2009-10	1197.00	79.5	6.6	1117.00
1.6	Site Gas Turbine Power Station (SGTPS)	2005-06	423.78	16.35	3.9	407.43
		2006-07	382.88	15.49	4	367.39
		2007-08	358.45	14.94	4.2	343.52
		2008-09	294.49	12.24	4.2	282.25
		2009-10	3.00	0.23	6.7	3.00
1.7	Site Gas Turbine Power Station-II (SGTPS-II) (Commissioned during 2008-09)	2008-09	8.90	0.26	2.9	8.63
		2009-10	505.00	14.88	2.9	491.00
1.8	Total Units Generated in KESC own Plant	2005-06	9129.68	684.88	7.5	8444.84
		2006-07	8168.84	638.37	7.8	7530.47
		2007-08	8662.52	664.77	7.7	7997.74
		2008-09	8262.12	618.74	7.6	7643.37
		2009-10	7963.96	591.42	n.a.	7373.00
2	**Fuel Consumption Ratio in Percentage (%)**					
		2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**
2.1	Gas	79.8	79.7	73.1	86.3	76.4
2.2	Furnace Oil	19.9	20.2	26.9	13.7	23.6
2.3	LDO/HSD Oil	0.2	0.1	0.3	0.0	0.0
3	**Average Fuel Price**					
3.1	Gas (Rs./MCF)	224.15	253.94	245.36	339.33	359.62
3.2	FO (Rs./M. Ton.)	19803.84	20224.46	28898.14	32797.96	30365.67
3.3	LDO (Rs./Ltr.)	11.12	--	--	--	--
3.4	HSD (Rs./Ltr.)	29.34	30.48	--	--	--

Continued

4	**Units Purchased by KESC**						
4.1	KANUPP		117.17	160.78	376.80	428.36	573.00
4.2	PASMIC		18.73	42.92	93.33	104.03	93.00
4.3	Gul Ahmed		718.11	822.06	901.99	455.94	608.00
4.4	Tapal		680.311	724.56	847.75	655.65	637.00
4.5	WAPDA		3836.10	4905.10	4071.73	4981.81	5187.00
4.6	Anoud Power		--	52.45	26.80	17.52	33.00
4.7	DHA Cogen.		--	--	160.72	68.03	163.00
4.8	IIL		--	--	47.40	131.21	121.00
4.9	Aggreko (Rental)		--	--	--	162.79	358.00
4.10	Engro Energy		--	--	--	--	45.00
4.11	Al-Abbas (Coal)		--	--	--	--	23.00
5	**Units Available for Distribution (GWh)**		13815.27	14238.34	14524.27	14648.75	15214.00
6	**Units Sold (GWh)**		9060.17	9367.39	10052.09	9396.47	9905.00
7	**T&D Losses excluding Auxiliary Consumption**	**GWh**	4755.1	4870.95	4955.62	5252.28	5309.00
		%	34.42	34.21	34.12	35.85	34.90

Source: Karachi Electric Supply Company Limited

TABLE 12
Thermal Electricity Generation by Fuel (GWh)

		2005-06	2006-07	2007-08	2008-09	2009-10
In PEPCO Area	**Gas**	**33658**	**30566**	**28514**	**32003**	**21002**
	% share to the total thermal generation in PEPCO	68.61	56.84	51.89	58.32	37.63
	% share to the total thermal generation in the Country	56.47	48.07	43.41	50.69	32.93
	Oil + HSD	**15267**	**23078**	**26297**	**22761**	**34694**
	% share to the total thermal generation in PEPCO	31.12	42.91	47.86	41.48	62.16
	% share to the total thermal generation in the Country	25.62	36.29	40.03	36.05	54.40
	Coal	**129**	**136**	**136**	**113**	**116**
	% share to the total thermal generation in PEPCO	0.26	0.25	0.25	0.21	0.21
	% share to the total thermal generation in the Country	0.22	0.21	0.21	0.18	0.18
	Sub-Total	**49054**	**53780**	**54947**	**54877**	**55812**
	% share to the total thermal generation in the Country	82.30	84.57	83.65	86.92	87.51
In KESC Area	**Gas**	**7231**	**6440**	**7110**	**7105**	**6200**
	% share to the total thermal generation in KESC	68.56	65.64	66.19	86.01	77.85
	% share to the total thermal generation in the Country	12.13	10.13	10.82	11.25	9.72
	Oil + HSD	**3316**	**3371**	**3631**	**1156**	**1764**
	% share to the total thermal generation in KESC	31.44	34.36	33.81	13.99	22.15
	% share to the total thermal generation in the Country	5.56	5.30	5.53	1.83	2.77
	Sub-Total	**10547**	**9811**	**10741**	**8261**	**7964**
	% share to the total thermal generation in the Country	17.70	15.43	16.35	13.08	12.49
In the Country	Gas	40889	37006	35624	39108	27202
	Oil+HSD	18583	26449	29928	23917	36458
	Coal	129	136	136	113	116
	Total	**59601**	**63591**	**65688**	**63138**	**63776**

Source: EMD / KESC

TABLE 13
Fuel Cost in GENCOs and KESC

Fiscal Year ending 30th June	Cost of Fuel (Rs. in million)		Electricity Generation (GWh)		Cost of Fuel (Paisa/kWh)	
	GENCOs	KESC	GENCOs	KESC	GENCOs	KESC
2005-06	66,202	29,241	22,519	9,130	293.98	320.28
2006-07	79,186	28,599	21,617	8,169	366.31	379.80
2007-08	95,717	35,880	20,508	8,663	466.72	448.67
2008-09	116,937	37,451	19,536	8,262	599.03	453.28
2009-10	146,913	37,181	19,826	7,964	749.81	466.86

TABLE 14
Fuel Consumption and Cost of Electricity Generation in GENCOs

	2005-06	2006-07	2007-08	2008-09	2009-10
Gas:					
Generation on Gas (GWh)	17402	13368	12474	11120	9968
Quantity of Gas Used (000 MCF)	214962	167282	155004	145621	129487
Consumption/kWh (Cft)	12.35	12.51	12.43	13.10	12.99
Cost/kWh (Paisa)	235.21	268.13	256.45	362.83	386.22
Furnace Oil (FO):					
Generation on Furnace Oil (GWh)	4976	8093	7816	8240	9324
Quantity of Furnace Oil Used (000 M.Tons)	1255	2094	2088	2189	2562
Consumption/kWh (Kg)	0.25	0.26	0.27	0.27	0.27
Cost/kWh (Paisa)	504.02	532.26	811.5	918.74	1127.66
High Speed Diesel (HSD):					
Generation on HSD (GWh)	2	4	1	48	185
Quantity of HSD Used (000 Ltrs.)	1045	2220	926	13410	49765
Consumption/kWh (Ltr)	0.62	0.54	0.73	0.28	0.27
Cost/kWh (Paisa)	1258.41	1507.96	1805.24	1350.90	1611.17
Coal:					
Generation on Coal (GWh)	129	136	136	113	116
Quantity of Coal Used (000 M.Tons)	149	164	162	121	125
Consumption/kWh (Kg)	1.16	1.2	1.19	1.07	1.08
Cost/kWh (Paisa)	133.17	161.06	202.92	211.87	248.52
Overall Fuel Cost and Cost of Fuel per kWh					
Overall Cost of Fuel Used in GENCOs for Generation of Electricity (Rs. Million)	66202	79186	95717	116937	146913
Overall Cost of Fuel Paisa/kWh	293.98	366.31	466.72	599.03	749.81

Source: Electricity Marketing Data

TABLE 15
Fuel Consumption and Cost of Generation Data - GENCOs

Power Station	Year	Gen. on Gas (GWh)	Gas Consumption		Gen. on FO (GWh)	FO Consumption		Gen. on HSD (GWh)	HSD Consumption (000 Liters)	Cost of Generation (Paisa/kWh)
			Total (MMCFT)	Cft/kWh (Average)		(000 M.Ton)	(Kg/kWh)			
JPCL (GENCO-I)										
TPS Jamshoro	2005-06	2,718	32,831	12.08	1,628	409	0.25	0.00	159	384.95
	2006-07	2,505	31,013	12.38	1,723	431	0.25	0.00	143	416.63
	2007-08	2,453	31,093	12.67	1,446	374	0.26	0.00	210	486.67
	2008-09	1,708	22,735	13.31	1,343	352	0.26	0.00	193	685.02
	2009-10	1,789	22,686	12.68	2,493	692	0.28	0.00	174	864.86
GTPS Kotri	2005-06	741	8,223	11.09	-	0	0	0.00	0	295.44
	2006-07	791	9,365	11.84	-	0	0	0.00	0	347.13
	2007-08	810	9,559	11.80	-	0	0	0.00	0	334.15
	2008-09	785	9,573	12.20	0	0	0	0.00	0	461.00
	2009-10	683	8,161	11.95	0	0	0	0.00	0	496.04
CPGCL (GENCO-II)										
TPS Guddu (Unit 1-4)	2005-06	2,739	37,414	13.66	53	14	0.26	0.00	0	269.68
	2006-07	1,630	23,122	14.19	97	25	0.26	0.00	0	343.03
	2007-08	2,228	31,758	14.25	55	14	0.26	0.00	0	322.62
	2008-09	2,832	41,059	14.50	203	53	0.26	0.00	0	450.87
	2009-10	2,586	39,255	15.18	157	43	0.27	0.00	0	501.50
TPS Guddu (Unit 5-13)	2005-06	6,091	70,820	11.65	0	0	0	0.00	0	219.90
	2006-07	6,074	71,976	11.85	0	0	0	0.00	0	247.37
	2007-08	5,781	66,795	12.07	0	0	0	0.00	0	245.90
	2008-09	5,034	62,343	12.38	0	0	0	0.00	0	350.70
	2009-10	4,469	53,011	11.86	12	0	0	0.00	0	367.34
NPGCL (GENCO-III)										
TPS Muzaffargarh	2005-06	3,566	43,343	12.15	3,109	776	0.25	0.00	0	391.01
	2006-07	1,308	16,815	12.85	5,736	1,464	0.26	0.00	0	511.29
	2007-08	462	6,122	13.26	5,456	1,419	0.26	0.00	0	799.99
	2008-09	199	2,459	12.35	5,964	1,540	0.26	0.00	0	913.98
	2009-10	29	451	15.73	6,027	1,605	0.27	0.00	0	1,136.58
SPS Faisalabad	2005-06	364	5,559	15.27	157	46	0.29	0.00	2	408.50
	2006-07	177	2,660	15.01	358	108	0.3	0.00	1	568.58
	2007-08	71	1,257	17.69	554	172	0.31	0.00	1	921.74
	2008-09	19	313	16.41	471	145	0.31	0.00	1	1,097.79
	2009-10	0	28	1,413.15	454	143	0.32	0.00	420	1,343.36
GTPS Faisalabad	2005-06	732	8,628	11.79	-	0	0	0.00	6	274.05
	2006-07	638	7,869	12.34	-	0	0	0.00	9	322.15
	2007-08	534	6,105	11.43	-	0	0	0.00	10	304.21
	2008-09	418	4,944	11.83	0	0	0	48.00	13,153	527.47
	2009-10	294	3,982	13.57	0	0	0	184.81	49,493	923.76
NGPS Multan	2005-06	301	4,941	16.39	29	10	0.35	0.00	0	442.24
	2006-07	170	2,840	16.93	179	66	0.37	0.00	0	652.21
	2007-08	56	983	17.71	305	108	0.36	0.00	0	1,025.62
	2008-09	46	938	20.40	259	99	0.38	0.00	0	1,287.44
	2009-10	0	15	0	194	78	0.40	0.00	0	1,831.53
GE 150 MW	2006-07	213	2695	12.65	0	0	0	0.00	0	0
	2007-08	731	8708	11.91	0	0	0	0.00	0	945.00
	2008-09	486	-	-	-	-	-	-	-	-
	2009-10	89	-	-	-	-	-	-	-	-
Alstom 136MW	2007-08	218	2,630	12.06	0	0	0	0.00	0	884.00
	2008-09	428	-	-	-	-	-	-	-	-
	2009-10	165	-	-	-	-	-	-	-	-

FBC Lakhra (GENCO-IV)

Year	Generation on Coal (GWh)	Coal Consumption (000 metric tons)	Coal Consumption (kg/kWh)	Cost of Generation (Paisa/kWh)
2005-06	129	149	1.16	547.72
2006-07	136	164	1.21	610.53
2007-08	136	162	1.19	673.21
2008-09	113	121	1.07	701.98
2009-10	116	125	1.08	780.70

TABLE 16
Fuel Consumption and Cost of Generation Data - KESC and Others

Power Station	Year	Gen. on Gas (GWh)	Gas Consumption		Gen. on FO (GWh)	FO Consumption		Gen. on HSD (GWh)	HSD Consumption (000 Liters)	Cost of Generation (Paisa/kWh)
			Total (MMCFT)	CFT/kWh (Average)		Total (000 M. Tons)	kg/kWh			
KESC (Own GENCOs)										
Bin Qasim TPS	2005-06	5,566	60760	10.92	1,667	457.63	0.27	-	-	358
	2006-07	4,830	53121	11.00	1,706	455.64	0.27	-	-	341
	2007-08	4,817	55759	11.58	2,488	638.84	0.26	-	-	426
	2008-09	5,247	60,535	12.00	1,149	313.10	0.27	-	-	451
	2009-10	3,742	43,029	12.00	1,764	481.00	0.27	-	-	561
Korangi TPS	2005-06	912	13445	14.74	203	61.71	0.3	-	-	394
	2006-07	845	12319	14.58	43	13.77	0.32	-	-	375
	2007-08	716	10214	14.27	14	4.36	0.31	-	-	347
	2008-09	914	12,176	13.00	8	2.27	0.30	-	-	440
	2009-10	222	2,886	13.00	-	-	-	-	-	440
Korangi Town GTPS	2005-06	430	5352	13.88	-	-	-	5	2386.8	398
	2006-07	361	6309	17.48	-	-	-	1	568.4	413
	2007-08	269	4875	18.12	-	-	-	-	-	405
	2008-09	310	5,476	18.00	-	-	-	-	-	540
	2009-10	66	1,135	17.00	-	-	-	-	-	493
Korangi Town GTPS-II	2009-10	465	4,767	10.00	-	-	-	-	-	346
Korangi CCPP	2008-09	330	3,404	10.00	-	-	-	-	-	346
	2009-10	1,197	11,229	9.00	-	-	-	-	-	326
Site GTPS	2005-06	415	6909	16.65	-	-	-	9	4062.3	398
	2006-07	378	6480	17.14	-	-	-	5	2124.3	426
	2007-08	358	6392	17.85	-	-	-	-	-	406
	2008-09	294	5,365	18.00	-	-	-	-	-	571
	2009-10	3	391	113.00	-	-	-	-	-	559
Site GTPS -II	2008-09	9	96	11.00	-	-	-	-	-	355
	2009-10	505	5,207	10.00	-	-	-	-	-	343
IPPs connected with KESC System										
Gul Ahmed	2005-06	-	-	-	680.31	143.75	0.21	-	-	645
	2006-07	-	-	-	724.56	159.2	0.21	-	-	626
	2007-08	-	-	-	847.75	182.46	0.21	-	-	811
	2008-09	-	-	-	456.00	99.00	217.00	-	-	1,262
	2009-10	-	-	-	608.00	132.00	217.00	-	-	1,160
Tapal Energy	2005-06	-	-	-	718.11	154.33	0.21	-	-	700
	2006-07	-	-	-	822.06	177.05	0.21	-	-	700
	2007-08	-	-	-	901.99	189.56	0.21	-	-	800
	2008-09	-	-	-	656.00	142.00	216.00	-	-	1,027
	2009-10	-	-	-	637.00	139.00	218.00	-	-	1,173
OTHERS (Operating under PEPCO)										
GTPS Shahdara	2005-06	37	1,050	28.63	0	0	0	-	-	728.73
	2006-07	26	776	29.52	0	0	0	-	-	735.09
	2007-08	10	299	29.80	0	0	0	-	-	824.43
	2008-09	1	38	28.18	0	0	0	-	-	2,888.75
	2009-10	0	0	0	0	0	0	0	0	0
TPS Quetta	2005-06	123	2,153	17.55	0	0	0	-	-	391.90
	2006-07	49	846	17.22	0	0	0	-	-	641.77
	2007-08	68	1,033	15.18	0	0	0	-	-	368.36
	2008-09	76	1,218	15.93	0	0	0	-	-	557.70
	2009-10	120	1,898	15.87	0	0	0	0.00	0	572.49
TPS Pasni	2005-06	0	0	0	0	0	0	0.57	194	1,820.10
	2006-07	0	0	0	0	0	0	1.14	342	1,554.90
	2007-08	0	0	0	0	0	0	0.11	45	9,349.40
	2008-09	0	0	0	0	0	0	0.01	4	-
	2009-10	0	0	0	0	0	0	0.00	0.58	0
GTPS Panjgur	2005-06	0	0	0	0	0	0	1.12	562	4,408.30
	2006-07	0	0	0	0	0	0	2.95	1624	2,342.90
	2007-08	0	0	0	0	0	0	1.17	587	3,438.20
	2008-09	0	0	0	0	0	0	0.02	20	-
	2009-10	0	0	0	0	0	0	0.06	57	46103.40

Source: Electricity Marketing Data / KESC

TABLE 17
Plant-wise Average Fuel and Overall Generation Cost Data - IPPs

Power Station	Year	Installed Generation Capacity (MW)	Gas		FO		HSD Generation (GWh)	Total Generation (GWh)	Average Fuel Cost (Rs./ KWh)	Overall Cost of Generation (Rs./KWh)
			Units Generated (GWh)	Quantity of Gas used (MMBTU)	Units Generated (GWh)	Quantity of FO used (MMBTU)				
Steam Turbine -RFO										
AES Lal Pir	2005-06	362 (ST)	-	-	898	225443	-	898	4.74	9.56
	2006-07		-	-	1356	337366	-	1356	5.01	8.17
	2007-08		-	-	1755	428071	-	1755	7.55	10.11
	2008-09		-	-	1806	441033	-	1806	7.85	12.20
	2009-10		-	-	2153	512827	-	2153	9.90	12.02
AES Pak Gen	2005-06	365 (ST)	-	-	1377	346582	-	1377	4.84	7.92
	2006-07		-	-	1943	477478	-	1943	4.91	7.08
	2007-08		-	-	1925	466137	-	1925	7.51	9.78
	2008-09		-	-	2038	480564	-	2038	8.16	11.08
	2009-10		-	-	2019	496361	-	2019	9.89	12.86
HUBCO	2005-06	1292 (ST)	-	-	3920	930905	-	3920	5.03	7.13
	2006-07		-	-	7212	1693619	-	7212	4.95	6.12
	2007-08		-	-	7204	1706747	-	7204	7.22	8.65
	2008-09		-	-	8256	1937098	-	8256	8.09	9.88
	2009-10		-	-	8337	1960891	-	8337	9.74	11.93
Saba Power	2005-06	134 (ST)	-	-	655	165404	-	655	4.99	7.09
	2006-07		-	-	868	211492	-	868	5.07	7.33
	2007-08		-	-	812	197178	-	812	7.26	8.89
	2008-09		-	-	702	170831	-	702	8.05	10.10
	2009-10		-	-	628	151889	-	628	9.81	12.17
Engine - RFO										
Japan Power	2005-06	135.6 (Diesel Engine)	-	-	454	100499	-	454	4.73	6.80
	2006-07		-	-	528	117820	-	528	4.82	6.54
	2007-08		-	-	505	112676	-	505	6.87	8.63
	2008-09		-	-	256	57892	-	256	10.09	13.13
	2009-10		-	-	198	33242	-	198	9.61	12.39
Southern Power	2005-06	117 (Diesel Engine)	-	-	502	113233	-	502	4.60	7.67
	2006-07		-	-	539	118225	-	539	4.71	7.43
	2007-08		-	-	369	82149	-	369	6.11	9.93
	2008-09		-	-	48	10751	-	48	9.19	37.46
	2009-10		-	-	393	85883	-	393	9.44	12.64
Kohinoor Energy	2005-06	131 (Diesel Engine + ST)	-	-	708	141196	-	708	4.62	7.10
	2006-07		-	-	806	159826	-	806	4.61	6.66
	2007-08		-	-	882	174803	-	882	6.74	8.43
	2008-09		-	-	873	172639	-	873	7.55	9.59
	2009-10		-	-	900	179044	-	900	8.95	10.59
Dual Fuel										
KAPCO	2005-06	1466 (GT-CCPP)	6526	58979624	1762	339797	4	8292	2.35	4.27
	2006-07		5332	51478323	2811	551831	41	8184	3.00	4.64
	2007-08		3915	36732450	4369	853339	579	8863	4.82	6.73
	2008-09		726	7489868	6222	1256193	597	7545	7.04	10.48
	2009-10		521	5395287	6499	1336649	747	7767	8.82	12.63

Contined … next page

Power Station	Year	Installed Generation Capacity (MW)	Gas		FO		HSD Generation (GWh)	Total Generation (GWh)	Average Fuel Cost (Rs./ KWh)	Overall Cost of Generation (Rs./KWh)
			Units Generated (GWh)	Quantity of Gas used (MMBTU)	Units Generated (GWh)	Quantity of FO used (MMBTU)				
Gas Engines / Gas Turbine (CCPP)										
Altern Energy	2005-06	10.5 (Gas Engine)	-	-	-	-	-	-	-	-
	2006-07		-	-	-	-	-	-	-	-
	2007-08		-	-	-	-	-	-	-	-
	2008-09		137	1350263	-	-	-	137	2.55	4.82
	2009-10		148	1549293	-	-	-	148	2.85	5.43
Fauji Kabirwala	2005-06	157 (GT-CCPP)	950	7696740	-	-	-	950	1.94	4.40
	2006-07		1184	9679667	-	-	-	1184	2.04	4.17
	2007-08		1167	10054518	-	-	-	1167	2.03	4.24
	2008-09		1253	8774882	-	-	-	1253	2.37	4.70
	2009-10		1123	774133	-	-	-	1123	2.68	5.67
Habibullah	2005-06	129.15 (GT –CCPP)	934	7610075	-	-	-	934	1.86	3.93
	2006-07		966	7870336	-	-	-	966	2.07	4.17
	2007-08		976	7957854	-	-	-	976	2.00	3.88
	2008-09		983	7785532	-	-	-	983	2.23	4.55
	2009-10		950	7785532				950	2.50	4.43
Rousch Power	2005-06	450 (GT-CCPP)	2377	19533203	-	-	-	2377	1.93	4.18
	2006-07		3090	25048365	-	-	-	3090	2.12	3.96
	2007-08		2764	22311821	-	-	-	2764	2.07	4.16
	2008-09		3328	26421554	-	-	-	3328	2.29	4.47
	2009-10		3256	25823860	-	-	-	3256	2.58	4.90
TNB Liberty Power	2005-06	235 (GT-CCPP)	1377	11272551	-	-	-	1377	3.18	5.11
	2006-07		1305	10638958	-	-	-	1305	4.02	6.16
	2007-08		1636	11997974	-	-	-	1636	4.31	6.20
	2008-09		1623	13193844	-	-	-	1623	7.71	10.19
	2009-10		1527	12238096	-	-	-	1527	5.32	8.43
UCH Power	2005-06	586 (GT-CCPP)	4091	31174293	-	-	-	4091	1.55	3.62
	2006-07		3889	30617980	-	-	-	3889	1.64	3.81
	2007-08		4336	32936956	-	-	-	4336	1.55	3.62
	2008-09		4368	30787080	-	-	-	4368	1.88	4.34
	2009-10		4119	31583725	-	-	-	4119	2.11	4.99

TABLE 18
Energy and Plant Data of Public Sector Thermal Power Stations

Power Station	Year	Installed Gen. Capacity (MW)	Total Generation (GWh)	Maximum Demand (MW)	Load Factor (%)	Plant Factor (%)
GENCO-I						
TPS Jamshoro	2005-06	850	4345.98	775	64.02	71.90
	2006-07		4229.00	730	66.13	63.11
	2007-08		3898.95	670	66.43	63.41
	2008-09		3051.00	635	54.85	74.71
	2009-10		4281.32	700	69.82	77.11
GTPS Kotri	2005-06	174	741.19	138	61.31	60.44
	2006-07		791.00	146	61.82	64.47
	2007-08		810.18	141	65.59	65.88
	2008-09		785.00	144	62.22	82.76
	2009-10		682.65	136	57.30	86.08
GENCO-II						
TPS Guddu (Unit 1-4)	2005-06	640	2777.67	460	69.28	70.82
	2006-07		1726.58	415	47.49	45.84
	2007-08		2283.29	400	65.16	61.16
	2008-09		3036.00	420	82.51	65.63
	2009-10		2742.93	445	70.36	76.62
TPS Guddu (Unit 5-13)	2005-06	1015	6091.00	809	85.95	78.44
	2006-07		6073.82	893	77.64	81.09
	2007-08		5781.38	774	85.27	90.16
	2008-09		5034.00	700	82.10	68.97
	2009-10		4469.19	715	71.35	70.38
GENCO-III						
TPS Muzaffargarh	2005-06	1350	6675.02	1320	57.73	60.48
	2006-07		7044.29	1255	64.08	63.82
	2007-08		5917.88	1055	64.03	59.62
	2008-09		6163.00	1120	62.82	82.96
	2009-10		6055.58	920	75.14	75.65
SPS Faisalabad	2005-06	132	521.50	106	56.16	59.53
	2006-07		534.76	106	57.59	61.05
	2007-08		625.25	100	71.38	71.18
	2008-09		490.00	92	60.78	69.70
	2009-10		453.56	75	69.03	74.22
GTPS Faisalabad	2005-06	244	731.85	218	38.32	39.78
	2006-07		637.67	200	36.40	34.66
	2007-08		534.04	222	27.46	28.95
	2008-09		466.00	221	24.06	90.57
	2009-10		478.35	198	27.58	87.75
NGPS Multan	2005-06	195	330.07	125	36.94	25.12
	2006-07		349.88	101	38.98	35.79
	2007-08		360.73	80	51.47	68.44
	2008-09		305.00	70	49.74	35.90
	2009-10		193.9	65	34.05	50.72
GE Rental Power (COD March, 2007)	2006-07	150	213	n.a.	n.a.	52.8
	2007-08		731	n.a.	n.a.	60.3
	2008-09		485.78	-	-	-
	2009-10		88.56	-	-	-
Alstom Rental Power (COD November, 2007)	2007-08	136	218	n.a.	n.a.	30.8
	2008-09		428.17	-	-	-
	2009-10		164.98	-	-	-
GENCO-IV						
FBC Lakhra	2005-06	150	128.96	33	44.61	21.03
	2006-07		136.13	52	29.88	22.85
	2007-08		136.35	42	37.06	24.86
	2008-09		113.00	37	34.92	24.67
	2009-10		116.38	38	34.96	42.22

TABLE 19
Energy and Plant Data of KESC and Other Thermal Power Stations

Power Station	Year	Installed Gen. Capacity (MW)	Total Generation (GWh)	Maximum Load (MW)	Load Factor (%)	Plant Factor (%)
KESC						
Bin Qasim TPS	2005-06	1260	5,566.00	1020.00	81.00	40.28
	2006-07		4,830.00	1060.00	70.00	32.06
	2007-08		4,817.00	1155.00	72.00	22.84
	2008-09		6,397.00	1107.00	66.00	57.95
	2009-10		5506.00	1080.00	58.00	50.00
Korangi TPS	2005-06	250	912.00	200.00	--	51.15
	2006-07		845.00	192.00	53.00	51.76
	2007-08		716.00	160.00	55.00	35.88
	2008-09		922.00	160.00	68.00	42.09
	2009-10		222.00	140.00	51.00	10.00
Korangi Town GTPS	2005-06	80	430.00	78.00	65.00	48.38
	2006-07		361.00	71.00	62.00	43.17
	2007-08		269.00	54.00	60.00	39.56
	2008-09		310.00	75.00	59.00	44.00
	2009-10		66.00	17.00	48.00	9.00
Korangi Town GTPS-II	2009-10	88	465.00	88.00	70.00	60.00
Korangi CCPP	2008-09	220	330.00	128.00	51.00	17.00
	2009-10		1197.00	205.00	69.00	62.00
Site GTPS	2005-06	100	415.00	79.00	65.00	65.53
	2006-07		378.00	78.00	64.00	59.21
	2007-08		358.00	75.00	62.00	63.31
	2008-09		294.00	74.00	61.00	34.63
	2009-10		3.00	17.00	90.00	2.00
Site GTPS-II	2008-09	88	9.00	42.00	49.00	2.00
	2009-10		505.00	88.00	68.00	66.00
Gul Ahmed	2005-06	136	718.11	82.00	64.00	60.00
	2006-07		822.06	94.00	74.00	69.00
	2007-08		901.99	103.00	81.00	76.00
	2008-09		456.00	126.00	38.00	38.00
	2009-10		608.00	127.00	51.00	51.00
Tapal Energy	2005-06	126	666.40	78.00	61.00	62.00
	2006-07		738.53	83.00	65.00	66.00
	2007-08		847.75	97.00	76.00	77.00
	2008-09		656.00	125.00	59.00	59.00
	2009-10		637.00	126.00	58.00	58.00
OTHERS (Operating under PEPCO)						
GTPS Shahdara	2005-06	59	36.69	37.00	11.32	10.47
	2006-07		26.30	30.00	10.01	7.50
	2007-08		9.94	29.00	3.91	3.81
	2008-09		1.00	30.00	0.51	50.85
	2009-10		0.00	0.00	0.00	92.31
TPS Quetta	2005-06	35	122.74	22.00	63.69	63.69
	2006-07		49.13	28.00	20.03	25.49
	2007-08		68.06	28.00	27.75	30.99
	2008-09		76.00	25.00	34.93	71.43
	2009-10		119.56	25.00	54.59	89.59
TPS Pasni	2005-06	17	0.57	8.00	0.81	0.39
	2006-07		1.13	8.00	1.62	0.77
	2007-08		0.04	5.00	0.23	0.07
	2008-09		0.00	2.00	0.05	10.88
	2009-10		0.00	0.00	0.00	34.62
GTPS Panjgur	2005-06	39	1.12	14.00	0.91	0.47
	2006-07		2.95	14.00	2.40	1.25
	2007-08		1.23	15.00	0.91	0.49
	2008-09		0.00	10.00	0.02	25.84
	2009-10		0.06	7.00	7.00	100.00

Table 20
Energy and Plant Data of Private Sector Thermal Power Stations

Power Station	Year	Installed Gen. Capacity (MW)	Dependable Capacity (MW)	Total Generation (GWh)	Plant Factor (%)
AES Lal Pir	2005-06	362	351	898	29.60
	2006-07		351	1,356	44.10
	2007-08		351	1,755	57.00
	2008-09		349	1,806	59.00
	2009-10		349	1,806	70.70
AES Pak Gen	2005-06	365	351	1,377	45.40
	2006-07		351	1,943	63.30
	2007-08		350	1,925	52.60
	2008-09		348	2,038	66.60
	2009-10		348	2,019	66.30
Altern Energy	2005-06	10.5	5	-	-
	2006-07		0	-	-
	2007-08		5	-	-
	2008-09		26	137	59.00
	2009-10		26	148	63.70
Fauji Kabirwala	2005-06	157	150	950	72.30
	2006-07		151	1,184	89.50
	2007-08		151	1,167	87.90
	2008-09		151	1,253	94.70
	2009-10		151	1,123	84.80
Habibullah	2005-06	140	129	934	82.50
	2006-07		129	966	85.40
	2007-08		129	976	86.10
	2008-09		129	983	86.90
	2009-10		129	950	84.00
HUBCO	2005-06	1292	1,200	3,920	37.30
	2006-07		1,200	7,212	68.60
	2007-08		1,200	7,204	68.30
	2008-09		1,200	8,256	78.60
	2009-10		1,200	8,337	79.30
Japan Power	2005-06	135.6	107	454	48.40
	2006-07		107	528	56.30
	2007-08		120	505	48.40
	2008-09		65	256	25.50
	2009-10		65	198	25.50
KAPCO	2005-06	1638	1,342	8,292	70.50
	2006-07		1,342	8,183	69.60
	2007-08		1,342	8,863	75.20
	2008-09		1,342	7,545	64.00
	2009-10		1,342	7,767	66.00
Kohinoor Energy	2005-06	131	124	708	66.40
	2006-07		124	806	74.20
	2007-08		124	882	81.00
	2008-09		124	873	80.30
	2009-10		124	900	82.80
Rousch Power	2005-06	450	395	2,377	68.70
	2006-07		395	3,090	89.30
	2007-08		395	2,764	79.70
	2008-09		395	3,328	96.20
	2009-10		395	3,256	94.10

Contined … next page

Power Station	Year	Installed Gen. Capacity (MW)	Dependable Capacity MW)	Total Generation (GWh)	Plant Factor (%)
Saba Power	2005-06	134	126	655	59.60
	2006-07		126	868	79.00
	2007-08		126	812	73.60
	2008-09		126	702	64.00
	2009-10		126	628	57.00
Southern Power	2005-06	117	110	502	52.00
	2006-07		104	539	59.10
	2007-08		116	369	36.20
	2008-09		119	48	4.60
	2009-10		119	393	37.80
TNB Liberty Power	2005-06	235	209	1,377	75.00
	2006-07		210	1,305	71.00
	2007-08		211	1,636	88.00
	2008-09		213	1,623	86.50
	2009-10		213	1,527	81.40
UCH Power	2005-06	586	551	4,091	84.70
	2006-07		551	3,889	80.50
	2007-08		551	4,336	89.60
	2008-09		551	4,368	90.60
	2009-10		551	4,119	85.30
Gul Ahmed	2005-06	136	-	718.11	60.00
	2006-07		-	822.06	39.00
	2007-08		-	901.99	76.00
	2008-09		-	456.00	38.00
	2009-10		-	608.00	51.00
Tapal Energy	2005-06	126	-	666.40	62.00
	2006-07		-	738.53	66.00
	2007-08		-	847.75	77.00
	2008-09		-	656.00	59.00
	2009-10		-	637.00	58.00
GE Rental Power	2005-06	150	*COD March, 2007*		
	2006-07		138	213	52.80
	2007-08		138	731	60.30
	2008-09		-	486	-
	2009-10		-	89	-
Alstom Rental Power	2006-07	136	*COD November, 2007*		
	2007-08		125	218	30.80
	2008-09		-	428	-
	2009-10		-	165	-

TABLE 21
Main Electricity Statistics of the Country

		2005-06	2006-07	2007-08	2008-09	2009-10
1: Maximum Energy Demand (MW)						
PEPCO Area		13,066	13,645	14,151	18,219	18,501
KESC Area		2,223	2,354	2,443	2,462	2,562
Un-diversified Energy Demand of the Country		15,289	15,999	16,594	20,681	21,063
Diversified Energy Demand of the Country		14,989	15,685	16,269	16,193	n.a.
2: Consumers (Nos.)						
PEPCO Area	Domestic	13,382,570	14,354,323	15,226,442	15,858,823	16,672,413
	Commercial	2,067,958	2,151,971	2,229,408	2,291,552	2,362,317
	Industrial	222,207	233,160	242,401	253,078	263,508
	Agriculture	220,485	236,255	245,640	258,368	271,268
	Public Lighting	6,550	6,990	7,337	7,680	8,112
	Bulk Supply + Others	3,798	3,855	4,138	4,602	4,606
Total in PEPCO Area		**15,903,568**	**16,986,554**	**17,955,366**	**18,674,103**	**19,582,224**
KESC Area	Domestic	1,447,728	1,494,669	1,518,664	1,531,971	1,582,403
	Commercial	409,452	425,001	433,416	437,463	445,164
	Industrial	21,871	21,920	21,453	20,751	20,693
	Agriculture	1,893	2,007	2,038	2,073	2,157
	Public Lighting	138	69	140	112	71
	Bulk Supply + Others	887	1,408	1,415	1,376	1,476
Total in KESC Area		**1,881,969**	**1,945,074**	**1,977,126**	**1,993,746**	**2,051,964**
Total in the Country		**17,785,537**	**18,931,628**	**19,932,492**	**20,667,849**	**21,634,188**
3: Auxiliary Consumption and System Losses (in percentage)						
PEPCO Area						
Auxiliary Consumption		2.21	2.11	1.95	1.98	2.03
Transmission		7.26	3.80	3.48	3.58	3.17
Distribution		15.12	17.72	17.85	17.59	17.80
KESC Area						
Auxiliary Consumption		7.5	7.8	7.7	7.5	7.4
Transmission Losses		34.42	34.21	34.12	35.85	34.90
Distribution Losses						
4: Average Sales Price (Paisa/kWh)						
PEPCO Area		399.20	409.90	474.00	521.90	625.00
KESC Area		458.77	473.50	514.00	617.72	711.63
5: Per Capita Electricity Consumption						
PEPCO system						
Population (Million)		143.08	145.96	148.42	152.16	n.a.
Energy Sale (GWh)		62,383	67,579	66,791	65,277	68,864
Per capita electricity consumption (kWh)		436	463	450	429	n.a.
Average Sale/consumer (kWh)		3681	3690	3493	3227	3251
KESC system						
Population (Million)		12.18	12.57	12.94	12.56	12.93
Energy Sale (GWh)		9,060	9,366	10,051	9,396	9,905
Per capita electricity consumption (kWh)		744	745	777	748	766
Average Sale/consumer (kWh)		4814	4815	5084	4713	4827

Source: EMD / NTDC / DISCOs / KESC

TABLE 22
Category-wise Energy Sales in PEPCO and KESC System (GWh)

		2005-06	2006-07	2007-08	2008-09	2009-10
In PEPCO System	Domestic	26,965	29,045	28,960	27,754	29,462
	Percentage share	43.22	42.98	43.36	42.52	42.78
	Commercial	3,768	4,291	4,356	4,205	4,466
	Percentage share	6.04	6.35	6.52	6.44	6.49
	Industrial	16,593	17,604	17,296	16,036	16,394
	Percentage share	26.60	26.05	25.90	24.57	23.81
	Agriculture	7,871	8,107	8,394	8,694	9,583
	Percentage share	12.62	12.00	12.57	13.32	13.92
	Public Lighting	254	315	340	348	372
	Percentage share	0.45	0.47	0.51	0.51	0.51
	Bulk Supply	1,928	2,122	3,323	3,187	3,349
	Percentage share	3.09	3.14	4.98	4.88	4.86
	Others + Traction	1,167	1,190	50	39	30
	Percentage share	1.87	1.76	0.07	0.06	0.04
Supplied to KESC		3,836	4,905	4,072	5,014	5,208
Percentage share		6.15	7.26	6.10	7.68	7.56
Total in PEPCO area		**62,383**	**67,579**	**66,791**	**65,277**	**68,864**
In KESC System	Domestic	3,760	3,864	4,271	3,989	4,168
	Percentage share	41.50	41.26	42.49	42.45	42.08
	Commercial	962	986	1,145	1,004	1,091
	Percentage share	10.62	10.53	11.39	10.69	11.01
	Industrial	3,206	3,364	3,533	3,226	3,387
	Percentage share	35.39	35.92	35.15	34.33	34.19
	Agriculture	76	79	95	100	104
	Percentage share	0.84	0.84	0.95	1.06	1.05
	Public Lighting	74	71	74	83	87
	Percentage share	0.81	0.76	0.74	0.88	0.88
	Bulk Supply	982	1,002	933	994	1,068
	Percentage share	10.84	10.70	9.28	10.58	10.78
	Traction	Included in Bulk Supplies				
Supplied to NTDC		3	5	66	33	20
Percentage share		0.03	0.05	0.66	0.35	0.20
Total in KESC area		**9,060**	**9,366**	**10,051**	**9,396**	**9,905**
Total in the Country		**67,607**	**72,040**	**72,770**	**69,659**	**73,561**

Source: EMD / KESC

TABLE 23
Category-wise Consumers and their Electricity Consumption (%)

		2005-06	2006-07	2007-08	2008-09	2009-10
PEPCO Area (Consumers and Consumption in percentage to the total)						
Domestic	Consumers	84.15	84.50	84.80	84.92	85.14
	Consumption	43.22	42.98	43.36	42.52	42.78
Commercial	Consumers	13.00	12.67	12.42	12.27	12.06
	Consumption	6.04	6.35	6.52	6.44	6.49
Industrial	Consumers	1.40	1.37	1.35	1.36	1.35
	Consumption	26.60	26.05	25.90	24.57	23.81
Agriculture	Consumers	1.39	1.39	1.37	1.38	1.39
	Consumption	12.62	12.00	12.57	13.32	13.92
Public Lighting	Consumers	0.04	0.04	0.04	0.04	0.04
	Consumption	0.41	0.47	0.51	0.53	0.54
Bulk Supply + Traction + Others	Consumers	0.02	0.02	0.02	0.02	0.02
	Consumption	4.96	4.90	5.05	4.94	4.91
Export to KESC	Consumption	6.15	7.26	6.10	7.68	7.56
KESC Area (Consumers and Consumption in percentage to the total)						
Domestic	Consumers	76.93	76.84	76.81	76.84	77.12
	Consumption	41.50	41.26	42.49	42.45	42.08
Commercial	Consumers	21.76	21.85	21.92	21.94	21.69
	Consumption	10.62	10.53	11.39	10.69	11.01
Industrial	Consumers	1.16	1.13	1.09	1.04	1.01
	Consumption	35.39	35.92	35.15	34.33	34.19
Agriculture	Consumers	0.10	0.10	0.10	0.10	0.11
	Consumption	0.84	0.84	0.95	1.06	1.05
Public Lighting	Consumers	0.01	0.00	0.01	0.01	0.00
	Consumption	0.81	0.76	0.74	0.88	0.88
Bulk Supply + Others	Consumers	0.05	0.07	0.07	0.07	0.07
	Consumption	10.84	10.70	9.28	10.58	10.78
Country (Consumers and Consumption in percentage to the total)						
Domestic	Consumers	83.38	83.72	84.01	84.14	84.38
	Consumption	45.45	45.68	45.67	45.57	45.72
Commercial	Consumers	13.93	13.61	13.36	13.20	12.98
	Consumption	7.00	7.32	7.56	7.48	7.55
Industrial	Consumers	1.37	1.35	1.32	1.32	1.31
	Consumption	29.29	29.11	28.62	27.65	26.89
Agriculture	Consumers	1.25	1.26	1.24	1.26	1.26
	Consumption	11.75	11.36	11.67	12.62	13.17
Public Lighting	Consumers	0.04	0.04	0.04	0.04	0.04
	Consumption	0.48	0.54	0.57	0.62	0.62
Bulk Supply + Others	Consumers	0.03	0.03	0.03	0.03	0.03
	Consumption	4.31	4.34	5.94	6.05	6.03
Traction	Consumers	0.00	0.00	0.00	0.00	0.00
	Consumption	1.73	1.65	0.07	0.06	0.04

7.2 Load Pattern and Peak Load Hours:

The electrical load pattern in the country varies from season to season; during summer season there is an increase in the inductive load while in winter season increase in resistive load has been observed. The peak hour timing in the system is normally from 6 PM to 10 PM. The hourly load figures for a typical working and non-working day in summer and winter, during 2009, are given hereunder.

TABLE 24
Hourly System Demand (MW)

Hours of the day	Maximum Demand (MW)		System Demand for a Typical day in Summer		System Demand for a Typical day in Winter	
	Summer	Winter	Working day	Non-working day	Working day	Non-working day
	(12-08-2009)	(22-12-2009)	(12-08-2009)	(09-08-2009)	(22-12-2009)	(20-12-2009)
1	17259	8962	17259	17399	8962	9308
2	17269	8940	17269	16896	8940	9021
3	16615	8810	16615	16785	8810	8882
4	16638	8854	16638	16834	8854	8839
5	16382	9219	16382	17054	9219	9105
6	16358	10073	16358	17089	10073	9964
7	15840	11123	15840	16154	11123	10510
8	16038	10797	16038	16236	10797	10170
9	15622	10855	15622	15778	10855	10335
10	16344	11147	16344	16349	11147	10939
11	16621	11221	16621	16765	11221	11469
12	16962	11254	16962	16601	11254	11597
13	17258	11063	17258	16654	11063	11405
14	17746	11052	17746	17268	11052	11231
15	17999	11367	17999	17247	11367	11369
16	18426	11353	18426	17591	11353	11263
17	18051	11847	18051	17593	11847	11554
18	17576	13540	17576	17105	13540	13593
19	17072	**14070**	17072	16600	**14070**	**13644**
20	17847	13528	17847	16780	13528	13128
21	**18577**	13195	**18577**	**17930**	13195	12604
22	18467	11959	18467	17636	11959	11595
23	18245	11230	18245	17556	11230	10711
24	17862	10305	17862	17561	10305	10297

Source: National Power Control Centre

Figure 24 A. Maximum Demand (MW)

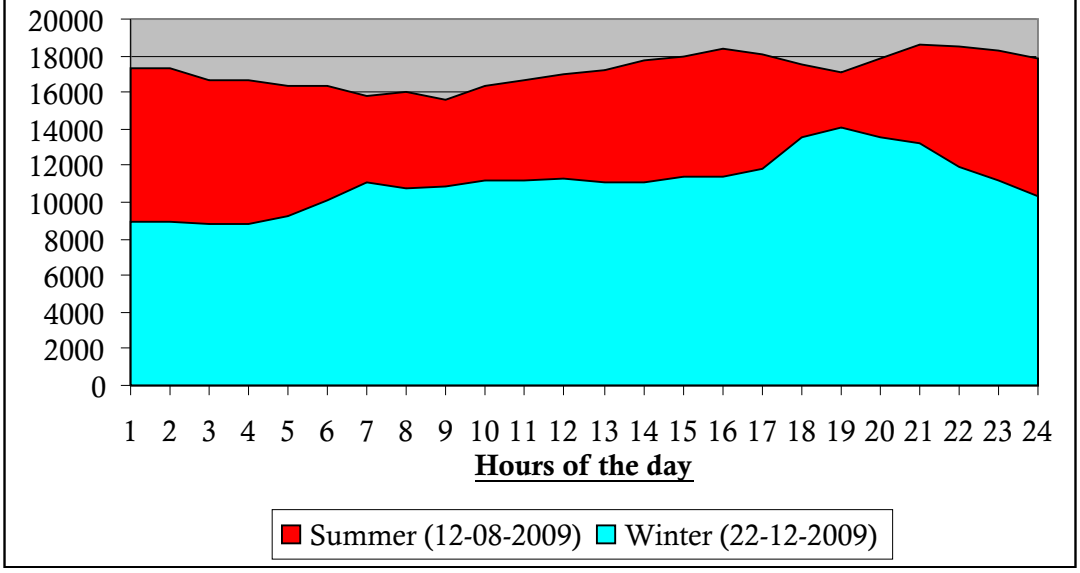
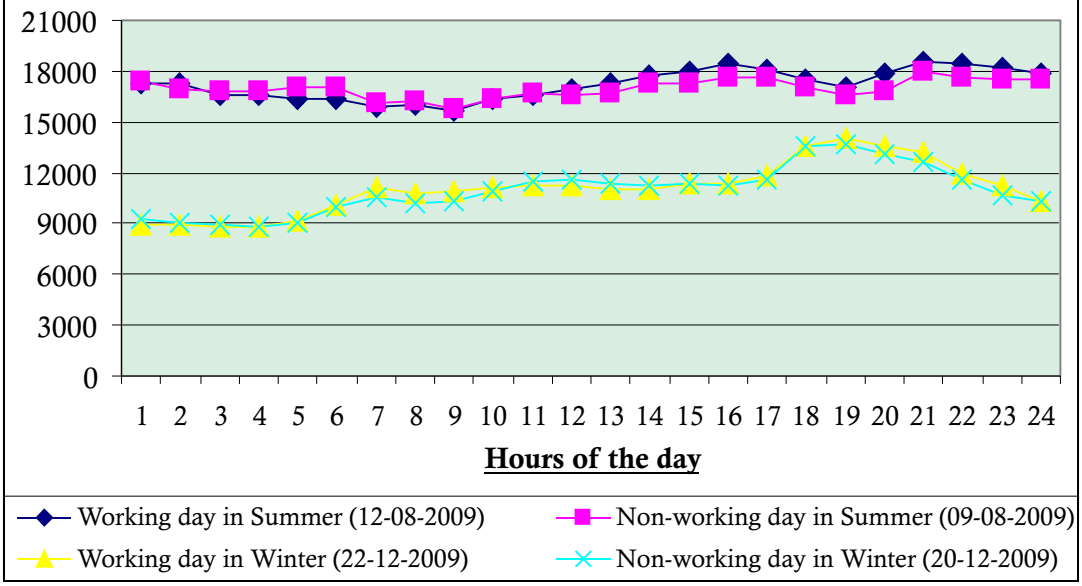


Figure 24 B. System Demand for a Typical Day in Summer and Winter



7.3 Maximum Demand:

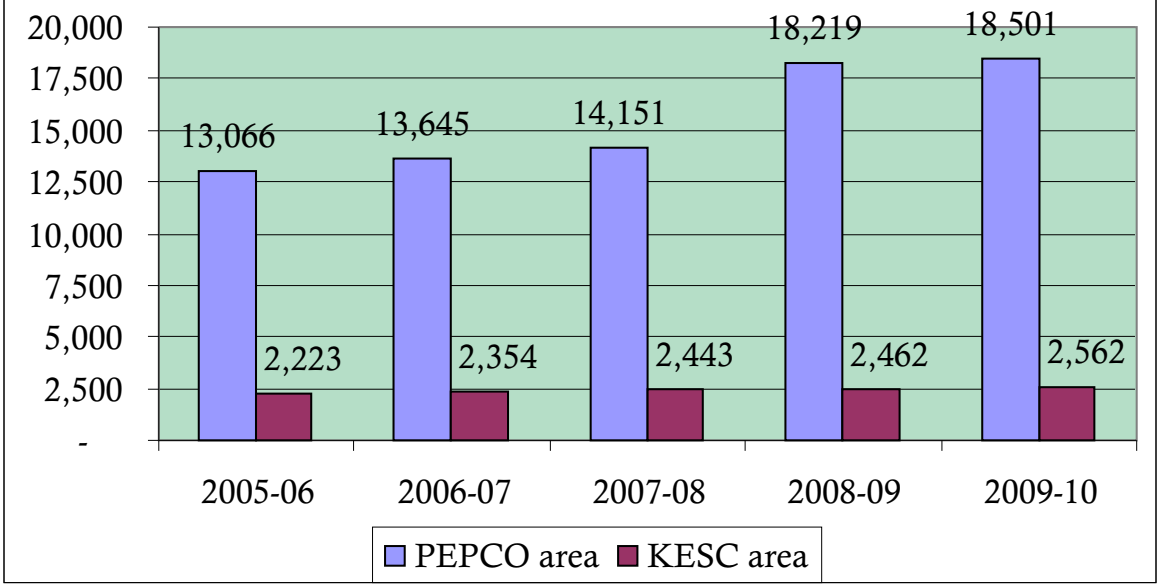
The maximum demand in PEPCO and KESC systems for the years 2005-06 to 2009-10 and the year-wise percentage change in maximum demand is given in the following Table.

TABLE 25
Maximum Electricity Demand in the Country (MW)

Financial Year ending 30th June	2005-06	2006-07	2007-08	2008-09	2009-10
PEPCO area	**13066**	**13645**	**14151**	**18219**	**18501**
% change in Maximum Demand	5.50	4.43	3.71	28.75	1.55
KESC area	**2223**	**2354**	**2443**	**2462**	**2562**
% change in Maximum Demand	1.18	5.89	3.78	0.78	4.06
Un-diversified Energy Demand of the Country	**15289**	**15999**	**16594**	**20681**	**21063**
% change in Maximum Demand	4.85	4.64	3.72	24.63	1.85
Diversified Energy Demand of the Country	**14989**	**15685**	**16269**	**16193**	**n.a.**
% change in Maximum Demand	4.85	4.64	3.72	-0.47	n.a.

Source: Electricity Marketing Data

Figure 25. Maximum Electricity Demand in the Country (MW)



7.4 Pattern of Electricity Consumption:

The overall electricity consumption in the country since 2000 was growing steadily. However, during the fiscal year 2009-10 electricity consumption in the country excluding KESC area increased by 5.50%. The sector-wise electricity consumption and their share in total electricity consumption of the country, for the years 2005-06 to 2009-10 are given in the following Table.

TABLE 26
Annual Growth Rate of Electricity Consumption

		2005-06	2006-07	2007-08	2008-09	2009-10
A: PEPCO area						
Domestic	GWh	26,965	29,045	28,960	27,754	29,462
	%	4.08%	7.72%	-0.29%	-4.16%	6.15%
Commercial	GWh	3,768	4,291	4,356	4,205	4,466
	%	17.14%	13.87%	1.53%	-3.48%	6.21%
Industrial	GWh	16,593	17,604	17,296	16,036	16,394
	%	6.26%	6.10%	-1.75%	-7.28%	2.23%
Agriculture	GWh	7,871	8,107	8,394	8,694	9,583
	%	12.37%	3.00%	3.54%	3.57%	10.23%
Public Lighting	GWh	254	315	340	348	372
	%	22.91%	13.26%	7.59%	7.59%	7.59%
Bulk Supply	GWh	1,928	2,122	3,323	3,187	3,349
	%	-5.90%	10.03%	56.62%	-4.09%	5.08%
Traction	GWh	1,167	1,190	50	39	30
	%	32.12%	1.95%	-95.81%	-21.75%	-23.08%
Supply to KESC	GWh	3,836	4,905	4,072	5,014	5,208
	%	58.77%	27.87%	-16.98%	23.13%	3.87%
Total	GWh	**62,383**	**67,579**	**66,791**	**65,277**	**68,864**
Percentage change	%	8.83%	8.33%	-1.17%	-2.27%	5.50%
B: KESC area						
Domestic	GWh	3,760	3,864	4,271	3,989	4,168
	%	7.18%	2.77%	10.53%	-6.60%	4.49%
Commercial	GWh	962	986	1,145	1,004	1,091
	%	8.35%	2.48%	16.13%	-12.31%	8.67%
Industrial	GWh	3,206	3,364	3,533	3,226	3,387
	%	6.07%	4.91%	5.02%	-8.69%	4.99%
Agriculture	GWh	76	79	95	100	104
	%	14.97%	4.11%	20.25%	5.26%	4.00%
Public Lighting	GWh	74	71	74	83	87
	%	-5.63%	-3.55%	4.23%	12.16%	4.82%
Bulk Supply + Others	GWh	982	1,002	933	994	1,068
	%	15.15%	2.01%	-6.89%	6.54%	7.44%
Total	GWh	**9,060**	**9,366**	**10,051**	**9,396**	**9,905**
Percentage change	%	7.65%	3.38%	7.31%	-6.52%	5.42%
Supplied by KESC	GWh	3	5	66	33	20
C: Country						
Domestic	GWh	30,725	32,909	33,231	31,743	33,630
	%	4.45%	7.11%	0.98%	-4.48%	5.94%
Commercial	GWh	4,731	5,277	5,501	5,209	5,557
	%	15.24%	11.55%	4.26%	-5.32%	6.68%
Industrial	GWh	19,799	20,968	20,829	19,262	19,781
	%	6.23%	5.90%	-0.66%	-7.52%	2.69%
Agriculture	GWh	7,947	8,186	8,489	8,794	9,687
	%	12.39%	3.01%	3.70%	3.59%	10.15%
Public Lighting	GWh	328	386	414	431	459
	%	7.50%	17.75%	7.26%	4.08%	6.50%
Bulk Supply + Others	GWh	2,911	3,124	4,256	4,181	4,417
	%	0.29%	7.32%	36.25%	-1.76%	5.64%
Traction	GWh	1,167	1,190	50	39	30
	%	32.12%	1.95%	-95.81%	-21.75%	-23.08%
Total	GWh	**67,607**	**72,040**	**72,770**	**69,659**	**73,561**
Percentage change	%	6.77%	6.56%	1.01%	-4.28%	5.60%

Source: EMD

7.5 Surplus/Deficit in Demand and Supply during Peak Hours (actual and projected):

The actual position of demand and supply of the electric power during peak hours in the NTDC's and KESC's system have been reproduced in the following Tables. Further, the projected figures of planned generation capacity, demand growth rate and surplus/deficit of electric power for the years to come, in the NTDC and KESC area have also been collected through respective companies and are included in the above stated Tables.

TABLE 27
Surplus/Deficit in Demand and Supply during NTDC's System Peak Hours

A: Actual Figures

Financial Year ending 30th June	Generation Capability (MW)	Demand During NTDC's System Peak Hours (MW)	Surplus / (Deficit) (MW)
2007	13292	15138	-1846
2008	12442	16838	-4396
2009	13637	17852	-4215
2010	n.a.	n.a.	n.a.

B: Projected Figures

Financial Year ending 30th June	Planned Generation Capability as per NTDC (MW)	NTDC Projected Demand Growth Rate (%)	NTDC Projected Demand (MW)	Surplus / (Deficit) (MW)
2011	17367	7.86	20873	-3506
2012	18913	7.60	22459	-3546
2013	21299	7.42	24126	-2827
2014	21668	7.43	25918	-4250
2015	30510	7.70	28029	2481

Source: National Transmission and Despatch Company

TABLE 28
Surplus/Deficit in Demand and Supply during KESC's System Peak Hours

A: Actual Figures

Financial Year ending 30th June	Generation Capability (MW)*	Demand During KESC's System Peak Hours (MW)	Surplus / (Deficit) (MW)
2007	2283	2349	(066)/ (max. 395)
2008	2265	2443	(387)/ (max. 484)
2009	2403	2462	59
2010	2393	2562	169

B: Projected Figures

Financial Year ending 30th June	Planned Generation Capability as per KESC (MW)**	KESC Projected Demand Growth Rate (%)	KESC Projected Demand during peak hours (MW)	Surplus / (Deficit) (MW)
2011	2419	5%	2690	-271
2012	2833	5%	2825	8
2013	2913	5%	2966	-53
2014	3413	5%	3114	299
2015	3713	5%	3270	443

** includes own generation / import from all sources.*

*** subject to availability of gas for new 560 MW Bin Qasim Power Plant.*

Source: Karachi Electric Supply Company Limited

7.6 Forecast of Monthly Generating Capability against Peak Demand:

An updated month-wise forecast of the firm generation capability against peak demand in the system of PEPCO Grid, prepared by NTDC, is reproduced in the following Table.

TABLE 29
Forecast of the Monthly Generating Capability against Peak Demand
(PEPCO Grid System) **(MW)**

S#	Month	Firm Generation Capability	Peak Demand	Surplus/ Deficit	Export to KESC	Surplus/Deficit with Export to KESC
			2010-11			
1	July	5673	19475	-2365	700	-3065
2	August	5981	19496	-2254	700	-2954
3	September	5964	19707	-3074	700	-3774
4	October	4900	17875	-2325	700	-3025
5	November	5474	16022	92	700	-608
6	December	3797	16149	-764	700	-1464
7	January	2602	16528	-1569	700	-2269
8	February	3899	16191	-459	700	-1159
9	March	3530	17222	-1632	700	-2332
10	April	4014	18696	-2375	700	-3075
11	May	5106	20065	-2021	700	-2721
12	June	5331	21055	-3019	700	-3719
			2011-12			
13	July	18185	21081	-2896	700	-3596
14	August	18411	21104	-2693	700	-3393
15	September	17752	21332	-3580	700	-4280
16	October	16649	19349	-2700	700	-3400
17	November	17193	17343	-150	700	-850
18	December	16307	17480	-1173	700	-1873
19	January	15919	17890	-1971	700	-2671
20	February	16620	17526	-906	700	-1606
21	March	16159	18643	-2484	700	-3184
22	April	16896	20238	-3342	700	-4042
23	May	18638	21719	-3081	700	-3781
24	June	19045	22791	-3746	700	-4446
			2012-13			
25	July	19166	22806	-3640	700	-4340
26	August	19273	22831	-3558	700	-4258
27	September	18577	23078	-4501	700	-5201
28	October	17356	20932	-3576	700	-4276
29	November	17791	18763	-972	700	-1672
30	December	17059	18911	-1852	700	-2552
31	January	17753	19354	-1601	700	-2301
32	February	18102	18960	-858	700	-1558
33	March	17676	20168	-2492	700	-3192
34	April	18442	21894	-3452	700	-4152
35	May	20202	23497	-3295	700	-3995
36	June	21142	24656	-3514	700	-4214

Contined … next page

S#	Month	Firm Generation Capability	Peak Demand	Surplus/ Deficit	Export to KESC	Surplus/Deficit with Export to KESC
2013-14						
37	July	21295	24778	-3483	700	-4183
38	August	21369	24805	-3436	700	-4136
39	September	20567	25073	-4506	700	-5206
40	October	19345	22743	-3398	700	-4098
41	November	19889	20385	-496	700	-1196
42	December	18714	20546	-1832	700	-2532
43	January	18476	21028	-2552	700	-3252
44	February	19094	20599	-1505	700	-2205
45	March	18618	21912	-3294	700	-3994
46	April	19166	23787	-4621	700	-5321
47	May	21035	25528	-4493	700	-5193
48	June	20999	26788	-5789	700	-6489

Source: National Transmission and Despatch Company

ELECTRICITY GENERATION

8. Electricity Generation

8.1 General:

Pakistan faces chronic electricity shortage due to demand growth, no addition in generation capacity, high system losses, and seasonal reductions in the availability of hydropower, circular debt etc. Rotating power outages ("load shedding") are common and many villages are not yet electrified.

The power sector in Pakistan is a mixed industry of thermal, hydro and nuclear power plants. Originally the ratio of hydel to thermal installed generation capacity, in the country was about 67% to 33% (1985) but with the passage of time, due to different reasons more of thermal generation was added and thereby reduced share of hydel generation. At present, this hydel to thermal installed generation capacity ratio turns to about 30% to 67%. As on June 30, 2010, the total installed capacity of the country was 21593 MW of which the share of thermal power plants was 14576 MW (67.50%) followed by hydel power plant 6555 MW (30.36%) and nuclear power plants 462 MW (2.14%). Pakistan is a country which is heavily dependent on import of oil for its domestic energy requirement due to large amount of oil-fired power plants.

During the fiscal year 2009-10 the total energy generated in the country was 99450 GWh of which the share of thermal electricity generation was 68228 GWh (68.61%), hydel power plants were 28555 GWh (28.71%) and nuclear power plants were 2667 GWh (2.68%). The increasing share of thermal electricity generation increased the utilities financial burden particularly in foreign exchange. It is a strong need of the time to increase the hydel generation by adding new hydropower plants. The share of private sector is increasing as compared to the public sector.

Electricity generation by source and sector during fiscal years 2005-06 to 2009-10 are shown in the following Table.

TABLE 30
Energy Generation by Sector and Source (GWh)

Sector/Source of Generation	2005-06	2006-07	2007-08	2008-09	2009-10
Public Sector	**55557**	**55568**	**51876**	**48658**	**50453**
Hydel	30751	31846	28536	27636	27960
Thermal	22519	21617	20508	19536	19826
Nuclear	2287	2105	2832	1486	2667
Private Sector	**37335**	**42246**	**45575**	**46005**	**48997**
Hydel (AJKHEB)	104	96	131	547	595
Thermal*	37231	42150	45444	45458	48402
Total	**92892**	**97814**	**97451**	**94663**	**99450**

** including Import from Iran and KESC*

Source: Electricity Marketing Data

8.2 Thermal Generation:

Majority of Pakistan's power generation is thermal, with furnace oil, high-speed diesel and natural gas as fuels; coal is almost non-existent. During fiscal year 2010, the share of thermal power generation in the energy mix of Pakistan was 68.33% as against 68.38% during last year. The share of oil, gas and coal used for thermal generation during year 2009-10 was 57.17%, 42.65% and 0.18% respectively while this share during 2008-09 was 37.88%, 61.94% and 0.18% respectively.

Most of the upcoming power projects in the country would be based on oil and gas. The list of Power Plants planned in Private Sector shows the fuel of their operation, prepared by PPIB, is also included in this report. The addition of thermal power plants running on oil will increase the current account deficit which is already problem for the country. The import of oil is one of the main reasons of current account deficit. Any strategy to cut current account deficit requires to cut down the oil imports and for this it is essential to reduce the electricity generation through oil. Similarly, the thermal power plants running on natural gas has negative externality. The economic loss resulting from deficiency of natural gas due to excessive reliance on gas fired power generation is a negative externality.

The total installed capacity of thermal power plants in the country as on June 30, 2010 was 14576 MW out of which thermal power plants of 4885 MW were in public sector.

8.3 Thermal Power Generation and Fuel Consumption:

Oil: During the year 2009-10, the share of electricity generated using oil in the thermal electricity generation, of the country was 57.17% while this share during 2008-09 was 37.88%.

Gas: During the year 2009-10, the share of electricity generated using gas in the thermal electricity generation of the country was 42.65% while this share during 2008-09 was 61.94%.

Coal: During the year 2009-10, the share of electricity generated using coal in the thermal electricity generation of the country was 0.18% which is same as that of period during 2008-09 was 0.18%.

The historical record of thermal electricity generation using different fuels, from the years 2005-06 to 2009-10 is given in the following Table.

TABLE 31 Thermal Electricity Generation (GWh)						
		2005-06	2006-07	2007-08	2008-09	2009-10
Thermal Generation by:						
GENCOs		22519	21617	20508	19536	19826
KESC Own Power Plants		9130	8169	8663	8262	7964
IPPs	PEPCO Area	26535	31869	33195	33702	36988
	KESC Area	1398	1547	1750	1112	1245
RPPs	PEPCO Area	0	213	938	913	299
	KESC Area	0	0	0	163	358
CPPs/SPPs/ Other Plants	PEPCO Area	0	81	306	725	868
	KESC Area	19	95	328	321	410
Total Thermal Generation		**59601**	**63591**	**65688**	**64734**	**67958**
Thermal Generation using:						
FO & HSD	PEPCO Area	15267	23078	26297	22761	34694
	KESC Area	3316	3371	3631	1156	1764
	Total	**18583**	**26449**	**29928**	**23917**	**36458**
Gas	PEPCO Area	33658	30566	28514	32003	21002
	KESC Area	7231	6440	7110	7105	6200
	Total	**40889**	**37006**	**35624**	**39108**	**27202**
Coal	PEPCO Area	129	136	136	113	116
	KESC Area	0	0	0	-	-
	Total	**129**	**136**	**136**	**113**	**116**
Total Thermal Generation		**59601**	**63591**	**65688**	**63138**	**63776**
Source: Electricity Marketing Data / KESC						

8.4 Hydel Generation:

Water flowing in the rivers has kinetic energy. Once it is used to drive the turbine and produce electricity, the power thus generated is called hydel energy. Power produced by the turbines depends on quantity of water flowing per minute and the head of water available.

Pakistan has a potential of around 40000 MW hydropower, whereas the installed hydel power capacity of Pakistan at the end of fiscal year 2010 was 6555 MW. The share of existing hydel power installed capacity to the total installed generation capacity of the country is only 30.36% while this share in year 1985 was around 67%. The share of hydel power generation during fiscal year 2009-10, in the energy mix of Pakistan, was 28.70% as against 29.78% during same period last year. Most of the installed hydel power capacity of the country is owned by public sector (WAPDA) and only 111 MW installed hydel power capacity is in private sector.

As discussed earlier, the availability of hydel power generation is subject to seasonal variation i.e. it depends upon the reservoir levels, inflow of water and discharge of water from the reservoir. Monthly variation in maximum hydro generation capacity, during past three years, has been collected from National Power Control Centre (NPCC) and is given in the following Table.

TABLE 32
Monthly Variation in Maximum Hydel Generating Capability (July, 2006 to June, 2010) (MW)

S#	Month	Year	Tarbela	Mangla	Ghazi Barotha	Warsak	Chashma	Small Hydels	Total
1	July	2006	3567	930	1250	200	176	57	6180
		2007	3680	1150	1450	207	176	55	6718
		2008	3489	1035	1450	208	179	55	6416
		2009	3552	1000	1450	203	184	53	6442
2	August	2006	3692	1150	1425	195	184	62	6708
		2007	3702	1150	1450	207	184	54	6747
		2008	3682	920	1450	206	184	54	6496
		2009	3638	1150	1450	210	170	53	6671
3	September	2006	3692	1150	1450	200	184	66	6742
		2007	3702	1150	1450	207	181	41	6731
		2008	3672	920	1450	206	184	51	6483
		2009	3642	1120	1450	213	178	55	6658
4	October	2006	3497	1150	1450	200	178	71	6546
		2007	3442	1150	1450	207	184	39	6472
		2008	3121	1150	1450	206	184	37	6148
		2009	3348	1090	1450	213	181	52	6334
5	November	2006	3120	1150	1160	170	72	69	5741
		2007	2957	1089	1450	140	160	39	5835
		2008	2890	1126	1450	137	184	37	5824
		2009	2738	1058	1450	178	170	45	5639
6	December	2006	2482	997	1450	133	184	45	5291
		2007	2401	808	1450	173	140	35	5007
		2008	1921	850	1450	137	140	42	4540
		2009	2425	942	1450	178	147	38	5180
7	January	2007	1434	840	1160	136	48	28	3646
		2008	1068	609	1100	173	128	30	3108
		2009	1455	666	1450	137	120	15	3843
		2010	1160	516	960	176	133	12	2957
8	February	2007	2186	440	1160	171	87	19	4063
		2008	1771	694	1350	173	115	32	4135
		2009	2080	981	1450	170	100	42	4823
		2010	2126	677	1450	143	161	55	4612
9	March	2007	2263	640	1160	171	161	39	4434
		2008	1675	576	1450	207	107	49	4064
		2009	2044	759	1450	170	154	46	4623
		2010	2064	606	1450	178	147	60	4505
10	April	2007	2493	1146	1450	210	184	52	5535
		2008	1466	732	1450	207	138	45	4038
		2009	2272	810	1450	217	174	54	4977
		2010	1606	836	1450	178	161	61	4292
11	May	2007	2925	1150	1450	210	184	53	5972
		2008	2024	880	1450	207	161	55	4777
		2009	2160	1034	1450	214	184	56	5098
		2010	2031	1036	1450	210	184	54	4965
12	June	2007	2652	1150	1450	210	149	55	5666
		2008	3149	1070	1450	208	181	56	6114
		2009	2234	1104	1450	200	184	50	5222
		2010	2512	1128	1450	210	184	54	5538

Source: National Power Control Centre

8.5 Nuclear Power Plants:

Pakistan Atomic Energy Commission (PAEC), interalia, undertakes the projects of nuclear power plants' development, operation and maintenance in the country.

The first nuclear power plant of the country, namely Karachi Nuclear Power Plant (KANUPP), was commissioned in 1971 in Karachi through a turn-key agreement. The total installed capacity of this plant was 137 MW and the useful life of this plant was 30 years. However, after completion of 30 years life, the Pakistan Nuclear Regulatory Authority (PNRA) extended the operational life of this plant, by another 15 year at reduced capacity. The second nuclear power plant of the country, namely the Chashma Nuclear Power Plant (CHASNUPP-I) was commissioned in year 2000 also through a turn key agreement by China National Nuclear Corporation. Pakistan is actively working on a third nuclear power project namely Chashma-2. The installed capacity of this plant would be 340 MW.

Total installed capacity of nuclear power plants, as on June 30, 2010, in the country was 462 MW as against the total installed electricity generation capacity of 21593 MW, which constitutes a share of nuclear power plant to the total installed generation capacity as 2.14%.

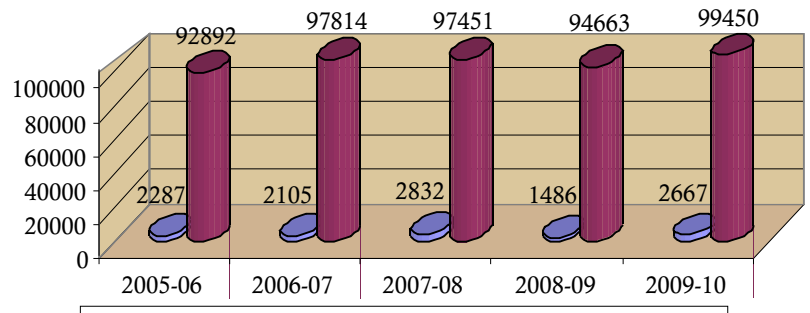
The electricity generated through nuclear power plant was increased by 79.48% during 2009-10. The share of electricity generated through nuclear power plants in the country, during 2009-10, was recorded as 2667 GWh (2.68%) as against 1486 GWh (1.57%) in the preceding year.

TABLE 33
Nuclear Power Statistics

	2005-06	2006-07	2007-08	2008-09	2009-10
Installed Capacity (MW)					
CHASNUPP (connected with PEPCO system)	325	325	325	325	325
KANUPP (connected with KESC system)	137	137	137	137	137
Total	**462**	**462**	**462**	**462**	**462**
% share to the total installed Capacity	2.36	2.35	2.28	2.25	2.14
Total Installed Capacity of the Country	**19561**	**19692**	**20232**	**20556**	**21593**
Energy Generated (GWh)					
CHASNUPP (connected with PEPCO system)	2170	1944	2455	1058	2094
KANUPP (connected with KESC system)	117	161	377	428	573
Total	**2287**	**2105**	**2832**	**1486**	**2667**
% share to total electricity generation	2.46	2.15	2.91	1.57	2.68
Total Energy Generated in the Country	**92892**	**97814**	**97451**	**94663**	**99450**

Source: Pakistan Energy Yearbook / Electricity Marketing Data

Figure 33. Nuclear Power and Total Electricity Generation in the Country (GWh)



8.6 Renewable Energy:

Pakistan, like other developing countries of the region, is facing a serious challenge of energy deficit. Hence, Pakistan is working to expand the use of renewable energy to help bridge the gap of energy deficiency in the country. The country is blessed with natural resources that can be utilized to create electricity.

Renewable resources that are technologically viable and have prospects to be exploited commercially in Pakistan include wind energy, solar energy, micro-hydel, bio-energy, and emerging technologies like Fuel cell. Pakistan can benefit from these resources and can supplement existing energy resources as well as can use as primary energy source when no other option in available.

The Coastal Belt of Pakistan is blessed with a wind corridor that is 60 km wide (Gharo – Kati Bandar) and 180 km long (upto Hyderabad). This corridor has the exploitable potential of 50,000 MW of electricity generation through wind energy. In addition to that there are other wind sites available in Coastal Area of Balochistan and some in Northern Areas. Technically the grid can take upto 30-40% of wind energy. Most of the remote villages in the south can be electrified through micro wind turbines. More than 5000 villages can be electrified through wind energy in Sindh, Balochistan and Northern Areas.

The Government of Pakistan established the Alternative Energy Development Board in 2003 to create an environment in the country that is conducive to investment from the private sector in renewable energy. The Government of Pakistan is putting greater emphasis on renewable energy and has set a target of 10% share of renewable energy or 2700 MW in the country's energy mix by 2015.

Besides, AEDB the Irrigation and Power Department of Punjab and Khyber Pakhtunkhwa are actively involved in development of Small Hydel Power Projects. The provincial/AJK organizations which are involved in development of small hydropower projects are as under:

i) Sarhad Hydel Development Organization (SHYDO)
ii) Punjab Power Development Board (PPDB)
iii) Irrigation Power Development Board, Sindh
iv) AJK Hydro Electric Board (AJKHEB) and AJK Private Power Cell
v) Northern Area Public Works Department

8.7 Available Power Generation Capacity:

Capability of thermal generation units varies due to their age, auxiliary consumption, fuel (gas) availability and site conditions. The availability of different power plants (technology-wise) against their installed capacity recorded during the fiscal year 2010 has been collected by the National Power Control Centre and Karachi Electric Supply Company Limited and is reproduced in following Table.

TABLE 34 Installed and Available Power Generation Capacity (MW)						
	2007-08		2008-09		2009-10	
	PEPCO	KESC	PEPCO	KESC	PEPCO	KESC
Installed Capacity						
Hydro*	6,444	0	6,444	0	6,444	0
Thermal	10,958	2257	11,142	2397	12,046	2530
Nuclear	325	137	325	137	325	137
Total	**17727**	**2394**	**17911**	**2534**	**18815**	**2667**
Available Capacity						
Hydro*	5829	0	n.a.	0	6609	0
Thermal	6564	1644	9572	1854	8734	2018
Nuclear	296	n.a.	300	80	300	82
Total	**12689**	**1644**	n.a.	**1934**	**15643**	**2100**
Available Percentage of Installed Capacity						
Hydro*	90.46	-	-	-	102.56	-
Thermal	59.90	72.84	85.91	77.35	72.51	79.76
Nuclear	91.08	-	92.31	58.39	92.31	59.85
Total	71.58	68.67	-	76.32	83.14	78.74
** Without 30 MW Jagran and 81 MW Malakand-III Power Plants*						
Source: NPCC/KESC						

8.8 Power Generation Expansion Plan:

Based on the plan developed, up-dated and provided by KESC and NTDC, year-wise position of cumulative total installed generation capacity showing the share of installed capacity of individual technology is shown in following Tables. Further, the details of power sector generation projects under provincial governments, as submitted by the respective provincial governments are listed separately.

TABLE 35 Expansion Plan of Installed Generation Capacity (PEPCO System)								
Year	Name of Plant	Fuel	Planned Installed Cap. (MW)					Expected COD
			Hydel	Nuclear	Thermal	Wind	Total Cap. addition	
2010-11	Duber Khwar HPP, Khyber Pakhtunkhwa	Hydel	130	0	-	0	2953	October, 2010
	Halmore PP, Bhikki, Punjab	RFO/Gas	0	0	225	0		December, 2010
	Liberty Power Tech, Faisalabad, Punjab	RFO	0	0	200	0		December, 2010
	Japan Expansion PP, Lahore, Punjab	RFO	0	0	101	0		December, 2010
	Green Power, Gharo, Sindh	Wind	0	0	0	50		December, 2010
	Zorlu Enerji, Jhimpir, Sindh	Wind	0	0	0	50		December, 2010
	Jinnah Low Head, Mianwali, Punjab	Hydel	96	0	0	0		February, 2011
	Nandipur Power Project, Punjab	Oil	0	0	425	0		March, 2011
	Bestway PP, Texila, Punjab	Oil	0	0	200	0		March, 2011
	Guddu CC, Sindh	Gas	0	0	750	0		April, 2011
	Chichu-ki Mallian CC, Punjab	Gas	0	0	526	0		June, 2011
	Gulistan PP, Gujranwala, Punjab	Oil	0	0	200	0		June, 2011
	Total		**226**	**0**	**2627**	**100**		

Year	Name of Plant	Fuel	Planned Installed Cap. (MW)					Expected COD
			Hydel	Nuclear	Thermal	Wind	Total Cap. addition	
2011-12	Star Thermal PP, Daharki, Sindh	Gas	0	0	134	0	2125	August, 2011
	Allai Khwar HPP, Khyber Pakhtunkhwa	Hydel	121	0	0	0		October, 2011
	Kurram Tangi HPP, Khyber Pakhtunkhwa	Hydel	83	0	0	0		December, 2011
	CHASNUPP-II, Punjab	Nuclear	0	325	0	0		December, 2011
	UCH-II PP, Dera Murad Jamali, Balochistan	Gas	0	0	450	0		December, 2011
	Shahkot PP, Faisalabad, Punjab	Oil	0	0	200	0		December, 2011
	New Bong Escape, Mangla, AJK	Hydel	84	0	0	0		December, 2011
	Arabian Sea, Gharo, Sindh	Wind	0	0	0	50		December, 2011
	Dawood Power, Gharo, Sindh	Wind	0	0	0	50		December, 2011
	Beacon Energy, Gharo, Sindh	Wind	0	0	0	50		December, 2011
	Fauji Fertilizer Co., Jhimpir, Sindh	Wind	0	0	0	50		December, 2011
	Tenaga Generasi, Gharo, Sindh	Wind	0	0	0	50		December, 2011
	Lucky Energy, Jhimpir, Sindh	Wind	0	0	0	50		December, 2011
	PIE-Am Power, Lahore, Punjab	RFO	0	0	200	0		December, 2011
	Asrit-Kedam HPP, Swat, Khyber Pakhtunkhwa	Hydel	215	0	0	0		January, 2012
	Kotli HPP, AJK	Hydel	97	0	0	0		January, 2012
	Total		**516**	**325**	**984**	**300**		
2012-13	Kandra Power Project, Sukkur, Sindh	Gas	0	0	120	0	3408	July, 2012
	Gul Pur (Poonch River), AJK	Hydel	100	0	0	0		November, 2012
	Shahpur PP, Sargodha, Punjab	Oil	0	0	150	0		December, 2012
	Rajdhani (Poonch River), AJK	Hydel	132	0	0	0		December, 2012
	Green PP, Dadu, Sindh	Gas	0	0	205	0		December, 2012
	Metro Power Co., Jhimpir, Sindh	Wind	0	0	0	50		December, 2012
	Gul Ahmad Energy, Jhimpir, Sindh	Wind	0	0	0	50		December, 2012
	Sapphire Wind, Jhimpir, Sindh	Wind	0	0	0	50		December, 2012
	Makwind Power, Jhimpir, Sindh	Wind	0	0	0	50		December, 2012
	Gabral Kalam HPP, Swat, Khyber Pakhtunkhwa	Hydel	101	0	0	0		June, 2013
	Mitsui Imported Coal, Gaddani, Balochistan	Coal	0	1200	0	0		January, 2013
	AES Imported Coal, Gaddani, Balochistan	Coal	0	1200	0	0		June, 2013
	Total		**333**	**2400**	**475**	**200**		
2013-14	Patrind HPP, Mansehra, Khyber Pakhtunkhwa	Hydel	147	0	0	0	527	December, 2013
	Master Wind Energy, Jhimpir, Sindh	Wind	0	0	0	50		December, 2013
	Zephyr Power, Gharo, Sindh	Wind	0	0	0	50		December, 2013
	HOM Energy, Jhimpir, Sindh	Wind	0	0	0	50		December, 2013
	Sachal Energy Dev., Jhimpir, Sindh	Wind	0	0	0	50		December, 2013
	Wind Eagle, Jhimpir, Sindh	Wind	0	0	0	50		December, 2013
	Sehra HPP, Poonch, AJK	Hydel	130	0	0	0		June, 2014
	Total		**277**	**0**	**0**	**250**		
2014-15	Integrated Coal Sondha-Jherrk, Sindh	Coal	0	405	0	0	1699	August, 2014
	Madian HPP, Swat, Khyber Pakhtunkhwa	Hydel	148	0	0	0		December, 2014
	Karot HPP, Kotli, AJK	Hydel	720	0	0	0		January, 2015
	Kalam - Asrit HPP, Swat, Khyber Pakhtunkhwa	Hydel	197	0	0	0		January, 2015
	Shogosin HPP, Khyber Pakhtunkhwa	Hydel	127	0	0	0		June, 2015
	Shushgai Zhendoli HPP, Khyber Pakhtunkhwa	Hydel	102	0	0	0		June, 2015
	Total		**1294**	**405**	**0**	**0**		

Source: National Transmission and Despatch Company

TABLE 36 Expansion Plan of Installed Generation Capacity (KESC System)							
Year	**Name of Plant**	**Capacity (MW)**	**Nuclear**	**Thermal**	**Wind**	**Total**	**Cumulative Total**
Existing Capacity							
2009-10		2667	137	2530	0	2667	2667
Plan of Capacity Addition							
2010-11	Port Qasim Industrial Area	116	0	116	0	116	2783
2011-12	Port Qasim Industrial Area	358	0	358	0	358	3141
2012-13	Site to be decided	220	0	220	0	220	3361
2013-14	Site to be decided	500	0	500	0	500	3861
2014-15	Site to be decided	300	0	300	0	300	4161
Source: Karachi Electric Supply Company Limited							

8.9 Investment Plan for Power Generation Projects:

The investment plan for power generation projects (Public/Private) along with other details, for the years to come, as provided by the National Transmission and Despatch Company (NTDC), KESC and Private Power and Infrastructure Board (PPIB) are produced in the following tables respectively.

TABLE 37 Investment Plan for Public Sector Power Generation Projects (approved list)				
S #	**Name of the Project**	**Capacity (MW)**	**Expected Commissioning Year**	**Estimated Cost (Million Rupee)**
1	Combined Cycle Power Plant at Nandipur	425	2010-11	22335
2	Combined Cycle Power Plant at Chichoki Malian	525	2012-13	18500
Source: National Transmission and Despatch Company				

TABLE 38 Investment Plan for Power Generation Projects (KESC)				
S#	**Name of the Project**	**Capacity (MW)**	**Expected Commissioning Year**	**Estimated Cost**
1	Bin Qasim CCPP	560 MW	2010-11	Rs.35 Billion
2	CCPP Phase-II	220 MW	2012	Rs.16 Billion
Plan to induct Rental Power Plants in KESC system, if any		nil		
Plan to induct IPPs in KESC system, if any		There are plans to introduce IPPs into KESC's system but at this time, it is premature to describe any particular one.		
Source: Karachi Electric Supply Company Limited				

TABLE 39
Investment Plan for Private Sector Power Generation Projects

S #	Name of the Project	Capacity (MW)	Investments (Million US$)	Expected COD	Latest Status of the Project
A:	**OIL/BAGASSE**				
1	Attock Gen Power Project	156	149	Achieved on 17 March, 2009	Commissioned
2	Sheikhupura (Atlas) Power Project	214	227	Achieved on 18 December, 2009	Commissioned
3	Nishat Power Project	195	195	Achieved on 9 June, 2009	Commissioned
4	Nishat Chunian Power Project	195	195	Achieved on 20 July, 2010	Commissioned
5	Liberty Power Tech Project	195	225	30 September, 2010	Under Construction
6	HUBCO - Narowal Project	214	233	31 October, 2010	Under Construction
7	Radian Power Project	150	212	June, 2012	Tariff petition submitted
8	Grange Holding Power Project	147	251	December, 2012	Tariff Determined by NEPRA
B:	**PIPELINE QUALITY GAS/DUAL-FUEL/LNG**				
9	Sahiwal (Saif) Power Project	209	213	Achieved on 30 April, 2010	Commissioned
10	Orient Power Project	213	190	Achieved on 24 May, 2010	Commissioned
11	Muridke (Sapphire) Power Project	209	263	31 July, 2010	Under Construction
12	Bhikki (Halmore) Power Project	209	231	31 October, 2010	Under Construction
C:	**DEDICATED GAS FIELDS**				
13	Engro Power Project	217	217	Achieved on 27 March, 2010	Commissioned
14	Fauji Mari Power Project	177	217	31 July, 2010	Under Construction
15	Green Power Project	171	194	June, 2013	Financial Close (FC) deadline lapsed. Upon Company's request for extension, competent authority approved extension in FC subject to submission of extended Performance Guarantee of double amount.
16	Star Thermal Power Project	126	196	June, 2013	
17	Uch-II Power Project	375	494	December, 2013	Financial Close in progress
18	Kandra Power Project	120	90	December, 2013	Under process
D:	**HYDEL**				
19	New Bong Escape Hydel Project	84	213	December, 2013	Under Construction
20	Rajdhani Hydropower Project	132	171	June, 2014	Under process
21	Gulpur Hydropower Project	100	159	June, 2014	Under process
22	Patrind Hydropower Project	150	237	December, 2014	Under process
23	Kotli Hydropower Project	100	170	December, 2014	Under process
24	Sehra Hydel Project	130	344	December, 2014	Under process
25	Karot Hydel Project	720	1470	August, 2015	Under process
26	Madian Hydropower Project	157	438	December, 2015	Under process
27	Asrit-Kedam Hydel Project	215	405	December, 2015	Under process
28	Azad Patan Hydel Project	222	333	August, 2016	Under process
29	Kalam-Asrit Hydel Project	197	295	December, 2016	Under process
30	Chakothi-Hattian Project	139	209	December, 2016	Under process
31	Shogosin Hydropower Project	127	190	December, 2016	Under process
32	Shushgai Zhendoli Hydel Project	102	156	December, 2016	Under process
33	Gabral-Kalam Hydropower Project	101	150	December, 2016	Under process
34	Suki Kinari Hydropower Project	840	1081	June, 2017	Under process
35	Kohala Hydropower Project	1100	1800	December, 2017	Under process
36	Kaigah Hydel Project	548	822	December, 2017	Under process
E:	**COAL**				
37	AES Imported Coal Project	1200	1820	June, 2015	Under process

F:	RENTAL POWER PLANTS				
38	Gulf Rental Project	62	n.a.	Achieved on 28 April, 2010	
39	Karkey Rental Project	232	n.a.	31 August, 2010	
40	Reshma Power Rental Project	201	n.a.	30 September, 2010	
41	Sialkot Rental Power Project	65	n.a.	30 September, 2010	
42	Ruba Energy Rental Project	156	n.a.	30 September, 2010	
43	Tapal Rental Power Project	70	n.a.	30 September, 2010	
44	Walters Power Rental Project	205	n.a.	31 October, 2010	
Source: Private Power and Infrastructure Board					

8.10 Economic Load Despatch System:

Based on the net heat rates of power plants, the National Power Control Centre, Islamabad decides the operation and load despatch of power plants in the country except the power plants operated by KESC. Merit Order position of power plants in the area of NTDC and KESC, during 2009-10 is given in following two Tables separately.

TABLE 40
Merit Order for Power Generation Plants
(Based on the Present Net Heat Rate at 100% Plant Factor)

Order in Merit	Plant Groups	Fuel Type	As on 30th June, 2009		
			Fuel Cost (Rs/kWh)	O&M Cost (Rs/kWh)	Specific Cost (Rs/kWh)
1	Uch (upto 152.375 GWh)	GAS	0.29480	0.16027	0.49367
2	Lakhra	COAL	1.36436	0.09498	1.45934
3	Uch (+ 152.375 GWh)	GAS	1.30510	0.16027	1.50397
4	Liberty (upto 61.904 GWh)	GAS	1.42178	0.22241	1.64419
5	KAPCO-I	GAS	2.34390	0.17807	2.52197
6	Rousch	GAS	2.47167	0.18790	2.65957
7	HCPC	GAS	2.40378	0.30195	2.70573
8	KAPCO-II	GAS	2.57086	0.20829	2.77915
9	FKPCL	GAS	2.33908	0.50460	2.84368
10	Altern (Phase-II)	GAS	2.39647	0.46015	2.85662
11	Guddu CC3	R. GAS	2.95529	0.05509	3.01038
12	KAPCO-III	GAS	2.65891	0.40149	3.06040
13	Guddu CC 1&2	R. GAS	3.08516	0.05509	3.14025
14	Muzaffargarh 4	GAS	3.42276	0.01747	3.44023
15	GTPS Faisalabad CC	GAS	3.43946	0.03813	3.47759
16	Muzaffargarh 1-3	GAS	3.46527	0.01747	3.48274
17	Altern (Phase-I)	GAS	3.07922	0.46015	3.53937
18	Guddu-3 Steam	R. GAS	3.53261	0.04246	3.57507
19	Guddu-4 Steam	R. GAS	3.55970	0.04246	3.60216
20	GTPS Kotri 3-4 OC	GAS	3.57845	0.03262	3.61107
21	Muzaffargarh 5-6	GAS	3.63718	0.01747	3.65465
22	Guddu C-33 (OC)	R. GAS	3.76073	0.05329	3.81402
23	Guddu 1-2 Steam	R. GAS	3.86873	0.04246	3.91119
24	GE Rental	GAS	3.14569	0.80016	3.94585
25	AP Rental	GAS	3.49560	0.45025	3.94585

Order in Merit	Plant Groups	Fuel Type	As on 30th June, 2009		
			Fuel Cost (Rs/kWh)	O&M Cost (Rs/kWh)	Specific Cost (Rs/kWh)
26	Guddu CC 1&2 (OC)	R. GAS	3.90822	0.05329	3.96151
27	Jamshoro 2-4	GAS	4.28980	0.04915	4.33895
28	SPS Faisalabad	GAS	4.49538	0.02989	4.52527
29	NGPS Multan 3-4	GAS	4.67248	0.05219	4.72467
30	NGPS Multan 1	GAS	4.71730	0.05219	4.76949
31	GTPS Faisalabad OC	GAS	4.96007	0.03757	4.99764
32	Muzaffargarh 4	MIX	5.66623	0.01747	5.68370
33	Muzaffargarh 1-3	MIX	5.73660	0.01747	5.75407
34	Muzaffargarh 5-6	MIX	6.02120	0.01747	6.03867
35	Guddu-4 Steam	MIX	6.02317	0.04246	6.06564
36	Guddu-3 Steam	MIX	5.97733	0.04246	6.07979
37	Jamshoro 2-4	MIX	6.87298	0.04915	6.92213
38	GTPS Kotri 1-2 OC	GAS	7.27155	0.03278	7.30433
39	Liberty (+ 61.904 GWh)	GAS	7.10887	0.22241	7.33128
40	KAPCO 1	FO	7.09549	0.30889	7.40438
41	SPS Faisalabad	MIX	7.43382	0.02989	7.46371
42	NGPS Multan 3-4	MIX	7.69391	0.05219	7.74610
43	NGPS Multan 1	MIX	7.76771	0.05219	7.81990
44	Muzaffargarh 4	FO	7.90970	0.01747	7.92717
45	Muzaffargarh 1-3	FO	8.00793	0.01747	8.02540
46	KEL	FO	7.74261	0.40145	8.14406
47	KAPCO-II	FO	7.78742	0.43480	8.22222
48	Jamshoro-1	FO	8.21127	0.04915	8.26042
49	HUBCO	FO	8.26317	0.11793	8.38110
50	Muzaffargarh 5-6	FO	8.40521	0.01747	8.42268
51	Japan Power	FO	8.13079	0.30828	8.43907
52	SEPCOL	FO	7.80298	0.64155	8.44453
53	Guddu-3 Steam	FO	8.42205	0.04246	8.46451
54	AES Pak-Gen	FO	8.36763	0.11500	8.48263
55	AES Lal Pir	FO	8.36763	0.11500	8.48263
56	Guddu-4 Steam	FO	8.48664	0.04246	8.52911
57	Saba Power	FO	8.48761	0.11504	8.60265
58	Jamshoro 2-4	FO	9.45615	0.04915	9.50530
59	KAPCO-I	HSD	10.06890	0.17906	10.24796
60	SPS Faisalabad	FO	10.37225	0.02989	10.40214
61	NGPS Multan 3-4	FO	10.71534	0.05219	10.76753
62	NGPS Multan 1	FO	10.81813	0.05219	10.87032
63	KAPCO-II	HSD	11.05074	0.24074	11.29148
64	KAPCO-III	HSD	11.42882	0.60794	12.03676

Source: National Power Control Centre

TABLE 41
Merit Order of KESC (Based on the Present Net Heat Rate at 100% Plant Factor) (Rs./kWh)

S #	Plant Groups	Fuel Type	As on 30-06-2009			As on 30-09-2009			As on 31-12-2009		
			Fuel Cost	O&M Cost	Total Cost	Fuel Cost	O&M Cost	Total Cost	Fuel Cost	O&M Cost	Total Cost
Thermal											
1	BQPS	Natural Gas	3.67	0.23	3.90	3.58	0.18	3.76	3.59	0.30	3.89
2	BQPS	HFO	8.54	0.23	8.77	10.01	0.18	10.19	11.01	0.30	11.31
3	CCPP	Natural Gas	3.73	0.31	4.03	3.08	0.21	3.29	2.99	0.54	3.43
4	KTPS	Natural Gas	4.37	0.49	4.86	4.17	0.62	4.79	-	-	-
5	KTPS	HFO	-	-	-	-	-	-	-	-	-
Gas Turbine											
1	KTGT	Natural Gas	5.49	0.41	5.90	5.12	0.62	5.74	-	-	-
2	SGT	Natural Gas	6.04	0.41	6.45	-	-	-	-	-	-
3	S-GEJ	Natural Gas	3.55	0.24	3.79	3.10	0.11	3.21	3.06	0.41	3.47
4	K-GEJ	Natural Gas	-	-	-	3.10	0.10	3.20	3.06	0.22	3.28

***Note**: The plant on dual fuel will occur at three places; firstly all on Gas, secondly on Mix Fuel (average 50:50 ratio of Gas and FO) and thirdly on Furnace Oil.*

Source: Karachi Electric Supply Company Limited

8.11 Generation Licenses Granted:

In Pakistan, the generation of electric power for the purpose of sale, is a licensed activity. NEPRA grants generation licence to different power producing companies who wish to sell their electric power to national grid or to bulk power consumers. However, there is no need of generation licence for those electric power producers which produce electricity for their self use. The details of up-to-date granted Licenses are given in following Tables.

TABLE 42
A: List of Generation Licensees (Hydel + Wind + Nuclear)

	Name Companies	Installed Capacity (MW)	Fuel	Technology
Hydel				
1	WAPDA Hydro Electric Power Company, Tarbela, Mangla, Warsak, Ghazi Barotha	6443.16	Storage Water / Run of River / Canal	Hydel
2	Sarhad Hydel Development Organization, Malakand Agency, Khyber Pakhtunkhwa	83.70	Run of Canal	Hydel
3	Blue Star Energy (Pvt.) Limited, Takht Bhai, Khyber Pakhtunkhwa	3.00	Run of River/ Canal	Hydel
4	SK Hydro (Pvt.) Limited, District Manshera, Khyber Pakhtunkhwa	840.00	Run of River/ Canal	Hydel
5	Olympus Energy (Pvt.) Limited, Lahore, Punjab	20.00		Hydel
6	Pehur Hydropower Project, Peshawar, Khyber Pakhtunkhwa	18.00		Hydel

	Name Companies	Installed Capacity (MW)	Fuel	Technology
7	Punjnad Hydropower (Pvt.) Limited, Lahore, Punjab	15.00	Run of River	Hydel
8	Rasul Hydropower (Pvt.) Limited. Lahore, Punjab	20.00	Run of River	Hydel
9	Olympia Hydropower Limited, Lahore, Punjab	12.60	Run of River	Hydel
Wind Power Projects Under Power Policy 2006				
1	Dawood Power (Pvt.) Limited, Gharo, Creek Area, Sindh	50.00	Wind	Wind Turbine
2	Green Power (Pvt.) Limited, Mirpur Sakro, Sindh	49.50	Wind	Wind Turbine
3	Milergo Pakistan Limited, Khuti Khan, Sindh	250.00	Wind	Wind Turbine
4	New Park Energy Limited, Khuti Khan, Sindh	49.50	Wind	Wind Turbine
5	Tenaga Generasi (Pvt.) Limited, Mirpur Sakro, Sindh	50.00	Wind	Wind Turbine
6	Zorlu Enerji Pakistan Limited, Thatta	49.50	Wind	Wind Turbine
7	SUNEC Wind Power Generation (Pvt.) Limited, Kalar Kahar, Chakwal, Punjab	50.00	Wind	Wind Turbine
8	SUNEC Wind Power Generation (Pvt.) Limited, Lahore, Punjab	2.40	Wind	Wind Turbine
Nuclear				
1	Chashma Nuclear Power Plant, Mianwali, Chashma Barrage, Punjab	325.00	Uranium	Pressurized Heavy Water Reactor
2	Karachi Nuclear Power Plant, Karachi, Sindh	137.00	Natural Uranium	Pressurized Heavy Water Reactor

TABLE 42
B: List of Generation Licensees (GENCOs)

S.#	Company	Description		Own (MW)	Rental (MW)	Total (MW)
1	Jamshoro Power Company Limited (GENCO-I)	Installed Capacity by Fuel	Dual Fuel Machines	630	0	630
			Machines on FO only	250	0	250
			Machines on Gas only	130	0	130
			CCPP	44	0	44
			Total	**1054**	**0**	**1054**
		Installed Capacity by Technology	Steam Turbines	880	0	880
			Gas Turbines	130	0	130
			Combined Cycle	44	0	44
			Engines with Gas	0	0	0
			Engines with FO	0	0	0
			Total	**1054**	**0**	**1054**
2	Central Power Generation Company Limited (GENCO-II)	Installed Capacity by Fuel	Dual Fuel Machines	420	0	420
			Machines on FO only	0	0	0
			Machines on Gas only	892	147.7	1039.7
			CCPP	343	0	343
			Total	**1655**	**147.7**	**1802.7**
		Installed Capacity by Technology	Steam Turbines	640	0	640
			Gas Turbines	672	147.7	819.7
			Combined Cycle	343	0	343
			Engines with Gas	0	0	0
			Engines with FO	0	0	0
			Total	**1655**	**147.7**	**1802.7**
3	Northern Power Generation Company Limited (GENCO-III)	Installed Capacity by Fuel	Dual Fuel Machines	1677	0	1677
			Machines on FO only	0	430	430
			Machines on Gas only	200	287	487
			CCPP	44	0	44
			Total	**1921**	**717**	**2638**
		Installed Capacity by Technology	Steam Turbines	1677	0	1677
			Gas Turbines	200	287	487
			Combined Cycle	44	0	44
			Engines with Gas	0	0	0
			Engines with FO	0	430	430
			Total	**1921**	**717**	**2638**
4	Lakhra Power Generation Company Limited (GENCO-IV)	Installed Capacity by Fuel	Dual Fuel Machines	0	0	0
			Machines on FO only	0	248.95	248.95
			Machines on Gas only	0	230	230
			CCPP	0	0	0
			Machine on Coal	150	0	150
			Total	**150**	**478.95**	**628.95**
		Installed Capacity by Technology	Steam Turbines	150	0	150
			Gas Turbines	0	230	230
			Combined Cycle	0	0	0
			Engines with Gas	0	0	0
			Engines with FO	0	248.95	248.95
			Total	**150**	**478.95**	**628.95**
5	Karachi Electric Supply Company Limited (KESC)	Installed Capacity by Fuel	Dual Fuel Machines	1510	0	1510
			Machines on FO only	0	0	0
			Machines on Gas only	418.5	0	418.5
			CCPP	26.5	0	26.5
			Total	**1955**	**0**	**1955**
		Installed Capacity by Technology	Steam Turbines	1510	0	1510
			Gas Turbines	418.5	0	418.5
			Combined Cycle	26.5	0	26.5
			Engines with Gas	0	0	0
			Engines with FO	0	0	0
			Total	**1955**	**0**	**1955**

TABLE 42
C: List of Generation Licensees (IPPs under Power Policy 1994)

	Name Companies	Installed Capacity (MW)	Fuel	Technology-wise Capacity (MW)	
1*	Fauji Kabirwala Power Co., Khanewal, Punjab	170	Gas	GT + ST	96+74
2*	TNB Liberty Power Ltd., Daharki, Ghotki, Sindh	235	Gas	GT + ST	156+79
3*	Habibullah Coastal Power (Pvt.) Company, Sheikh Manda, Balochistan	155	Gas	GT + ST	111+29
4*	Uch Power Ltd., Murad Jamali, Nasirabad, Balochistan	586.2	Gas	GT + ST	390+196
5*	Rousch (Pakistan) Power Limited, Abdul Hakeem, Sidhani, Khanewal, Punjab	450	Gas	GT + ST	304+146
6	Altern Energy Ltd., Fateh Jang, Attock, Punjab	10.5	Gas	Engine	10.5
7*	Kohinoor Energy Limited, Raiwind, Manga Road, Lahore, Punjab	131	FO	DE + ST	125+6
8	AES Lal Pir (Pvt.) Limited, Mehmood Kot, Muzaffargarh, Punjab	362	FO	ST	362
9	AES Pak Gen (Pvt.) Limited, Mehmood Kot, Muzaffargarh, Punjab	365	FO	ST	365
10	Saba Power Company Limited, Farooqabad, Sheikhupura, Punjab	135	FO	ST	135
11	HUB Power Co. Ltd., Hub, Lasbela, Balochistan**	1292	FO	ST	1292
12	Southern Electric Power, Raiwind, Lahore, Punjab	117	FO	Engine	117
13	Japan Power Generation, Off Raiwind Road, Near Jia Bagga, Lahore, Punjab	120	FO	Engine	120
14	Gul Ahmed Energy (Pvt.) Limited, Korangi Town, Karachi, Sindh	136	FO	Engine	136
15	Tapal Energy (Pvt.) Limited, Karachi, Sindh	126	FO	Engine	126
16*	Kot Addu Power Company, Kot Addu, Muzaffargarh, Punjab**	1621	Gas + FO	GT+ST	400+797 +424

** Combined Cycle technology is being used in these plants*
*** Prior to 1994 Power Policy*

TABLE 42
D: List of Generation Licensees (IPPs under Power Policy 2002)

S#	Name Companies	Installed Capacity (MW)	Fuel	Technology-wise Capacity (MW)	
1	DHA Cogen Limited, Karachi, Sindh	94	Gas	GT+ST	67+27
2	Star Power Generation Ltd., Daharki, Sindh	134	Gas	GT+ST	88+45
3	Orient Power Co. (Pvt.) Ltd., Balloki, Punjab	225	Gas	GT+ST	151+74
4	Saif Power Limited, Qadirabad, Punjab	225	Gas	GT+ST	152+73
5	Sapphire Electric Power Co. Ltd., Muridke, Punjab	235	Gas	GT+ST	152+83
6	Foundation Power Company (Daharki) Limited, Daharki, Sindh	179	Gas	GT+ST	115+64
7	Halmore Power Generation Company (Pvt.) Limited, Bhikki, Punjab	225	Gas	GT+ST	150+75
8	Attock Gen Limited, Rawalpindi, Punjab	165	FO	DG+ST	153+12
9	Atlas Power (Pvt.) Limited, Lahore-Sheikhupura Road, Punjab	224	FO	DG+ST	208+16
10	Gujranwala Energy Limited, Sangowali, Punjab	201	FO	DG+ST	186+14
11	Eastern Power Company Ltd., Pasroor, Punjab	152	FO	DG+ST	144+8
12	Engro Energy (Pvt.) Ltd., Qadirabad, Sindh	227	FO	DG+ST	126+100
13	Nishat Chunian Power Ltd., Kasur, Punjab	202	FO	DG+ST	188+14

14	Nishat Power Limited, Lahore, Punjab	202	FO	DG+ST	188+14
15	Intergen Private Ltd., Lachi, Kohat, KHYBER PAKHTUNKHWA	165	FO	RE+ST	154+11
16	Liberty Power Tech Limited, Sahiwal, Punjab	202	FO	RE+ST	188+14
17	Hub Power Company Limited,	225	FO	RE+ST	208+17
	Narowal-Muridke Road, Punjab				
18	Green Electric (Pvt.) Limited, Dadu, Sindh	188	FO	GT+ST	126+62
19	UCH-II Power (Pvt.) Limited, Islamabad	404	FO		
20	First Tri-Star Modaraba, Karachi, Sindh	110	Gas		
21	Davis Energen Limited, Lahore, Punjab	12.16	Bagasse		

TABLE 42

E: List of Generation Licensees (SPPs, CPPs and Isolated Generation Companies)

S#	Name of Company and Location	Installed Capacity (MW)	Fuel	Technology-wise Capacity (MW)	
	SPPs				
1	Sapphire Power Generation Limited, Sheikhupura, Jamalabad, Punjab	25.9	FO + Gas	DE+GE	20.5+5.4
2	ICI Pakistan Powergen Limited, Sheikhupura, Punjab	25.34	FO + Gas	DE+GT	14+11.34
3	Mahmood Textile Mills Limited, Multan, Punjab	15.05	FO + Gas	DE+GE	9.2+5.85
4	Crescent Powertech Limited, Shahkot, Punjab	10.6	FO	DE	10.6
5	Ellcot Spinning Mills Limited, Kotri, Sindh and Manga Mandi, Sheikhupura, Punjab	21.96	FO	DE	21.96
6	Kohinoor Mills Limited, Manga Raiwind Road, Punjab	25.38	FO	DE	26
7	Gulistan Power Generation Limited, Sheikhupura, Jamalabad, Kotri	20.95	FO + Gas	DE+GE	16.5+4.45
8	D.S. Power Limited Bhikki, Punjab	1.98	FO	DE	1.98
9	Monnoo Energy Limited, Monnoopur, Punjab	4.6	FO	DE	4.6
10	Sitara Energy Limited, Sheikhupura Road, Punjab	47.68	FO	DE	47.68
11	Bhanero Energy Limited, Kotri, Sindh and Sheikhupura-Faisalabad Road, Punjab	17.35	FO + Gas	DE+GE	14.5+1.95
12	Quetta Textile Mills Limited, Kotri, Sindh and Bhai Pheru, Punjab	18.32	FO	DE	18.32
13	Ideal Energy Limited, Sheikhupura Road, Punjab	11.82	FO	DE	11.82
14	Genertech Pakistan Limited, Bhai Peru, Punjab	27.52	FO	DE	27.52
15	Kohinoor Power Company Limited, Kohinoor Nagar, Faisalabad, Punjab	15.28	FO	DE	15.2
16	Ghazi Power Limited, Lahore, Punjab	20.82	FO	DE	20.8
17	Kohinoor Textile Mills Limited, Rawalpindi, Punjab	11.72	FO	DE	11.72
18	Zeeshan Energy Limited, 32-KM, F/abad-Sheikhupura Road, Faisalabad, Punjab	6.9	FO	DE	6.9

S#	Name of Company and Location	Installed Capacity (MW)	Fuel	Technology-wise Capacity (MW)	
19	Nimir Industrial Chemicals Limited, 14.8-KM, Sheikhupura-Faisalabad Road, Bhikki, Sheikhupura, Punjab	18.32	FO + Gas	ST	13
20	Zaman Energy Company Limited, 26-KM, Lahore- Sheikhupura Road, Lahore, Punjab	16.95	FO	DE	16.9
21	Crescent Bahuman Energy Limited, Lahore-Sargodha Road, Punjab	11.632	FO	DE	11.63
22	Engro Asahi Polymer and Chemicals, Port Qasim, Karachi, Sindh	5.2	FO	GT	5.2
23	Anoud Power Generation Limited, 7B/1, (NRL) Korangi Industrial Zone, Karachi, Sindh	23.84	FO	DE	23.84
24	Olympia Power Generation (Pvt.) Limited, Karachi, Sindh	5.88	Gas	GE	5.88
25	Lucky Energy (Pvt.) Limited, Karachi, Sindh	12.665	Gas	GE	12.665
26	Nadeem Power Generation Limited, Plot No.E-11, SITE, Karachi, Sindh	2.805	Gas	GE	2.805
27	Ibrahim Fiber Limited, Faisalabad, Punjab	31.8		RE	31.8
28	Shakarganj Mills Limited, Toba Road, Jhang, Punjab	8.512	Gas	RE	8.512
29	Prosperity Weaving Mills Limited, 13.5-KM, Sharaqpur Road, Sheikhupura, Punjab	6.9	HFO	DE	6.9
30	Almoiz Industries Limited, 26-KM, Chashma Road, Dera Ismail Khan, KHYBER PAKHTUNKHWA	27	Bagasse	DE	27
31	Roomi Fabrics Limited, 13-KM, Khanewal-Multan Road, Multan, Punjab	4.17	Gas	GE	4.17
31	Din Textile Mills Limited, 70-KM, Kot Akbar Khan, Pattoki, Kasur, Punjab	9.68	FO + Gas	GE+FO	2.59+2.75
32	Nishat Mills Limited, 12-KM, Sheikhupura-Faisalabad Road, Bhikki, Punjab	9.5	FO + Gas	DE+GT	6+3.5
33	Pakistan Steel Mills Limited, Bin Qasim, Karachi, Sindh	165	Gas	ST	165
34	Indus Sugar Mills Limited, Kot Bahadur (Indus Highway), Kashmore Road, Rajanpur, Punjab	11	Bagasse	ST	11
35	Colony Mills Limited, 12-KM, Shershah Road, Ismailabad, Multan, Punjab	36.132	Gas	GE	36.132
36	Ghotki Sugar Mills Limited, Mouza Lalu Wala, Near Goth Islamabad, Ghotki, Sindh	12	Bagasse	ST	12
37	JDW Sugar Mills Limited, Mouza Sharian, Jamal Din Wali, Sadiqabad, Rahim Yar Khan, Punjab	22	Bagasse	ST	22
38	Brothers Sugar Mills Limited, 20-KM Khudian Road, Chunian, District Kasur, Punjab	13	Bagasse	ST	13
39	Al-Noor Sugar Mills Limited, Noor Jahania, Taluka Dulatpur, District Nawabshah, Sindh	21.8	Bagasse	ST	21.8
40	Shakarganj Energy (Pvt.) Limited, 38-KM, Jhang-Muzaffargarh Road, Dargai Shah, Jhang, Punjab	20	Bagasse	ST	20.01

S#	Name of Company and Location	Installed Capacity (MW)	Fuel	Technology-wise Capacity (MW)	
41	Sapphire Textile Mills Limited, D-15, SITE, Kotri, Dadu, Sindh	5.01	Gas	Engine	5.01
42	Crescent Textile Mills, Sargodha Road, Faisalabad, Punjab	28	FO + Gas	Engine	28
43	Grange Power Limited, 15-KM, Arifwala-Sahiwal Road, Pakpattan, Punjab	163.353	RFO	GT+ST	109+54.35
44	Shadman Cotton Mills Limited, Mouza Kot Shah Muhammad, 3.5-KM, Ferozewatton-Warburton Road, Nankana, Punjab	9.25	Gas + Diesel	GE+DE	5.65+4.6
45	Sheikhoo Sugar Mills Limited, Lahore, Punjab	12	Bagasse		
46	RYK Mills Limited, Lahore, Punjab	12	Bagasse		
47	International Industries Limited, Karachi, Sindh	19.31	Gas		
48	Agar Textile Mills (Pvt.) Limited, Karachi, Sindh	2.11	Gas		
49	International Industries Limited, Karachi, Sindh	4.38	Gas		
50	Haji Mohammad Ismail Mills Limited, Karachi, Sindh	1.90	Gas		
51	Ashraf Sugar Mills Limited, Lahore, Punjab	8	Bagasse		
52	Al-Abbas Sugar Mills Limited, Karachi, Sindh	15	Imported Coal		
53	Layyah Sugar Mills Limited, Rawalpindi, Punjab	9.2	Bagasse		

GE – Gas Engines
DE – Diesel Engines
ST – Steam Turbines
FO – Furnace Oil
RE – Reciprocating Engines
GT – Gas Turbines

TABLE 42
F: List of Transmission and Distribution Licensees

S#	Company	Date of Licence Issued	Number of Consumers (as on 30th June, 2010)	Licence Valid Until
Transmission Licence Granted				
1	National Transmission and Despatch Company Limited (NTDC)	31-12-2002	---	30-12-2032
2	Karachi Electric Supply Company Limited (KESC)	11-06-2010	---	10-06-2030
Public Sector Distribution Companies				
1	Peshawar Electric Supply Company Limited (PESCO)	30-04-2002	2947108	29-04-2022
2	Islamabad Electric Supply Company Limited (IESCO)	02-11-2001	2059207	01-11-2021
3	Gujranwala Electric Power Company Limited (GEPCO)	23-04-2002	2457107	22-04-2022
4	Lahore Electric Supply Company Limited (LESCO)	01-04-2002	3182293	31-03-2022
5	Faisalabad Electric Supply Company Limited (FESCO)	02-03-2002	2879188	01-03-2022
6	Multan Electric Power Company Limited (MEPCO)	25-04-2002	4057491	24-04-2022
7	Hyderabad Electric Supply Company Limited (HESCO)	23-04-2002	1511878	22-04-2022
8	Quetta Electric Supply Company Limited (QESCO)	30-04-2002	490805	29-04-2022
Distribution Company working in Private Sector				
9	Karachi Electric Supply Company Limited (KESC)	21-07-2003	2051964	20-07-2023
Distribution Licence Granted to Small Power Producers				
10	Monnoo Energy Limited	20-10-2006	3	07-12-2016
11	Sapphire Power Gen. Limited	20-10-2006	8	26-08-2016
12	Sitara Energy Limited	20-10-2006	16	01-01-2017
13	Gulistan Power Gen. Limited	20-10-2006	4	15-11-2016
14	Mahmood Power Gen. Limited	14-11-2006	1	21-10-2016
15	Kohinoor Mills Limited (formerly Kohinoor Weaving Mills Limited)	14-11-2006	1	07-12-2016
16	Quetta Textile Mills Limited	14-11-2006	3	31-01-2017
17	Crescent Power Tech. Limited	18-12-2008	3	21-10-2016
18	Ibrahim Fibers (Pvt.) Limited	22-07-2008	3	30-12-2021
19	Engro Chemical Pakistan Limited	22-07-2009	Self Consumption	21-07-2029

Source: National Electric Power Regulatory Authority

ELECTRICITY TRANSMISSION

9. Electricity Transmission

9.1 General:

In Pakistan, there are two companies which are, presently engaged, in the business of electric power transmission. One is National Transmission and Despatch Company Limited and the other is Karachi Electric Supply Company Limited. NTDC is the National Grid Company of Pakistan and is, exclusively, responsible for electric power transmission in whole country except for the area served by KESC. NTDC is a public sector company and came into existence as a result of restructuring of WAPDA in 1998 and then has succeeded in obtaining a transmission licence by NEPRA in 2002. NTDC is responsible for overall reliability, planning and coordination of the electricity in Pakistan except the area under KESC. At present, NTDC owns a net work of 500 kV, 220 kV and some 132 kV (links) transmission lines and grid stations in its network.

Besides NTDC, the other company which is engaged in electric power transmission business of Pakistan is Karachi Electric Supply Company Limited. KESC is a vertically integrated company operating in private sector. Earlier the company was in public sector and responsible for generation, transmission and distribution of electric power in its area. Later-on, KESC was privatized as a single vertically integrated electric power utility. KESC, at present, has two separate licenses; one for their generation businesses while the other is for distribution of electricity in its designated area. NEPRA has granted transmission licence to KESC in June, 2010. The transmission network of KESC is connected to the national grid of the country by 220 kV and 132 kV links.

The statistics of electricity imported and exported by NTDC for the years 2005-06 to 2009-10 is shown in following Table.

TABLE 43
Electricity Import and Export by NTDC (GWh)

Country/Agency	2005-06	2006-07	2007-08	2008-09	2009-10
Electricity Import					
Iran	146	171	199	227	250
KESC	3	5	65	33	20
Total Electricity Imported	**149**	**176**	**264**	**260**	**270**
Electricity Export					
KESC	3836	4905	4072	5014	5208
Any other Country/Region	0	0	0	0	0
Total Electricity Exported	**3836**	**4905**	**4072**	**5014**	**5208**

Source: National Transmission and Despatch Company / Electricity Marketing Data

9.2 Transmission Lines and Grid Stations with NTDC:

The integrated transmission system of NTDC comprises of 500 kV and 220 kV transmission lines and Grid stations. The status of Transmission lines and Grid Stations, at the end of fiscal years from 2006 to 2010, owned and operated by NTDC is mentioned in following Table.

TABLE 44
Transmission Lines and Grid Stations with NTDC

Transmission Lines

As on 30th June	500 kV (Circuit – km)	220 kV (Circuit – km)	Total Transmission Line with NTDC (Circuit – km)
2006	4453	6993	11446
2007	4712	7318	12030
2008	4748	7318	12066
2009	5078	7325	12403
2010	5108	7337	12445

Grid Stations

As on 30th June	500 kV		220 kV		Total No. of Grid Stations with NTDC
	No. of Grid Station	MVA Capacity	No. of Grid Station	MVA Capacity	
2006	10	8874	27	9688	37
2007	10	11400	26	10403	36
2008	11	12000	26	11190	37
2009	12	13800	26	14829	38
2010	12	14850	27	15744	39

Source: National Transmission and Despatch Company / Electricity Marketing Data

9.3 Transmission Losses:

When power is transmitted through power carrier lines, some power is lost as dissipated heat, during transmission. Technically it is not possible to eliminate such losses, however, such losses can be reduced by transmitting electric power to higher voltages. The history of transmission losses of NTDC system for the years 2005-06 to 2009-10 are mentioned in following Table

TABLE 45
Unit Received, Delivered and Transmission Losses in NTDC System (GWh)

	System		2005-06	2006-07	2007-08	2008-09	2009-10
Unit Received by NTDC	500 kV 220 kV		80404	85987	84584	82702	87072
Unit Delivered by NTDC	500 kV 220 kV		74565	82719	81636	79833	84356
Unit Lost	500 kV 220 kV	GWh	5839	3268	2948	2869	2716
		%	7.26	3.8	3.49	3.58	3.10
Overall Transmission Losses (with respect to unit received)		**(GWh)**	**5839**	**3268**	**2948**	**2869**	**2716**
		%	**7.26**	**3.8**	**3.49**	**3.58**	**3.10**

Source: National Transmission and Despatch Company / Electricity Marketing Data

9.4 Utilization of Transmission Lines and Power Transformers:

Appropriate utilization of transmission lines and power transformers in any electric power system is important and has a very significant impact both technically as well as financially. The position of utilization of transmission lines in the NTDC's network is mentioned in following Table.

TABLE 46
Utilization of Transmission Lines and Power Transformers in NTDC System

Loading Status of Transmission Lines			**2008-09**
Overloaded Transmission Lines/Circuits (Nos.)		500 kV	0
		220 kV	2
Underutilized Transmission Lines/Circuits (Nos.)		500 kV	0
		220 kV	18

Loading Status of Power Transformers					
		2005-06	**2006-07**	**2007-08**	**2008-09**
Overloaded Power Transformers (Nos.)	500 kV	14	20	20	12
	220 kV	74	79	82	55
Underutilized Power Transformers (Nos.)	500 kV	5	4	4	2
	220 kV	6	10	7	50

Source: National Transmission and Despatch Company

TABLE 47
Transmission Lines Tripping in PEPCO and KESC System

Year		**Planned Outages**		**Forced Outages**	
		500 kV	**220 kV**	**500 kV**	**220 kV**
PEPCO System					
2006-07	No. of Outages	140	657	29	351
	Total duration in minutes	1046.61	4570.11	433.47	17914.21
	Maximum duration of any single outage (Minutes)	65.04	85.07	98.25	243.53
2007-08	No. of Outages	237	685	63	360
	Total duration in minutes	1262.31	5217.18	1779.18	3934.61
	Maximum duration of any single outage (Minutes)	212.25	200.05	343.13	724.51
2008-09	No. of Outages	321	499	62	259
	Total duration in minutes	2278.02	4326.14	1788.71	2410.54
	Maximum duration of any single outage (Minutes)	13.00	39.90	144.32	55.15
2009-10	No. of Outages	204	563	80	341
	Total duration in minutes	80460	226401	100684	130716
	Maximum duration of any single outage (Minutes)	n.a.	n.a.	n.a.	n.a.
KESC System					
2008-09	No. of Outages	n.a.	194	n.a.	103
	Total duration in minutes	n.a.	74634	n.a.	27970
	Maximum duration of any single outage (Minutes)	n.a.	600	n.a.	15454
2009-10	No. of Outages	n.a.	180	n.a.	102
	Total duration in minutes	n.a.	71960	n.a.	22207
	Maximum duration of any single outage (Minutes)	n.a.	806	n.a.	2880

Source: National Transmission and Despatch Company / KESC

9.5 Investment Plan - NTDC System:

Being National Grid Company of the country, NTDC is solely responsible for overall reliability, planning and coordination of the electricity transmission in Pakistan except, the area under KESC. Further, NTDC is solely responsible to provide interconnection arrangement to evacuate power from up-coming power projects in the country. To discharge its responsibility NTDC has prepared an investment plan for improvement of its transmission network and grid stations. Tables shows that Grid Station and Transmission Expansion Plans of NTDC.

TABLE 48
Grid Station Expansion Plan of NTDC upto 2011-12

Year	500/220 kV Grids				220/132 kV Grids			
	Nos.	MVA	Expected COD	Estimated Cost (Rs. million)	Nos.	MVA	Expected COD	Estimated Cost (Rs. million)
New Grid Station								
2010-11	1	1700	2010-11	4936	7	2870	2010-11	25751
2011-12	1	1700	2011-12	4467	5	2640	2011-12	14345
Extension								
2010-11	1	450	2010-11	1050	3	-	-	-
Addition/Reinforcement of Transformers at Overloaded of Grid Stations								
2010-11	-	-	-	-	2	1000	2010-11	682

Source: National Transmission and Despatch Company

TABLE 49
List of NTDC's Approved Projects
(where financing has been lined-up)

S#	Name of Project	Project Cost (Rs. in million)			Total Cost (MUS$)	Expected Commissioning Year	Financing Agency
		Total	Local	FEC			
1	220 kV Grid Station at Khuzdar, 220 kV Dadu-Khuzdar D/C Transmission Line	2901	1648	1253	48.35	2010-11	JBIC
2	220 kV Grid Station at Ghazi Road, Lahore along with associated 220 kV D/C Transmission Lines	2591	1324	1267	43.18	2010-11	kfW
3	220 kV Grid Station at Kassowal along with associated 220 kV D/C Transmission Lines	2067	1256	811	34.45	2010-11	World Bank
4	Interconnection of 6 IPPs with National Grid	1680	1040	640	22	2010-11	NTDC own resources
5	National Power System Expansion Plan	490	171	319	8	2010-11	NTDC own resources
6	220 kV GIS substation at Gwadar along with 100 km long 220 kV D/C Transmission Lines from Pak-Iran Boarder to Gwadar	3664	1730	1934	61.06	2011-12	Iranian Bank through M/s SUNIR of Iran

Source: National Transmission and Despatch Company

TABLE 50
Power Transmission Enhancement Project (Phase – I)
Approved Project being financed by ADB under MMF (Tranche-I)

S#	Name of Sub-Station	Transformer Capacity (MVA)	Associated Transmission Lines	Estimated Cost		Expected Commissioning Year
				(Rs. in Million)	Equivalent (MUS$)	
1	Extension at 500 kV Multan for Installation of 220/132 kV T/Fs.	3x160	-	1012	16.87	June, 2010
2	Looping in/out of Ghazi Barotha – Shahi Bagh at Mardan	--	Looping in and out of one circuit of Ghazi Barotha – Shahi Bagh at Mardan (30 km)	533	8.88	June, 2010
3	Upgradation of existing 132 kV to new 220 kV GIS Bandala (near Shahkot)	2x160	220 kV Gatti – KSK D/C in/out at Bandala (5+5 km)	1950	32.50	December, 2011
4	Installation of SVCs at 220 kV NKLP, Lahore	SVCs	Static Var Compensators of appropriate capacity	2265	37.75	December, 2011
Total				**5760**	**96**	

Source: National Transmission and Despatch Company

TABLE 51
Power Transmission Enhancement Project (Phase – II)
Approved Project being financed by ADB under MMF (Tranche-II)

S#	Name of Sub-Station	Transformer Capacity (MVA)	Associated Transmission Lines	Estimated Cost		Expected Commissioning Year
				(Rs. in Million)	Equivalent (MUS$)	
1	Augmentation of 220 kV Ravi at Lahore	3x250		747	12	June, 2010
2	Extension at Ghazi Barotha for addition of 600 MVA 500/220 kV T/F	1x600		1654	28	June, 2011
3	220 kV Rohri New for interconnection of IPPs at Engro Energy PP and Mari (Dharki) CCPP	2x250	i) 220 kV D/C T/L Dharki CCPP – Rohri New (115 km) ii) 132 kV D/C T/L for in/out of Rohri – Khairpur – Gambat D/ C T/L at Rohri New (1+1 km) iii) 220 kV D/C Rohri New – Shikarpur T/L (50 km) iv) 220 kV D/C T/L for in/out of Dharki – Rohri New at Engro CCPP (5+5 km) v) 132 kV Rohri New – Gambat D/C T/L (53 km)	4847	81	June, 2011
4	220 kV Okara	3x250	220 kV Yousafwala – Sarfaraz Nagar D/C in/out at Okara (5+5 km)	1884	31	December, 2011
5	220 kV Toba Tek Singh/Gojra	3x250	220 kV Faisalabad – Multan D/C in/out at Toba Tek Singh/Gojra (1+1 km)	1759	29	December, 2011
6	Installation of SVC at Quetta	SVC	Static Var Compensators of appropriate capacity	2087	35	January, 2012
7	220 kV Loralai	2x250	220 kV Dera Ghazi Khan – Loralai (250 km)	5088	85	June, 2012
8	220 kV Nowshera	3x250	220 kV D/C Transmission Line for in/out of Ghazi Barotha – Shahi Bag Transmission Line at Nowshera (5+5 km)	1876	31	June, 2012
9	500 kV Dera Ghazi Khan sub-station	2x600 2x250	500 kV Guddu – Multan 2nd CCT in/out at Dera Ghazi Khan substation (20+20 km)	4467	74	June, 2012
Total				**24409**	**406**	

Source: National Transmission and Despatch Company

TABLE 52
Interconnection Arrangement to Evacuate Power from Up-coming Power Projects

S#	Name of Power Project	Capacity of Plant (MW)	COD	Proposed Transmission Schemes
Hydropower Projects				
1	Duber Khwar HPP	130	October 2010	▪ 132 kV D/C transmission line, 59 km long on twin bundled rail conductor from Duber Khwar to Allai Khwar ▪ 132 kV D/C transmission line, approx 1 km long on twin bundled rail conductor for looping in/out of one circuit Duber Khwar – Allai Khwar 132 kV D/C transmission line at Khan Khwar ▪ 2x160 MVA, 220/132 kV transformers at Allai Khwar ▪ A new 220/132 kV substation (Mansehra New) with 2x160 MVA, 220/132 kV transformers ▪ 220 kV D/C transmission line, approx 80 km long on twin bundled rail conductor from Allai Khwar to Mansehra ▪ 220 kV D/C transmission line, approx 105 km long on twin bundled raid conductor from Mansehra to Islamabad Peshawar Road, (Sangjani) ▪ 132 kV D/C transmission line, approx 16 km long on Lynx conductor for looping in/out of Mansehra–Abbotabad two 132 kV S/C lines at Mansehra
2	Allai Khwar HPP	121	October 2011	
3	Jinnah Low Head HPP	96	February 2011	▪ 132 kV D/C transmission line, approx 5 km long on Lynx conductor from Jinnah HPP to Daud Khel New
4	New Bong Escape HPP	84	December 2011	▪ Two 132 kV D/C transmission lines, approx 0.3 + 0.3 = 0.6 km long on Lynx conductor for looping in/out of 132 kV Mangla – Kharian D/C transmission line at New Bong Escape HPP
Thermal Power Projects				
1	Chichoki Mallian Power Project	526	June 2011	▪ Two 132 kV D/C transmission lines approx 10+10=20 km long on rail conductor for looping in/out of the Attabad – Kala Shah Kaku 132 kV D/C transmission line at Chichoki Mallian Power Project ▪ A 132 kV D/C transmission line, approx 14 km long on rail conductor from Chichoki Mallian Power Project to Kala Shah Kaku
2	Nandipur Power Project	425	December 2011	▪ A 220 kV D/C transmission lines, approx 15 km long on rail conductor, for looping in/out of the existing Gakkhar – Sahuwala (Sialkot) 220 kV single circuit transmission line at Nandipur PP ▪ A 132 kV D/C transmission line, approx 25 km long on rail conductor from Nandipur Power Project to Sialkot ▪ A 132 kV D/C transmission line, approx 6 km long on rail conductor from Nandipur Power Project to Gujranwala-Sialkot Road
3	CHASNUPP -II PP	325	December 2011	▪ A 220 kV D/C transmission line approx 125.4 km long on raid conductor from CHASNUPP Power Project to Ludewala
IPPs				
1	Halmore Power Project	225	July 2010	▪ Two 132 kV D/C transmission lines, approx 4+4=8 km long on Lynx conductor for looping in/out of existing Bhikki–Shahkot/Feroz Watoan 132 kV D/C transmission line at Bhikki Power Project. ▪ A 132 kV D/C transmission line, approx 15 km long on Lynx conductor for looping in/out of one circuit of the existing Sheikhupura-Sharaqpur 132 kV D/C transmission line at Bhikki Power Project
2	Liberty Power Project	225	March 2011	▪ A 132 kV D/C transmission line on rail conductor, approx 23 km from Liberty Power Tech Power Plan to Kamalpur 132 kV substation. ▪ A 132 kV D/C transmission line on rail conductor, approx 7 km for looping in/out of Nishtabad-Sargodha-II S/C at Kamalpur ▪ A 132 kV D/C transmission line on rail conductor, approx 6 km, from Liberty Tech Power Plant to M-3 Industry 132 kV substation
3	Orient Power Project	225	March 2011	▪ A 132 kV D/C transmission line, approx 2.9 km long on rail conductor for looping in/out of existing 132 kV Bhaipheru-Habibabad S/C transmission line at Orient Power Project ▪ A 132 kV D/C trans. line, approx 50 km long on rail conductor for looping in/out of 132 kV Chung-Bund Road S/C trans. line at Orient Power Project
4	Gulistan Power Project	200	June 2011	▪ A 132 kV D/C transmission line, approx 1.5 km long on rail conductor for looping in/out of Gakkhar-Gujrat Old S/C transmission line at Wazirabad

S#	Name of Power Project	Capacity of Plant (MW)	COD	Proposed Transmission Schemes
				▪ Re-conductoring of 132 kV Gakkhar – Wazirabad D/C transmission line, approx 16 km long from Tiger to rail conductor ▪ Two 132 kV D/C transmission lines, approx 0.5+0.5=1 km long on rail conductor for looping in/out of Gakkhar – Wazirabad 132 kV D/C transmission line at Gulistan Power Project
5	Star Power Project	134	August 2011	▪ A 132 kV D/C transmission line, approx 60 km long on rail conductor from Star Power Project to Sadiqabad
6	Shahkot (Leading) Power Project	200	December 2011	▪ A 132 kV D/C transmission line, approx 8 km long on rail conductor from Leading Power Project to Bandala ▪ A 132 kV D/C transmission line, approx 4 km long on Lynx conductor for looping in/out of one circuit from proposed Shah kot-Nishatabad 132 kV D/C transmission line at Lead Power Project

Source: National Transmission and Despatch Company

9.6 Transmission Lines and Grid Stations of KESC:

The KESC was a vertically integrated public limited company, which was responsible for generation, transmission and distribution of electric power in the area of Karachi City and its suburb. Later-on, in year 2005, it was privatized with same function of generation, transmission and distribution of electric power in its area under separate licenses. The generation and distribution licenses have been granted to KESC while the application of KESC for transmission licence is under process with NEPRA. KESC system is connected to the national grid of the country by 220 kV and 132 kV links. The statistics and investment/expansion plans in respect of KESC transmission lines and grid stations are given in the following Tables.

TABLE 53
Transmission Lines and Grid Station with KESC

		2005-06	2006-07	2007-08	2008-09	2009-10
Length of Transmission Lines in km						
Overhead Lines	220 kV	264	312	312	321	321
	132 kV	531	592	598	602	6046
	66 kV	213	164	150	149	149
	33 kV	-	-	-	-	-
Underground Lines	220 kV	13	14	16	16	17
	132 kV	74	73	88	113	120
	66 kV	7	3	3	0	0
	33 kV	-	-	-	-	-

Number of Grid Stations in KESC Transmission System

		2005-06		2006-07		2007-08		2008-09		2009-10	
		No.	MVA	No.	MVA	No.	MVA	No.	MVA	No.	MVA
KESC's Owned Grid Stations	220 kV	6	2500	7	2750	7	3000	7	3000	7	3000
	132 kV	41	3306	40	3574	40	3853	48	4223	48	4363
	66 kV	4	223	4	193	3	60	3	60	3	60
	33 kV	-	-	-	-	-	-	-	-	-	-
Consumers Owned Grid Stations	220 kV	-	0	-	0	1	40	1	40	1	40
	132 kV	1	20	1	20	1	20	5	20	5	20
	66 kV	-	0	-	0	-	0	3	60	3	60
	33 kV	-	-	-	-	-	-	-	-	-	-
Total No. of Grid Stations		52	6049	52	6537	52	6973	8	7403	8	7543

Source: Karachi Electric Supply Company Limited

TABLE 54
Transmission/Sub-Transmission Losses in KESC System (GWh)

		2005-06	2006-07	2007-08	2008-09	2009-10
Total Energy Purchased by KESC		5370.42	6707.87	6526.53	7005.00	7842.00
Units Generated – KESC (Gross)		9129.74	8168.83	8662.53	8262.12	7964.00
Auxiliary Consumption in KESC Plant		684.88	638.36	664.78	618.73	591.41
Unit sent out – KESC		8444.85	7530.47	7997.75	7643.00	7373.00
Unit Available for Distribution		13815.27	14238.34	14524.28	14648.75	15214.00
Units Sold		9060.17	9367.39	9568.66	9396.47	9905.00
Energy Losses (%)	Auxiliary	7.50	7.80	7.50	7.40	7.40
	Transmission	34.42	34.21	35.85	34.90	34.90
	Distribution					

Source: Karachi Electric Supply Company / Electricity Marketing Data

TABLE 55
Grid Station Expansion Plan (2010-13) of KESC

Year	Addition of MVA Capacity (220/132 kV)	Expected Date of Completion
New Grid Stations Planned:		
2010-11	250 MVA (Auto)	January, 2013
2011-12	Shadman Town G/S - 80 MVA	November, 2012
2012-13	Old Golimar G/S -80 MVA	January, 2013
	Mominabad G/S - 80 MVA	November, 2013
Addition of New Power Transformers at Existing Grid Stations:		
2010-11	40 MVA at Old Town (132 kV/11 kV)	December, 2011
	40 MVA at Maymar Grid (132 kV/11 kV)	
	40 MVA at Jauhar (132 kV/11 kV)	
	40 MVA at Surjani (132 kV/11 kV)	
	40 MVA at Garden (132 kV/11 kV)	
	40 MVA at Korangi South (132 kV/11 kV)	
	40 MVA at Baldia (132 kV/11 kV)	

Source: Karachi Electric Supply Company Limited

ELECTRICITY DISTRIBUTION

10. Electricity Distribution

10.1 General:

There are eight distribution companies in public sector, which are distributing electric power to end consumers in Pakistan except the area served by KESC. In the area Karachi city and its suburb, Karachi Electric Supply Company Limited is solely responsible for distributing of electric power to end-consumers under a separate distribution licence granted by NEPRA. In addition to eight public sectors and one private sector Distribution Company, NEPRA so far has granted ten distribution licenses to small power producers for supply of electric power to designated bulk power consumers. The List of distribution licence granted by NEPRA is given in following Table.

TABLE 56
List of Licenses Issued to Distribution Companies

S#	Company	Date of Licence Issued	Number of Consumers (as on 30th June, 2010)	Licence Valid Until
Distribution Companies working in Public Sector				
1	Peshawar Electric Supply Company Limited (PESCO)*	30-04-2002	2947108	29-04-2022
2	Islamabad Electric Supply Company Limited (IESCO)	02-11-2001	2059207	01-11-2021
3	Gujranwala Electric Power Company Limited (GEPCO)	23-04-2002	2454254	22-04-2022
4	Lahore Electric Supply Company Limited (LESCO)	01-04-2002	3182293	31-03-2022
5	Faisalabad Electric Supply Company Limited (FESCO)	02-03-2002	2879188	01-03-2022
6	Multan Electric Power Company Limited (MEPCO)	25-04-2002	4057491	24-04-2022
7	Hyderabad Electric Supply Company Limited (HESCO)	23-04-2002	1511878	22-04-2022
8	Quetta Electric Supply Company Limited (QESCO)	30-04-2002	490805	29-04-2022
Distribution Company working in Private Sector				
9	Karachi Electric Supply Company Limited (KESC)	21-07-2003	2051964	20-07-2023
Distribution Licence Granted to Small Power Producers				
10	Monnoo Energy Limited	20-10-2006	3	07-12-2016
11	Sapphire Power Gen. Limited	20-10-2006	8	26-08-2016
12	Sitara Energy Limited	20-10-2006	16	01-01-2017
13	Gulistan Power Generation Limited	20-10-2006	4	15-11-2016
14	Mahmood Power Generation Limited	14-11-2006	1	21-10-2016
15	Kohinoor Mills Limited (formerly Kohinoor Weaving Mills Ltd.)	14-11-2006	1	07-12-2016
16	Quetta Textile Mills Limited	14-11-2006	3	31-01-2017
17	Crescent Power Tech. Limited	18-12-2008	3	21-10-2016
18	Ibrahim Fibers (Pvt.) Limited	22-07-2008	3	30-12-2021
19	Engro Chemical Pakistan Limited	22-07-2009	Self Consumption	21-07-2029

** including TESCO*

Source: National Electric Power Regulatory Authority

TABLE 57
Service Area of Ex-WAPDA Distribution Companies

NAME	SERVICE AREA
Peshawar Electric Supply Company Limited (PESCO)	Whole Province of Khyber Pakhtunkhwa, except tribal areas.
Tribal Area Electric Supply Company Limited (TESCO)	Khyber, Bajaur, Mohmand, Orakzai, Kurrum, North Waziristan, South Waziristan, Frontier Region Peshawar, Frontier Region Kohat, Frontier Region Banuu, Frontier Region Tank, Frontier Region Lukhy Murwat, Frontier Region Dera Ismail Khan.
Islamabad Electric Supply Company Limited (IESCO)	Islamabad, Rawalpindi, Attock, Jhelum, Chakwal.
Gujranwala Electric Power Company Limited (GEPCO)	Gujranwala, Sialkot, Mandi Bahauddin, Hafizabad, Narowal, Gujrat.
Lahore Electric Supply Company Limited (LESCO)	Lahore, Sheikhupura, Kasur, Okara, Nankana.
Faisalabad Electric Supply Company Limited (FESCO)	Faisalabad, Sargodha, Khushab, Jhang, Toba Tek Singh, Bhalwal, Mianwali, Bhakkar.
Multan Electric Power Company Limited (MEPCO)	Multan, Rahim Yar Khan, Khanewal, Sahiwal, Pakpattan, Vehari, Muzaffargarh, Dera Ghazi Khan, Leiah, Rajan Pur, Bahawalpur, Lodhran, Bahawalnagar.
Hyderabad Electric Supply Company Limited (HESCO)	Whole Province of Sindh, except Karachi and part of Thatta District where KESC is responsible for distribution of power.
Quetta Electric Supply Company Limited (QESCO)	Whole Province of Balochistan, except Lasbela where KESC is responsible for distribution of power.

Source: National Electric Power Regulatory Authority

10.2 Function of Distribution Companies:

The distribution companies in Pakistan are responsible for channeling electricity from the transmission substations below 220 kV to the consumers at different distribution voltages. The end users are classified as residential, commercial, industrial, agriculture, street lights etc. The distribution network is composed of lines and grid stations of 132 kV and lower voltage capacities, and each distribution company is responsible for constructing, operating, and maintaining the power distribution facilities within its dedicated geographic area. The overall distribution system, especially in urban areas, is over stressed and needs to be upgraded, augmented, and expanded.

10.3 Distribution System Performance:

The continuity of supply is one of the most important indicators to measure the performance of any Distribution Company. Besides other, the following three indices are commonly used to monitor the system performance of distribution companies. The indices are listed as under:-

1. System Average Interruption Frequency Index (SAIFI): Frequency of Interruption per Connected Customers

   SAIFI= (Frequency of Interruption/Total Connected Customers)

2. System Average Interruption Duration Index (SAIDI): SAIDI= (Hours of Interruption per Connected Customers)

   SAIDI = (Hours of Interruption/Total Connected Customers)

3. Customers Average Interruption Duration Index (CAIDI): Measured in Hours per Interruption

   CAIDI = (SAIDI/SAIFI)

A comparison of SAIFI and SAIDI in respect of all distribution companies of the country, for the year 2005-06 to 2008-09 has been carried out and is included in this report.

Pursuant to NEPRA Performance Standards (Distribution) Rules, 2005 a Distribution Company shall ensure that the SAIFI and SAIDI (of supply of power per consumer per annum) and does not exceed thirteen (13) and fourteen (14), respectively.

TABLE 58
Comparison of SAIFI and SAIDI of Distribution Companies

		2005-06	2006-07	2007-08	2008-09
Total Number of Consumers	PESCO	2116910	2195394	2237948	2732234
	IESCO	1537924	1537941	1848660	1978602
	GEPCO	2077162	2139870	2672708	2356305
	LESCO	2560412	2538722	2651666	3045612
	FESCO	4541667	2273236	2637545	2762672
	MEPCO	2762500	4278754	3593499	3841907
	HESCO	1332678	1176950	1372997	1480714
	QESCO	423614	439726	459682	476057
	KESC	1874050	1945074	1981901	1993746
Total Number of Consumer Power Supply Interruptions	PESCO	188418153294	15865292840	127761825244	451250356
	IESCO	10920525	10920525	853861624	992622
	GEPCO	412830	246030957	166679553	40790288
	LESCO	947034117	253236356	178553374	275681338
	FESCO	237076297	227725796	254312844	180150848
	MEPCO	105170	882585687549	787564034668	114257
	HESCO	61408	24083919	4334590	1366101946
	QESCO	84404	210484564	70059367	73445184
	KESC	41958.7	not provided	147021	163430618
Aggregate sum of all Consumer Power Supply Interruptions (Duration in Minutes)	PESCO	18257625909911	16710715393326	12770164778010	36727538992
	IESCO	606614672	606614672	30680231303	44104783
	GEPCO	17354281	4185264915	550795802	45717405
	LESCO	14933446947	9893348699	10501677972	18835312663
	FESCO	14103508270	10089733060	14689906882	318535019018
	MEPCO	1262770	32867597321	700377861765	7488539
	HESCO	2822036	463738708	31461222	124884689182
	QESCO	4221993376	39341228663	5746145451	6030197010
	KESC	6453191	not provided	46450574	2141766118
System Average Interruption Frequency Index (SAIFI)	PESCO	89006.2	72267.8	57088.8	193.97
	IESCO	7.1	7.1	462	0.5
	GEPCO	0.2	114.9	62.4	17.3
	LESCO	369.8	99.7	67.3	100.2
	FESCO	52.2	100.2	96.4	64.9
	MEPCO	0.04	206271.6	219162.7	0.03
	HESCO	0.05	20.5	3.2	918.53
	QESCO	0.2	478.7	152.4	155.4
	KESC	0	not provided	0.01	0.1
System Average Interruption Duration Index (SAIDI)	PESCO	8624658.54	7611715.89	5706193.7	15787.43
	IESCO	395	395	1660	22.8
	GEPCO	8.3	1955.8	2060.8	19.4
	LESCO	5832.4	3896.9	3960.4	6847.7
	FESCO	3105.4	4438.5	5569.5	114731.9
	MEPCO	0.46	7681.6	194901.3	2.01
	HESCO	2.1	394	22.9	83969.3
	QESCO	9966.6	89467.6	12501	12757.3
	KESC	3.4	not provided	23.4	1074.6

Source: DISCOs / NEPRA

TABLE 59
Peak Demand of Distribution Companies (MW)

Company	2005-06	2006-07	2007-08	2008-09	2009-10
Peshawar Electric Supply Company Limited (PESCO)*	2155	2412	3088	3142	3685
Peak Demand Growth Rate over Last Year	-13.63	11.93	28.03	1.75	17.28
Islamabad Electric Supply Company Limited (IESCO)	2111	1373	1342	1753	1457
Peak Demand Growth Rate over Last Year	81.51	-34.96	-2.26	30.63	-16.89
Gujranwala Electric Power Company Limited (GEPCO)	1151	1354	1590	1749	1813
Peak Demand Growth Rate over Last Year	5.50	17.64	17.43	10.00	3.66
Lahore Electric Supply Company Limited (LESCO)	2578	3060	3674	3800	3916
Peak Demand Growth Rate over Last Year	2.96	18.70	20.07	3.43	3.05
Faisalabad Electric Supply Company Limited (FESCO)	1554	1686	2214	2265	2298
Peak Demand Growth Rate over Last Year	7.47	8.49	31.32	2.30	1.46
Multan Electric Power Company Limited (MEPCO)	2097	2284	2588	3006	3006
Peak Demand Growth Rate over Last Year	27.40	8.92	13.31	16.15	0.00
Hyderabad Electric Supply Company Limited (HESCO)	1353	1484	1408	2009	1797
Peak Demand Growth Rate over Last Year	27.88	9.68	-5.12	42.68	-10.55
Quetta Electric Supply Company Limited (QESCO)	885	951	1180	1157	1316
Peak Demand Growth Rate over Last Year	29.20	7.46	24.08	-1.95	13.74
Karachi Electric Supply Company Limited (KESC)	2223	2354	2443	2462	2562
Peak Demand Growth Rate over Last Year	1.18	5.89	3.78	0.78	4.06

** including TESCO*

Source: Distribution Companies / KESC

TABLE 60
Category-wise Number of Consumers

DISCO	As on 30th June	Domestic	Commercial	Industrial	Agriculture	Public Light	Bulk Power	Others	Total
PESCO*	2005-06	2098647	262737	25824	32280	738	871	45	2421142
	2006-07	2238072	271026	26362	33181	782	881	45	2570349
	2007-08	2332953	274675	26620	33660	793	888	46	2669635
	2008-09	2390097	279375	26826	34183	804	903	46	2732234
	2009-10	2596152	287215	27221	34732	823	919	46	2947108
GEPCO	2005-06	1782994	227379	40271	25362	328	119	0	2076453
	2006-07	1866285	238621	42451	27953	353	121	0	2175784
	2007-08	1956251	250136	44858	29334	380	125	0	2281084
	2008-09	2014886	261680	47212	31986	399	129	13	2356305
	2009-10	2101375	270901	49809	34424	453	132	13	2457107
LESCO	2005-06	2118540	420151	56000	41152	1340	488	4	2637675
	2006-07	2253044	438056	58506	43811	1487	489	4	2795397
	2007-08	2364032	452564	60894	45142	1564	476	200	2924872
	2008-09	2468427	463701	63394	47693	1631	478	288	3045612
	2009-10	2587000	476706	65695	50427	1773	481	211	3182293
FESCO	2005-06	1951897	257015	33330	24956	1069	176	0	2268443
	2006-07	2114637	270339	35063	27365	1167	179	0	2448750
	2007-08	2275421	282148	36094	29149	1270	187	0	2624269
	2008-09	2401612	290036	37929	31489	1318	192	96	2762672
	2009-10	2504756	299925	39510	33347	1356	195	99	2879188
MEPCO	2005-06	2623944	337352	33370	49531	951	372	4	3045524
	2006-07	2923516	355267	36152	54168	1014	382	4	3370503
	2007-08	3195573	373646	38191	57214	1114	389	4	3666131
	2008-09	3356725	382213	40796	60482	1192	392	107	3841907
	2009-10	3554192	394499	42993	64071	1234	394	108	4057491
HESCO	2005-06	1086013	231575	20512	22695	784	727	0	1362306
	2006-07	1132487	231247	21015	23494	790	733	0	1409766
	2007-08	1164906	236451	21416	24015	806	746	0	1448340
	2008-09	1191748	240465	21958	24859	822	755	107	1480714
	2009-10	1217618	243765	22741	26023	852	773	106	1511878
QESCO	2005-06	322102	79882	2711	18565	170	184	0	423614
	2006-07	335793	82747	2838	19935	188	185	0	441686
	2007-08	350112	86653	2956	20393	197	191	0	460502
	2008-09	363947	87943	3083	20671	214	195	4	476057
	2009-10	375026	91264	3178	20910	224	199	4	490805
KESC	2005-06	1447728	409452	21871	1893	138	887	0	1881969
	2006-07	1494669	425001	21920	2007	69	1408	0	1945074
	2007-08	1518664	433416	21453	2038	140	1415	0	1977126
	2008-09	1531971	437463	20751	2073	112	1373	3	1993746
	2009-10	1582403	445164	20693	2157	71	1473	3	2051964

** including TESCO*

Source: Distribution Companies / KESC

TABLE 61
Category-wise Sanctioned Load (MW)

DISCO	As on 30th June	Domestic	Commercial	Industrial	Agriculture	Public Light	Bulk Power	Others	Total
PESCO*	2005-06	4225	739	1614	415	121	407	6	7528
	2006-07	4496	813	1681	429	121	421	7	7969
	2007-08	4784	882	1805	444	124	425	8	8472
	2008-09	4502	939	1805	525	121	428	7	8327
	2009-10**	2678	533	983	237	59	223	4	4717
IESCO	2005-06	2185	595	634	61	119	0	532	4126
	2006-07	2387	655	685	64	120	0	546	4457
	2007-08	2615	708	614	104	85	0	675	4801
	2008-09	2840	769	754	70	113	588	3	5137
	2009-10	3005	831	780	73	97	608	3	5397
GEPCO	2005-06	2114	331	824	190	36	41	1	3537
	2006-07	2273	382	893	205	36	47	1	3837
	2007-08	2468	444	978	223	36	55	1	4205
	2008-09	2600	488	1080	243	36	60	1	4508
	2009-10	2777	522	1170	260	36	65	1	4831
LESCO	2005-06	294	846	2346	424	123	103	91	4227
	2006-07	3188	956	2528	33	12	153	162	7032
	2007-08	3408	1068	2667	463	104	16	42	7768
	2008-09	3626	1142	2863	489	103	156	42	8421
	2009-10	3822	1214	3057	518	105	171	42	8929
FESCO	2005-06	4661	400	1050	279	8	92	5	6496
	2006-07	5026	464	1175	305	9	92	6	7077
	2007-08	5410	535	1232	324	9	102	6	7620
	2008-09	5741	578	1294	352	10	121	5	8101
	2009-10	6012	617	1355	376	10	121	6	8497
MEPCO	2005-06	3276	506	1364	707	12	55	22	5942
	2006-07	3724	568	1456	783	13	69	26	6639
	2007-08	4142	645	1506	833	13	71	26	7237
	2008-09	4417	686	1627	891	14	73	22	7730
	2009-10	4745	722	1714	955	14	76	23	8249
HESCO	2005-06	1316	311	715	301	6	73	123	2845
	2006-07	1393	313	757	311	6	74	121	2975
	2007-08	1438	345	783	320	7	75	119	3086
	2008-09	1475	378	811	333	42	77	10	3126
	2009-10	1509	398	853	348	37	81	10	3236
QESCO	2005-06	433	221	66	413	5	38	0	1176
	2006-07	471	122	107	483	5	38	0	1226
	2007-08	499	136	113	544	5	40	0	1337
	2008-09	560	148	126	557	5	44	0	1440
	2009-10	463	93	113	3248	4	78	0	3999
KESC	2005-06	3760	962	3206	76	74	982	0	9060
	2006-07	3864	986	3364	79	71	1002	0	9366
	2007-08	2424	859	1512	26	0	443	0	5264
	2008-09	2456	811	1537	27	0	468	0	5299
	2009-10	2609	857	1598	28	0	502	0	5594

** including TESCO*

*** TESCO's sanctioned load is not included*

Source: Distribution Companies / KESC

TABLE 62
Category-wise Electricity Sold (GWh)

DISCO	As on 30th June	Domestic	Commercial	Industrial	Agriculture	Public Light	Bulk Power	Others	Total
PESCO*	2005-06	5565	411	1379	450	18	253	178	8255
	2006-07	5695	458	1512	411	19	475	5	8573
	2007-08	5610	465	1533	359	18	496	4	8485
	2008-09	4940	427	1384	322	19	464	3	7559
	2009-10	5453	483	1443	363	20	493	3	8258
IESCO	2005-06	2733	743	1240	83	65	492	914	6270
	2006-07	2987	843	1559	80	87	528	982	7065
	2007-08	3005	846	1679	86	92	1519	5	7232
	2008-09	3060	822	1652	88	92	1483	4	7201
	2009-10	3308	878	1672	92	92	1526	4	7572
GEPCO	2005-06	3327	328	1655	267	11	239	0	5827
	2006-07	3475	371	1709	275	9	115	156	6110
	2007-08	3405	386	1709	304	9	262	1	6076
	2008-09	3318	389	1665	339	9	235	1	5956
	2009-10	3460	407	1688	410	9	245	1	6220
LESCO	2005-06	5190	999	5661	839	56	327	17	13089
	2006-07	5653	1156	5855	847	63	358	14	13947
	2007-08	5630	1197	5567	884	77	399	12	13766
	2008-09	5440	1148	5132	998	94	346	10	13168
	2009-10	5694	1190	5360	1144	96	390	6	13880
FESCO	2005-06	3485	415	2945	820	13	204	9	7890
	2006-07	3824	468	3253	819	14	214	9	8600
	2007-08	3810	487	3196	861	14	202	8	8578
	2008-09	3576	457	2895	913	10	232	6	8089
	2009-10	3691	472	2852	1041	9	247	5	8317
MEPCO	2005-06	4150	469	2496	1659	0	123	44	8941
	2006-07	4624	537	2422	1810	31	132	16	9571
	2007-08	4527	550	2232	1901	30	136	13	9388
	2008-09	4401	536	1990	1955	25	135	9	9051
	2009-10	4655	582	2092	2399	29	152	6	9915
HESCO	2005-06	2114	314	1098	621	88	204	6	4445
	2006-07	2386	363	1148	632	89	216	8	4842
	2007-08	2542	318	1226	695	96	221	7	5105
	2008-09	2568	334	1189	726	95	211	6	5129
	2009-10	2738	361	1174	786	113	218	5	5395
QESCO	2005-06	401	90	118	3132	3	86	0	3829
	2006-07	402	95	147	3233	3	85	0	3965
	2007-08	431	108	153	3304	4	87	0	4089
	2008-09	451	92	129	3353	4	81	0	4110
	2009-10	463	93	113	3348	4	78	0	4099
KESC	2005-06	3760	962	3206	76	74	982		9060
	2006-07	3864	986	3364	79	71	1002		9366
	2007-08	4271	1145	3533	95	74	913	20	10051
	2008-09	3989	1004	3226	100	83	862	132	9396
	2009-10	4168	1091	3387	104	87	920	148	9905

** including TESCO*

Source: Distribution Companies / KESC

TABLE 63
Total Units Purchased, Sold and Losses

DISCO	As on 30th June	Unit Purchased (GWh)			Unit Sold (GWh)	Losses	
		Through NTDC	Through CPPs	Total Unit Purchased		GWh	Percentage
PESCO*	2005-06	12097	0	12097	8255	3842	58.30
	2006-07	12646	0	12646	8573	4073	56.37
	2007-08	12545	14	12559	8485	4074	53.90
	2008-09	11326	347	11673	7559	4114	63.65
	2009-10	12110	528	12638	8258	4380	61.97
IESCO	2005-06	7229	0	7229	6270	959	13.27
	2006-07	8044	0	8044	7065	979	12.17
	2007-08	8061	0	8061	7232	829	10.28
	2008-09	8071	0	8071	7201	870	10.78
	2009-10	8396	0	8396	7572	824	9.81
GEPCO	2005-06	6486	0	6486	5827	659	10.16
	2006-07	6916	0	6916	6110	805	11.65
	2007-08	6839	0	6839	6076	763	11.15
	2008-09	6672	0	6672	5956	716	10.73
	2009-10	6987	0	6987	6220	767	10.98
LESCO	2005-06	15056	0	15056	13089	1967	13.06
	2006-07	15999	0	15999	13947	2052	12.82
	2007-08	15688	43	15731	13766	1965	12.49
	2008-09	15093	92	15185	13168	2017	13.28
	2009-10	15864	237	16101	13880	2221	13.79
FESCO	2005-06	8926	0	8926	7890	1035	11.60
	2006-07	9723	0	9723	8600	1123	11.55
	2007-08	9502	145	9647	8578	1069	11.08
	2008-09	7237	1816	9053	8089	964	10.65
	2009-10	7637	1692	9329	8317	1012	10.85
MEPCO	2005-06	11250	0	11250	8941	2309	20.53
	2006-07	11764	2	11767	9571	2196	18.66
	2007-08	11490	27	11517	9388	2129	18.49
	2008-09	11091	0	11091	9051	2040	18.39
	2009-10	12225	0	12225	9915	2310	18.90
HESCO	2005-06	7308	0	7308	4445	2863	39.18
	2006-07	7681	0	7681	4842	2839	36.96
	2007-08	7958	0	7958	5105	2854	35.86
	2008-09	7853	52	7905	5129	2776	35.12
	2009-10	8211	64	8275	5395	2880	34.80
QESCO	2005-06	4827	0	4827	3829	997	20.67
	2006-07	5043	0	5043	3965	1077	21.37
	2007-08	5162	0	5162	4089	1073	20.79
	2008-09	5145	0	5145	4110	1035	20.12
	2009-10	5167	0	5167	4099	1068	20.67
KESC	2005-06	5370	9130	14500	9060	5440	37.52
	2006-07	6708	7530	14238	9366	4872	34.22
	2007-08	4072	2455	6527	10051	-3524	-53.99
	2008-09	4982	2024	7006	9396	5252	-34.11
	2009-10	5187	2655	7842	9905	-2063	-26.31

** including TESCO*

Source: Distribution Companies / KESC

TABLE 64 (A)
Units Billed and Amount Realized in DISCOs (2008-09)

DISCO		Unit	Domestic	Commercial	Industrial	Agriculture	Public Light	Bulk Supply	Others	Total
PESCO*	Unit Billed	GWh	4940	427	1384	322	19	464	3	7559
	Amount of Billed Unit	Rs. Mil.	26651	4344	9348	2340	169	2520	31	45403
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	13780	4094	9019	1723	112	2575	39	31342
		%	51.71	94.24	96.48	73.63	66.27	102.18	125.81	69.03
IESCO	Unit Billed	GWh	3060	822	1652	88	92	1483	4	7201
	Amount of Billed Unit	Rs. Mil.	16781	8969	11922	623	960	8314	43	47612
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	17284	9314	11922	623	941	5880	43	46007
		%	103.00	103.85	100.00	100.00	98.02	70.72	100.00	96.63
GEPCO	Unit Billed	GWh	3318	389	1665	339	9	235	1	5956
	Amount of Billed Unit	Rs. Mil.	16974	4789	13030	1822	80	1462	9	38166
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	16334	4676	12398	1490	61	1183	9	36151
		%	96.23	97.64	95.15	81.78	76.25	80.92	100.00	94.72
LESCO	Unit Billed	GWh	5440	1148	5132	998	94	346	10	13168
	Amount of Billed Unit	Rs. Mil.	31541	13153	38186	5412	707	2928	90	92017
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	30574	12839	36671	4507	725	2838	109	88263
		%	96.93	97.61	96.03	83.28	102.55	96.93	121.11	95.92
FESCO	Unit Billed	GWh	3576	457	2895	913	10	232	6	8089
	Amount of Billed Unit	Rs. Mil.	18345	5591	21548	4493	105	1870	52	52004
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	18005	5555	21190	3677	103	1891	61	50482
		%	98.15	99.36	98.34	81.84	98.10	101.12	117.31	97.07
MEPCO	Unit Billed	GWh	4401	536	1990	1955	25	135	9	9051
	Amount of Billed Unit	Rs. Mil.	21723	6587	15127	9539	202	1125	83	54386
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	21249	6543	14794	8040	206	1109	172	52113
		%	97.82	99.33	53.15	2.16	549.01	15.29	207.23	95.82
HESCO	Unit Billed	GWh	2568	334	1189	726	95	211	6	5129
	Amount of Billed Unit	Rs. Mil.	15617	3989	9710	4859	1132	1741	92	37140
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	9040	3736	7648	3130	20	1364	371	25309
		%	57.89	93.66	78.76	64.42	1.77	78.35	403.26	68.14
QESCO	Unit Billed	GWh	451	92	129	3353	4	81	0	4110
	Amount of Billed Unit	Rs. Mil.	2317	1076	1108	14601	44	683	2	19831
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	412	175	170	4206	1	67	0	5031
		%	17.78	16.26	15.34	28.81	2.27	9.81	0.00	25.37
KESC	Unit Billed	GWh	3989	1004	3226	100	83	862	132	9396
	Amount of Billed Unit	Rs. Mil.	19710	9779	20376	134	607	6745	718	58069
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	19710	9779	20342	134	607	6745	727	58044
		%	100.00	100.00	99.83	100.00	100.00	100.00	101.25	99.96

** including TESCO*

Source: Distribution Companies / KESC

TABLE 64 (B)
Units Billed and Amount Realized in DISCOs (2009-10)

DISCO		Unit	Domestic	Commercial	Industrial	Agriculture	Public Light	Bulk Supply	Others	Total
PESCO*	Unit Billed	GWh	5453	483	1443	363	20	493	3	8258
	Amount of Billed Unit	Rs. Mil.	36039	4877	9818	2647	184	2892	28	56485
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	109595	4495	9423	2012	107	2721	36	128389
		%	304.10	92.17	95.98	76.01	58.15	94.09	128.57	227.32
IESCO	Unit Billed	GWh	3308	878	1672	92	92	1526	4	7572
	Amount of Billed Unit	Rs. Mil.	22022	11132	14566	714	1232	10720	47	60433
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	21930	11213	14448	681	835	8799	48	57954
		%	99.58	100.73	99.19	95.38	67.78	82.08	102.13	95.90
GEPCO	Unit Billed	GWh	3475	407	1666	411	8	252	1	6220
	Amount of Billed Unit	Rs. Mil.	21417	5807	16355	2574	86	1886	11	48136
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	20761	5722	15791	2152	103	1533	24	46086
		%	96.94	98.54	96.55	83.61	119.77	81.28	218.18	95.74
LESCO	Unit Billed	GWh	5694	1190	5360	1144	96	390	6	13880
	Amount of Billed Unit	Rs. Mil.	40661	16029	48201	7435	1087	3811	73	117297
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	38999	15597	45803	5034	338	3465	109	109345
		%	95.91	97.30	95.02	67.71	31.09	90.92	149.32	93.22
FESCO	Unit Billed	GWh	3691	472	2852	1041	9	247	5	8317
	Amount of Billed Unit	Rs. Mil.	22722	6693	25211	6523	108	2211	53	63521
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	22345	6632	24951	5316	129	2221	63	61657
		%	98.34	99.09	98.97	81.50	119.44	100.45	118.87	97.07
MEPCO	Unit Billed	GWh	4655	582	2092	2399	29	152	6	9915
	Amount of Billed Unit	Rs. Mil.	27540	8233	19259	15334	278	1435	71	72150
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	26546	8128	19429	12198	201	1361	105	67968
		%	96.39	98.72	63.34	1.31	489.57	7.32	147.89	94.20
HESCO	Unit Billed	GWh	2738	361	1174	786	113	218	5	5395
	Amount of Billed Unit	Rs. Mil.	19444	5063	11670	6003	1557	2122	86	45945
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	9503	4759	8107	3052	39	1592	407	27459
		%	48.87	94.00	69.47	50.84	2.50	75.02	473.26	59.76
QESCO	Unit Billed	GWh	463	93	113	3348	4	78	0	4099
	Amount of Billed Unit	Rs. Mil.	3033	1273	1209	17699	50	779	1	24044
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	2178	1160	1169	12886	31	740	1	18165
		%	71.81	91.12	96.69	72.81	62.00	94.99	100.00	75.55
KESC	Unit Billed	GWh	4168	1091	3387	104	87	920	148	9905
	Amount of Billed Unit	Rs. Mil.	24171	12090	24098	121	1104	8014	890	70488
	Amount Realized and %age Recovery to billed Amount	Rs. Mil.	24171	12090	24098	121	1104	8014	890	70488
		%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

** including TESCO*

Source: Distribution Companies / KESC

TABLE 65
Average Annual Electricity Consumption per Connection (kWh)

DISCO	As on 30th June	Domestic	Commercial	Industrial	Agriculture	Public Light	Bulk Power	Others	Total
PESCO*	2005-06	2652	1565	53413	13954	24377	290769	3952667	3410
	2006-07	2544	1688	57337	12372	24297	538729	111111	3335
	2007-08	2405	1692	57604	10668	22699	558570	86957	3178
	2008-09	2067	1528	51592	9420	23632	513843	65217	2767
	2009-10	2100	1682	53011	10451	24301	536453	65217	2802
IESCO	2005-06	1955	2949	121726	13922	55906	608342	0	3758
	2006-07	2004	3184	144735	12572	71787	634615	0	3982
	2007-08	1893	3097	147672	12702	75829	1795780	125500	3846
	2008-09	1831	2873	139057	12562	70769	1730455	100000	3639
	2009-10	1902	2944	134926	12667	65855	1722348	100000	3677
GEPCO	2005-06	1866	1443	41102	10543	32927	2009244	0	2806
	2006-07	1862	1557	40253	9850	25637	947851	0	2808
	2007-08	1741	1544	38088	10372	24158	2094640	0	2664
	2008-09	1647	1487	35266	10598	22556	1821705	76923	2528
	2009-10	1647	1502	33889	11910	19868	1856061	76923	2531
LESCO	2005-06	2450	2378	101089	20388	41791	670082	4250000	4962
	2006-07	2509	2639	100075	19334	42629	731800	3622500	4989
	2007-08	2381	2644	91427	19578	49201	838445	59150	4706
	2008-09	2204	2476	80954	20926	57633	723849	34722	4324
	2009-10	2201	2496	81589	22686	54146	810811	28436	4362
FESCO	2005-06	1785	1613	88362	32859	12049	1161136	0	3478
	2006-07	1808	1733	92765	29938	11714	1193743	0	3512
	2007-08	1674	1726	88549	29540	10756	1082674	0	3269
	2008-09	1489	1576	76327	28994	7587	1208333	62500	2928
	2009-10	1474	1574	72184	31217	6637	1266667	50505	2889
MEPCO	2005-06	1582	1390	74798	33494	0	330645	11000000	2936
	2006-07	1582	1510	66982	33411	30316	346126	4067500	2840
	2007-08	1417	1472	58433	33226	26732	350180	3140000	2561
	2008-09	1311	1402	48779	32324	20973	344388	84112	2356
	2009-10	1310	1475	48659	37443	23501	385787	55556	2444
HESCO	2005-06	1947	1356	53530	27363	112245	280605	0	3263
	2006-07	2107	1570	54628	26900	112658	294679	0	3435
	2007-08	2182	1345	57245	28943	119243	295925	0	3524
	2008-09	2155	1389	54149	29205	115572	279470	56075	3464
	2009-10	2249	1481	51625	30204	132629	282018	47170	3568
QESCO	2005-06	1244	1127	43379	168683	18824	467391	0	9039
	2006-07	1196	1148	51913	162198	18298	456811	0	8978
	2007-08	1232	1248	51888	162031	22589	456754	0	8880
	2008-09	1239	1046	41842	162208	18692	415385	0	8633
	2009-10	1235	1019	35557	160115	17857	391960	0	8352
KESC	2004-05	2508	2244	142460	37183	634146	1036452	0	4629
	2005-06	2597	2350	146606	40085	533406	1107373	0	4814
	2006-07	2585	2320	153467	39362	1028986	711648	0	4815
	2007-08	2812	2642	164686	46614	528571	645230	0	5084
	2008-09	2604	2295	155462	48239	741071	627822	44000000	4713
	2009-10	2634	2451	163679	48215	1225352	624576	49333333	4827

** including TESCO*

Source: Distribution Companies / KESC

TABLE 66
Distribution Losses (voltage category-wise) (%)

DISCO	Losses of	2005-06	2006-07	2007-08	2008-09	2009-10
PESCO*	132 kV system	n.a	5.5	34.26	32.6	8.16
	11 kV and below system	n.a	55.9	59.00	56.1	37.21
	Overall system	59.12	61.4	36.1	37.4	37.00
IESCO	132 kV system	n.a	3.60	2.90	3.35	2.20
	11 kV and below system	n.a	8.90	7.60	7.69	7.80
	Overall system	13.19	12.50	10.30	10.78	9.80
GEPCO	132 kV system	n.a	1.47	1.90	1.46	0.81
	11 kV and below system	n.a	10.32	9.40	9.41	10.26
	Overall system	11.60	11.79	11.10	10.72	10.99
LESCO	132 kV system	n.a	-0.14	0.20	0.50	13.80
	11 kV and below system	n.a	12.80	12.50	12.80	13.70
	Overall system	13.17	12.66	12.70	13.30	13.70
FESCO	132 kV system	n.a	2.09	1.90	1.70	1.30
	11 kV and below system	n.a	9.70	9.30	9.10	9.70
	Overall system	34.60	11.79	11.10	10.70	10.90
MEPCO	132 kV system	6.11	3.63	3.99	3.90	4.40
	11 kV and below system	15.35	15.60	15.10	15.10	15.10
	Overall system	20.50	19.23	18.49	18.40	18.90
HESCO	132 kV system	4.96	3.02	3.68	5.20	5.20
	11 kV and below system	34.20	33.93	32.18	31.50	31.90
	Overall system	34.20	36.95	37.00	35.10	34.80
QESCO	132 kV system	7.70	8.29	7.60	7.10	7.00
	11 kV and below system	14.60	14.11	14.20	14.30	14.20
	Overall system	14.55	21.37	20.79	20.40	20.70
KESC	132 kV system	n.a	n.a.	n.a	n.a	n.a
	11 kV and below system	n.a	11.89	n.a	n.a	n.a
	Overall system	n.a	11.89	34.12	35.85	34.9

** including TESCO*

Source: Distribution Companies / KESC

TABLE 67
Status of Distribution Lines (km)

DISCO	As on 30th June	132 kV	66 kV	33 kV	11 kV	Total HT	Total LT
PESCO*	2005-06	2035	1369	1116	34701	38579	45166
	2006-07	2060	1369	1116	35785	39688	46912
	2007-08	2080	1369	1116	36459	40382	48211
	2008-09	2129	1244	1116	36869	40715	48511
	2009-10	2998	1259	1116	37624	42355	48897
IESCO	2005-06	2047	581	139	18140	20908	20664
	2006-07	2333	581	139	19505	22559	22566
	2007-08	2380	581	152	20697	23810	23710
	2008-09	2431	581	152	21551	2431	n.a.
	2009-10	2450	581	152	n.a.	2450	n.a.
GEPCO	2005-06	1275	412	0	265	1952	375
	2006-07	1295	412	0	292	1999	452
	2007-08	1297	412	0	384	2094	309
	2008-09	1328	412	0	555	2295	282
	2009-10	1786	402	0	20077	22265	16693
LESCO	2005-06	1634	505	0	0	22549	13992
	2006-07	1635	505	0	0	23039	14098
	2007-08	1653	505	0	0	23519	14209
	2008-09	3172	544	0	0	24049	14335
	2009-10	1808	505	0	0	24875	14421
FESCO	2005-06	1427	1324	0	30015	32766	18417
	2006-07	1495	1297	0	31995	34787	20084
	2007-08	1495	1297	0	33606	36398	21873
	2008-09	1527	1296	0	34725	37549	22772
	2009-10	1564	1296	0	35543	38403	23234
MEPCO	2005-06	2764	1479	40	56640	60923	37912
	2006-07	2803	1479	0	59189	63471	39621
	2007-08	2803	1450	0	61385	65638	41374
	2008-09	2813	1405	0	63061	67280	42482
	2009-10	2923	1405	0	64824	69152	43867
HESCO	2005-06	3319	1753	0	40813	45886	20146
	2006-07	3466	1787	0	41985	47238	20227
	2007-08	3654	1787	0	43309	48751	20326
	2008-09	3677	1776	0	45454	50908	25298
	2009-10	3775	178	0	47038	3952	47038
QESCO	2005-06	2877	636	478	14906	14906	7831
	2006-07	2970	636	748	16187	16187	8274
	2007-08	2970	636	802	25000	25000	10808
	2008-09	3294	636	802	26754	26268	11295
	2009-10	3338	636	985	28169	33128	12168
KESC	2005-06	605	219	-	6287	6287	10696
	2006-07	665	167	-	6546	6546	10721
	2007-08	705	153	-	7032	7890	11696
	2008-09	714	149	-	7363	8227	11842
	2009-10	724	149	-	7681	8406	15629

** including TESCO*

Source: Distribution Companies / KESC

TABLE 68 (A)
Feeder Outages Statistics of DISCOs (2008-09)

DISCO	Nature of Tripping	132 kV Feeders		66 kV Feeders		33 kV Feeders		11 kV Feeders		All Feeders	
		No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)
PESCO*	Planned	222	136080	93	633090	3715	124950	24637	704437	28667	1598557
	Forced	943	361642	1037	319492	1799	551216	108519	9900368	112298	11132718
	Total	1165	497722	1130	952582	5514	676166	133156	10604805	140965	12731275
IESCO	Planned	75	2700	18	6480	10	36000	n.a.	n.a.	103	45180
	Forced	240	9600	48	1920	378	15120	n.a.	n.a.	666	26640
	Total	315	12300	66	8400	388	51120	n.a.	n.a.	769	71820
GEPCO	Planned	33	9380	14	4267	0	0	1408	281326	1455	294973
	Forced	135	2054	44	309	0	0	33663	254569	33842	256932
	Total	168	11434	58	4576	0	0	35071	535895	35297	551905
LESCO	Planned	0	0	0	0	0	0	7920	29680	7920	29680
	Forced	724	0	8	0	0	0	12230	14064	12962	14064
	Total	724	0	8	0	0	0	20150	43744	20882	43744
FESCO	Planned	148	43817	81	23120	0	0	5534	455877	5763	522814
	Forced	126	9376	67	4757	0	0	41851	566258	42044	580391
	Total	274	53193	148	27877	0	0	47385	1022135	47807	1103205
MEPCO	Planned	953	3741	224	1199	0	0	888925	1201457	890102	1206397
	Forced	6339	15709	2945	6442	0	0	175802	212666	185086	234817
	Total	7292	19450	3169	7641	0	0	1064727	1414123	1075188	1441214
HESCO	Planned	0	0	0	0	0	0	0	0	0	0
	Forced	268	580	257	170	0	0	103640	53493	104165	54243
	Total	268	580	257	170	0	0	103640	53493	104165	54243
QESCO	Planned	6	24	14	28	50	58	2042	4126	2112	4236
	Forced	468	1749	2598	7197	667	1516	34228	14800	37961	25262
	Total	474	1773	2612	7225	717	1574	36270	18926	40073	29498

** including TESCO*

Source: Distribution Companies

TABLE 68 (B)
Feeder Outages Statistics of DISCOs (2009-10)

DISCO	Nature of Tripping	132 kV Feeders		66 kV Feeders		33 kV Feeders		11 kV Feeders		All Feeders	
		No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)	No. of Tripping	Duration (Min.)
PESCO*	Planned	463	2327	255	1649	37	887	143410	58818	144165	63681
	Forced	405	1723	180	1937	165	1436	130019	88109	130769	93205
	Total	868	4050	435	3586	202	2323	273429	146927	274934	156886
IESCO	Planned	72	34560	7	3360	10	4800	n.a.	n.a.	89	42720
	Forced	270	11400	59	2160	345	1260	n.a.	n.a.	674	14820
	Total	342	45960	66	5520	355	6060	0	0	763	57540
GEPCO	Planned	0	0	0	0	0	0	2794	9304	2794	9304
	Forced	178	89	74	37	0	0	38248	4820	38500	4946
	Total	178	89	74	37	0	0	41042	14124	41294	14250
LESCO	Planned	0	0	0	0	0	0	11813	14766	11813	14766
	Forced	742	0	8	0	0	0	57729	2212	58479	2212
	Total	742	0	8	0	0	0	69542	16978	70292	16978
FESCO	Planned	150	39901	76	17096	0	0	2548	363583	2774	420580
	Forced	159	18345	50	8691	0	0	40291	1293558	40500	1320594
	Total	309	58246	126	25787	0	0	42839	1657141	43274	1741174
MEPCO	Planned	1162	4774	216	1297	0	0	723638	2220782	725016	2226853
	Forced	5765	11829	2568	5148	0	0	137367	2412514	145700	2429491
	Total	6927	16603	2784	6445	0	0	861005	4633296	870716	4656344
HESCO	Planned	0	0	0	0	0	0	0	0	0	0
	Forced	302	50901	121	20212	0	0	141965	62586	142388	133699
	Total	302	50901	121	20212	0	0	141965	62586	142388	133699
QESCO	Planned	6	1440	8	1440	45	3000	2105	255600	2164	261480
	Forced	480	106380	2604	432540	670	94500	34628	15600	38382	649020
	Total	486	107820	2612	433980	715	97500	36733	271200	40546	910500

** including TESCO*

Source: Distribution Companies

TABLE 69
Percentage Loading of Distribution Feeders

DISCO	Year	Overloaded Feeders (Above Designed Capacity)			
		132 kV	66 kV	33 kV	11 kV
PESCO*	2006-07	18	3	4	57
	2007-08	19	3	4	42
	2008-09	23	4	2	63
	2009-10	21	2	2	51
IESCO	2006-07	6	0	0	27
	2007-08	8	0	0	28
	2008-09	13	0	0	-
	2009-10	9	0	0	-
GEPCO	2006-07	6	0	0	8
	2007-08	5	0	0	5
	2008-09	9	0	0	0
	2009-10	1	0	0	0
LESCO	2006-07	13	3	0	60
	2007-08	16	2	0	75
	2008-09	81	0	0	140
	2009-10	64	2	0	27
FESCO	2006-07	n.a.	1	n.a.	n.a.
	2007-08	2	n.a.	n.a.	n.a.
	2008-09	1	0	0	127
	2009-10	1	-5	0	58
MEPCO	2006-07	3	0	0	0
	2007-08	4	0	0	0
	2008-09	1	0	0	0
	2009-10	2	0	0	0
HESCO	2006-07	1	0	0	0
	2007-08	2	3	0	0
	2008-09	0	0	0	0
	2009-10	3	1	0	0
QESCO	2006-07	1	3	0	200
	2007-08	1	3	0	193
	2008-09	6	9	7	278
	2009-10	6	9	7	295
KESC	2007-08	0	0	0	138
	2008-09	0	0	0	188
	2009-10	0	0	0	116

** including TESCO*

Source: Distribution Companies / KESC

TABLE 70
Status of Grid Stations

DISCO	As on 30th June	132 kV			66 kV			33 kV			Total
		DISCO Owned	Cons. Owned	Sub-Total	DISCO Owned	Cons. Owned	Sub-Total	DISCO Owned	Cons. Owned	Sub-Total	
PESCO*	2005-06	66	6	72	29	1	30	6	0	6	108
	2006-07	66	6	72	29	1	30	6	0	6	108
	2007-08	67	6	73	29	1	30	6	0	6	109
	2008-09	68	6	74	26	1	27	6	0	6	107
	2009-10	67	9	76	26	1	27	5	0	5	108
IESCO	2005-06	48	16	64	11	1	12	4	0	4	80
	2006-07	49	17	66	11	1	12	5	0	5	83
	2007-08	51	17	68	11	1	12	5	0	5	85
	2008-09	53	19	72	11	1	12	5	0	5	89
	2009-10	55	20	75	10	1	11	5		5	91
GEPCO	2005-06	35	0	35	11	0	11	0	0	0	46
	2006-07	37	0	37	9	0	9	0	0	0	46
	2007-08	39	0	39	10	0	10	0	0	0	49
	2008-09	41	0	41	8	0	8	0	0	0	49
	2009-10	41	0	41	8	0	8	0	0	0	49
LESCO	2005-06	71	11	82	11	0	11	0	0	0	93
	2006-07	73	14	87	11	0	11	0	0	0	98
	2007-08	74	15	89	10	0	10	0	0	0	99
	2008-09	75	14	89	9	0	9	0	0	0	98
	2009-10	80	22	102	7	1	8	0	0	0	110
FESCO	2005-06	45	10	55	32	0	32	0	0	0	87
	2006-07	46	13	59	29	0	29	0	0	0	88
	2007-08	50	13	63	29	0	29	0	0	0	92
	2008-09	50	13	63	28	0	28	0	0	0	91
	2009-10	53	13	66	26	0	26	0	0	0	92
MEPCO	2005-06	71	4	75	31	0	31	1	0	1	107
	2006-07	73	6	79	31	0	31	0	0	0	110
	2007-08	74	7	81	30	0	30	0	0	0	111
	2008-09	77	7	84	27	0	27	0	0	0	111
	2009-10	77	7	84	27	0	27	0	0	0	111
HESCO	2005-06	77	6	83	37	1	38	0	0	0	121
	2006-07	79	6	85	37	1	38	0	0	0	123
	2007-08	81	6	87	35	1	36	0	0	0	123
	2008-09	81	6	87	35	1	36	0	0	0	123
	2009-10	84	6	90	33	1	34	0	0	0	124
QESCO	2005-06	42	0	42	11	0	11	18	0	18	71
	2006-07	45	0	45	11	0	11	18	0	18	74
	2007-08	45	0	45	11	0	11	25	0	25	81
	2008-09	46	0	46	11	0	11	26	0	26	83
	2009-10	59	0	59	11	0	11	26	0	26	96
KESC	2005-06	40	0	40	6	0	6	0	0	0	46
	2006-07	42	5	47	3	0	3	0	0	0	50
	2007-08	42	5	47	3	0	3	0	0	0	50
	2008-09	46	5	51	3	0	3	0	0	0	54
	2009-10	48	5	53	3	0	3	0	0	0	56

** including TESCO*

Source: Distribution Companies / KESC

TABLE 71
Village Electrification in Distribution Companies

DISCO	Year	Total Number of Villages	Total Villages Electrified	Percentage of total Electrified Villages
PESCO*	2006-07	21307	15411	72.33
	2007-08	23129	16982	73.42
	2008-09	25232	18151	71.94
	2009-10	24176	17389	71.93
IESCO	2006-07	4125	3855	93.45
	2007-08	4882	4675	95.76
	2008-09	5561	5203	93.56
	2009-10	6325	6019	95.16
GEPCO	2006-07	7569	7476	98.77
	2007-08	7802	7655	98.12
	2008-09	8037	7720	96.06
	2009-10	8956	8368	93.43
LESCO	2006-07	5624	3066	54.52
	2007-08	5472	3218	58.81
	2008-09	2886	4231**	--
	2009-10	2886	5252	181.98
FESCO	2006-07	16968	13598	80.14
	2007-08	17145	15973	93.16
	2008-09	18639	16828	90.28
	2009-10	20142	18360	91.15
MEPCO	2006-07	38707	30418	78.59
	2007-08	38707	3113	8.04
	2008-09	5248	3221	61.38
	2009-10	6093	4270	70.08
HESCO	2006-07	n.p	13169	--
	2007-08	n.p	1412	--
	2008-09	38275	16454	42.99
	2009-10	46713	27184	58.19
QESCO	2006-07	17123	6610	38.60
	2007-08	9110	1008	11.06
	2008-09	17123	9504	55.50
	2009-10	17123	11506	67.20
KESC	2006-07	2276	589	25.88
	2007-08	2276	601	26.41
	2008-09	2276	640	28.12
	2009-10	2276	670	29.44

** including TESCO*

*** As per record of Statistics Division Census 1998, the total Nos. of Villages in LESCO Area are 2886 where as LESCO has electrified 4231 villages. The difference is due to the electrification of Dera and new small abadies within the same status of village.*

Source: Distribution Companies / KESC

TABLE 72
Applications of New Connections Received and Energized in Distribution Companies and KESC

DISCO	Year	Application Received (Nos.)	Connection		Application Pending (Nos.)
			Sanctioned (Nos.)	Load (kW)	
PESCO*	2006-07	42480	43017	742408	-537
	2007-08	45167	31010	486076	14157
	2008-09	78545	77	215851	78468
	2009-10	81013	80774	225722	239
IESCO	2006-07	118237	107173	107173	11064
	2007-08	118155	107345	107345	10810
	2008-09	104852	94467	94467	10385
	2009-10	96780	80402	n.a.	16378
GEPCO	2006-07	119530	98566	296087	20964
	2007-08	126044	100672	328986	25372
	2008-09	114891	72458	n.p.	42433
	2009-10	81930	100672	626600	-18742
LESCO	2006-07	180353	157056	628129	23297
	2007-08	178107	112721	621526	65386
	2008-09	150444	n.p.	512573	150444
	2009-10	144930	124543	508784	20387
FESCO	2006-07	181888	180072	580.926	1816
	2007-08	173729	158478	543.233	15251
	2008-09	142508	n.p.	495032	142508
	2009-10	144480	115810	395658	28670
MEPCO	2006-07	344085	330738	551700	13347
	2007-08	294247	276825	437141	17422
	2008-09	205927	175071	497159	30856
	2009-10	216280	209637	497159	6643
HESCO	2006-07	8781	8490	n.p	291
	2007-08	7318	7287	n.p	31
	2008-09	26740	n.p.	104623	26740
	2009-10	29210	27315	72137	1895
QESCO	2006-07	21261	19352	90560	1909
	2007-08	19464	17571	89890	1893
	2008-09	14458	n.p.	41083	14458
	2009-10	14770	13273	46383	1497
KESC	2006-07	0	71038	259316	-71038
	2007-08	52429	51470	203365	959
	2008-09	n.p.	18620	77236	-18620
	2009-10	62854	14720	52920	48134

** including TESCO*

Source: Distribution Companies / KESC

TABLE 73
Province-wise Electricity Consumption by Economic Groups of the Country (GWh)

Category	Year	Punjab*	Sindh**	Khyber Pakhtunkhwa#	Balochistan##	KESC	Total
Domestic	2005-06	18921.00	2120.36	5566.70	400.66	3759.85	30768.57
	2006-07	20596.00	2394.17	5598.02	401.67	3864.00	32853.86
	2007-08	20405.00	2548.74	5365.01	431.58	4263.00	33013.33
	2008-09	19819.00	2574.00	4944.00	451.00	3989.00	31777.00
	2009-10	20825.00	2738.00	5453.00	463.00	n.a.	29479.00
Commercial	2005-06	2953.00	313.54	411.08	89.95	962.16	4729.73
	2006-07	3375.00	362.98	456.28	94.98	986.00	5275.24
	2007-08	3470.00	317.92	462.43	108.12	1153.00	5511.47
	2008-09	3351.00	334.00	427.00	92.00	1004.00	5208.00
	2009-10	3529.00	361.00	483.00	93.00	n.a.	4466.00
Industrial	2005-06	13998.00	1098.05	1382.81	117.59	3206.43	19802.88
	2006-07	14798.00	1147.64	1510.57	147.33	3544.00	21147.54
	2007-08	14383.00	1225.96	1536.40	153.38	3398.00	20696.74
	2008-09	13334.00	1189.00	1384.00	129.00	3226.00	19262.00
	2009-10	13641.00	1175.00	1443.00	113.00	n.a.	16372.00
Agriculture	2005-06	3668.00	621.91	450.94	3131.57	75.88	7948.30
	2006-07	3831.00	632.40	400.89	3233.42	79.00	8176.71
	2007-08	4036.00	695.08	345.19	3304.31	95.00	8475.58
	2008-09	4294.00	726.00	323.00	3353.00	100.00	8796.00
	2009-10	5088.00	786.00	363.00	3348.00	n.a.	9585.00
Public Lighting	2005-06	170.00	87.91	17.99	3.21	73.61	352.72
	2006-07	204.00	89.52	18.97	3.44	65.00	380.93
	2007-08	222.00	96.11	17.97	4.45	74.00	414.53
	2008-09	230.00	95.00	19.00	4.00	83.00	431.00
	2009-10	5088.00	786.00	363.00	3348.00	n.a.	9585.00
Bulk Supply	2005-06	2300.00	208.86	430.51	91.05	982.24	4012.66
	2006-07	2484.00	215.96	478.86	87.51	829.00	4095.33
	2007-08	2520.00	226.77	495.61	89.24	1069.00	4400.62
	2008-09	2436.00	215.00	464.00	83.00	994.00	4192.00
	2009-10	n.a.	n.a.	n.a.	n.a.	n.a.	0.00
Traction/ Others	2005-06	13.00	0.00	0.00	0.00	0.00	13.00
	2006-07	12.00	0.00	0.00	0.00	0.00	12.00
	2007-08	8.00	0.00	0.00	0.00	0.00	8.00
	2008-09	5.00	0.00	0.00	0.00	0.00	5.00
	2009-10	n.a.	n.a.	n.a.	n.a.	n.a.	0.00
Total	2005-06	42023.00	4450.63	8260.03	3834.03	9060.17	67627.86
	2006-07	45300.00	4842.67	8463.59	3968.35	9367.00	71941.61
	2007-08	45044.00	5110.58	8222.61	4091.08	10052.00	72520.27
	2008-09	43469.00	5133.00	7561.00	4112.00	9396.00	69671.00
	2009-10	43083.00	5060.00	7742.00	4017.00	0.00	59902.00

** Islamabad Capital Territory is included*
*** Consumption in KESC Area is not included*
 # FATA is included
Area served by KESC is excluded
Source: Electricity Marketing Data

TABLE 74
Province-wise Electricity Consumption by Economic Groups of the Country (%)

Category	Year	Punjab*	Sindh**	Khyber Pakhtunkhwa#	Balochistan##	KESC	Total
Domestic	2005-06	45.03	47.64	67.39	10.45	41.50	45.50
	2006-07	45.47	49.44	66.14	10.12	41.25	45.67
	2007-08	45.30	49.87	65.25	10.55	42.41	45.52
	2008-09	45.59	50.15	65.39	10.97	42.45	45.61
	2009-10	48.34	54.11	70.43	11.53	0.00	49.21
Commercial	2005-06	7.03	7.04	4.98	2.35	10.62	6.99
	2006-07	7.45	7.50	5.39	2.39	10.53	7.33
	2007-08	7.70	6.22	5.62	2.64	11.47	7.60
	2008-09	7.71	6.51	5.65	2.24	10.69	7.48
	2009-10	8.19	7.13	6.24	2.32	0.00	7.46
Industrial	2005-06	33.31	24.67	16.74	3.07	35.39	29.28
	2006-07	32.67	23.70	17.85	3.71	37.83	29.40
	2007-08	31.93	23.99	18.69	3.75	33.80	28.54
	2008-09	30.67	23.16	18.30	3.14	34.33	27.65
	2009-10	31.66	23.22	18.64	2.81	0.00	27.33
Agriculture	2005-06	8.73	13.97	5.46	81.68	0.84	11.75
	2006-07	8.46	13.06	4.74	81.48	0.84	11.37
	2007-08	8.96	13.60	4.20	80.77	0.95	11.69
	2008-09	9.88	14.14	4.27	81.54	1.06	12.63
	2009-10	11.81	15.53	4.69	83.35	0.00	16.00
Public Lighting	2005-06	0.40	1.98	0.22	0.08	0.81	0.52
	2006-07	0.45	1.85	0.22	0.09	0.69	0.53
	2007-08	0.49	1.88	0.22	0.11	0.74	0.57
	2008-09	0.53	1.85	0.25	0.10	0.88	0.62
	2009-10	0.00	0.00	0.00	0.00	0.00	0.00
Bulk Supply	2005-06	5.47	4.69	5.21	2.37	10.84	5.93
	2006-07	5.48	4.46	5.66	2.21	8.85	5.69
	2007-08	5.59	4.44	6.03	2.18	10.63	6.07
	2008-09	5.60	4.19	6.14	2.02	10.58	6.02
	2009-10	0.00	0.00	0.00	0.00	0.00	0.00
Traction/ Others	2005-06	0.03	0.00	0.00	0.00	0.00	0.02
	2006-07	0.03	0.00	0.00	0.00	0.00	0.02
	2007-08	0.02	0.00	0.00	0.00	0.00	0.01
	2008-09	0.01	0.00	0.00	0.00	0.00	0.01
	2009-10	0.00	0.00	0.00	0.00	0.00	0.00
Total	2005-06	100.00	100.00	100.00	100.00	100.00	100.00
	2006-07	100.00	100.00	100.00	100.00	100.00	100.00
	2007-08	100.00	100.00	100.00	100.00	100.00	100.00
	2008-09	100.00	100.00	100.00	100.00	100.00	100.00
	2009-10	100.00	100.00	100.00	100.00	100.00	100.00

** Islamabad Capital Territory is included*
*** Consumption in KESC Area is not included*
 # FATA is included
Area served by KESC is excluded
Source: Electricity Marketing Data

ELECTRICITY TARIFF

11. Electricity Tariff

The determination of tariff for electric power services is one of the primary responsibilities of NEPRA. NEPRA determines electricity tariff, keeping in view the principles of economic efficiency and service quality according to the prescribed Tariff Standards and Procedure Rules, 1998. Under Section 7(3) of the NEPRA Act, NEPRA has been expressly conferred the power to determine tariff, rates, charges and other terms and conditions for the supply of electric power services by generation, transmission and distribution companies and to recommend these to the Federal Government for notification.

11.1 Tariff Setting:

The procedures and standards in accordance with which tariffs are required to be determined, modified or revised are prescribed in the NEPRA (Tariff Standards and Procedure) Rules, 1998.

11.2 Tariff Standards:

i) Tariffs should allow licensees the recovery of any and all costs prudently incurred to meet the demonstrated needs of their customers, provided that assessments of licensees' prudence may not be required where tariffs are set on other than cost-of-service basis, such as formula-based tariffs that are designed to be in place for more than one year;

ii) Tariffs should generally be calculated by including a depreciation charge and a rate of return on the capital investment of each licensee commensurate to the earned by other investments of comparable risk;

iii) Tariffs should allow licensees a rate of return which promotes continued reasonable investment in equipment and facilities for improved and efficient service;

iv) Tariffs should include a mechanism to allow licensees a benefit from, and penalties for failure to achieve the efficiencies in the cost of providing the service and the quality of service;

v) Tariffs should reflect marginal cost principles to the extent feasible, keeping in view the financial stability of the sector;

vi) The Authority shall have a preference for competition rather than regulation and shall adopt policies and establish tariffs towards that end;

vii) The tariff regime should clearly identify interclass and inter-region subsides and shall provide such subsides transparently if found essential, with a view to minimizing if not eliminating them keeping in view the need for an adequate transition period;

viii) Tariffs may be set below the level of cost of providing the service to consumers consuming electric power below the consumption levels determined for the purpose from time to time by the Authority, as long as such tariffs are financially sustainable;

ix) Tariffs should, to the extent feasible, reflect the full cost of service to consumer groups with similar service requirements;

x) Tariff should take into account Government subsidies or the need for adjustment to finance rural electrification in accordance with the policies of the Government;

xi) The application of the tariffs should allow reasonable transition periods for the adjustments of tariffs to meet the standards and other requirements pursuant to the Act including the performance standards, industry standards and the uniform codes of conduct;

xii) Tariffs should seek to provide stability and predict ability for customers; and

xiii) Tariffs should be comprehensible, free of misinterpretation and shall state explicitly each component thereof.

NEPRA is required to determine electricity tariff so as to protect the interest of the consumers as well as electric power producers/suppliers. Any raise in tariff requested by the producers/suppliers of electricity has to be allowed or rejected by NEPRA after analyzing all the costs involved in the proposed sale price. For any determination of tariff, the following points are generally considered by NEPRA in addition to other points on case-to-case basis:

i) Utility should be able to recover its costs with some surplus for capacity expansion or return on equity.
ii) The average sale rate should provide for reasonable rate of return.

TABLE 75
Electricity Tariff of Distribution Companies 1st Quarter (2009-10)

Description	Fixed Charges (Rs./kW/M)	NEPRA Determined Tariff							
		IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO
		Variable Charges (Rs./kWh)							
Residential For Sanctioned Load less than 5 kW									
Up to 50 Units		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
For consumption exceeding 50 Units									
01-100 Units		7.00	8.25	8.00	8.25	8.00	9.75	9.75	9.75
101-300 Units		9.50	10.25	10.00	10.50	10.50	14.75	13.00	12.00
301-700 Units		12.00	12.50	12.00	13.00	13.00	15.75	14.00	14.00
Above 700 Units		13.00	14.00	14.00	14.00	15.00	16.82	15.50	15.50
For Sanctioned Load 5kW & above									
Time of Use (TOU) - Peak		13.00	13.00	13.00	13.50	13.50	16.82	15.50	15.50
Time of Use (TOU) - Off-Peak		7.50	8.00	7.50	8.00	7.50	10.30	8.50	8.44
Commercial									
For Sanctioned Load less than 5kW		13.00	14.00	14.00	14.00	15.00	16.82	15.50	15.50
For Sanctioned Load 5kW & above									
Regular	400.00	11.00	11.50	11.50	12.00	12.00	14.00	14.00	14.00
Time of Use (TOU) - Peak		13.00	13.00	13.00	13.50	13.50	16.82	15.50	15.50
Time of Use (TOU) - Off-Peak	400.00	7.00	7.50	7.00	7.50	7.00	9.80	8.00	7.94
Industrial									
B1 Less than 5 kW (at 400/230 Volts)		9.00	10.00	10.00	10.00	10.50	12.00	11.00	10.50
B2 5-500kW (at 400 Volts)	400.00	8.50	9.00	9.00	9.00	9.50	11.00	10.00	9.50
B2 - TOU (Peak)		13.00	13.00	13.00	13.50	13.50	16.82	15.50	15.50
B2 - TOU (Off-Peak)	400.00	7.00	7.50	7.00	7.50	7.00	9.80	8.00	7.94
B3 - TOU (Peak) (upto 5000kW at 11kV, 33kV)		12.90	12.90	12.90	13.40	13.40	16.72	15.40	15.40
B3 - TOU (Off-Peak)	380.00	6.90	7.40	6.90	7.40	6.90	9.70	7.90	7.84
B4 - TOU (Peak) (at 66kV, 132kV & above)		12.80	12.80	12.80	13.30	13.30	16.62	15.30	15.30
B4 - TOU (Off-Peak)	360.00	6.80	7.30	6.80	7.30	6.80	9.60	7.80	7.74
Bulk Supply									
C1(a) Supply at 400 Volts- less than 5 kW		10.00	10.50	10.50	10.50	11.00	13.00	11.50	11.00
C1(b) Supply at 400 Volts- 5 kW & above	400.00	9.25	10.00	9.50	10.00	10.00	12.00	10.50	10.00
Time of Use (TOU) - Peak		13.00	13.00	13.00	13.50	13.50	16.82	15.50	15.50
Time of Use (TOU) - Off-Peak	400.00	7.00	7.50	7.00	7.50	7.00	9.80	8.00	7.94
C2 Supply at 11 kV	380.00	9.15	9.90	9.40	9.90	9.90	11.90	10.40	9.90
Time of Use (TOU) - Peak		12.90	12.90	12.90	13.40	13.40	16.72	15.40	15.40
Time of Use (TOU) - Off-Peak	380.00	6.90	7.40	6.90	7.40	6.90	9.70	7.90	7.84
C3 Supply above 11 kV	360.00	9.05	9.80	9.30	9.80	9.80	11.80	10.30	9.80
Time of Use (TOU) - Peak		12.80	12.80	12.80	13.30	13.30	16.62	15.30	15.30
Time of Use (TOU) - Off-Peak	360.00	6.80	7.30	6.80	7.30	6.80	9.60	7.80	7.74
Agricultural									
SCARP		10.00	10.00	10.00	10.00	10.50	13.00	12.00	12.00
Agricultural Tube-wells	200.00	6.00	6.00	6.00	6.00	6.00	8.00	7.50	9.60
Time of Use (TOU) - Peak		13.00	13.00	13.00	13.00	13.50	16.82	15.50	15.50
Time of Use (TOU) - Off-Peak	200.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	7.00
Public Lighting		13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
Residential Colonies attached to Industries		13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
Railway Traction			10.00			10.00			
AJK	360.00	7.75		8.75			11.00		
Time of Use (TOU) - Peak		13.00		13.00			16.82		
Time of Use (TOU) - Off-Peak	360.00	7.00		7.00			9.80		
Rawat		9.25							

TABLE 76
Electricity Tariff of Distribution Companies 2nd Quarter (2009-10)

Description	Fixed Charges (Rs./kW/M)	NEPRA Determined Tariff							
		IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO
		Variable Charges (Rs./kWh)							
Residential For Sanctioned Load less than 5 kW									
Up to 50 Units		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
For consumption exceeding 50 Units									
01-100 Units		7.15	8.30	8.15	8.30	8.10	9.85	9.70	9.50
101-300 Units		10.25	11.25	10.50	11.25	10.80	15.50	13.00	11.90
301-700 Units		12.50	13.75	13.00	13.75	13.50	16.30	13.84	13.25
Above 700 Units		14.35	15.50	14.35	15.45	15.50	17.90	15.00	15.25
For Sanctioned Load 5kW & above									
Time of Use (TOU) - Peak		14.00	14.50	14.00	14.50	14.50	17.90	15.50	15.50
Time of Use (TOU) - Off-Peak		7.50	8.00	7.50	8.00	8.00	10.30	8.00	7.50
Commercial									
For Sanctioned Load less than 5kW		14.00	14.00	14.35	15.45	15.50	17.90	15.50	15.25
For Sanctioned Load 5kW & above									
Regular	400.00	11.00	11.50	11.50	12.00	12.00	14.00	14.00	14.00
Time of Use (TOU) - Peak		14.00	14.50	14.00	14.50	14.50	17.90	15.50	15.50
Time of Use (TOU) - Off-Peak	400.00	7.00	8.00	7.00	8.00	8.00	9.80	8.00	7.00
Industrial									
B1 Less than 5 kW (at 400/230 Volts)		9.00	10.00	10.00	10.70	10.50	13.50	10.00	10.00
B2 5-500kW (at 400 Volts)	400.00	8.50	9.50	9.00	9.50	9.50	12.50	9.00	9.00
B2 - TOU (Peak)		14.00	14.50	14.00	14.50	14.50	17.90	15.50	15.50
B2 - TOU (Off-Peak)	400.00	7.00	8.00	7.00	8.00	8.00	9.80	8.00	7.00
B3 - TOU (Peak) (upto 5000kW at 11kV, 33kV)		13.90	14.40	13.90	14.40	14.40	17.80	15.40	15.40
B3 - TOU (Off-Peak)	380.00	6.90	7.90	6.90	7.90	7.90	9.70	7.90	6.90
B4 - TOU (Peak) (at 66kV, 132kV & above)		13.80	14.30	13.80	14.30	14.30	17.70	15.30	15.30
B4 - TOU (Off-Peak)	360.00	6.80	7.80	6.80	7.80	7.80	9.60	7.80	6.80
Bulk Supply									
C1(a) Supply at 400 Volts- less than 5 kW		10.00	10.50	10.50	11.20	11.00	13.00	10.50	10.50
C1(b) Supply at 400 Volts- 5 kW & above	400.00	9.25	10.50	9.50	10.50	10.00	13.50	9.50	9.50
Time of Use (TOU) - Peak		14.00	14.50	14.00	14.50	14.50	17.90	15.50	15.50
Time of Use (TOU) - Off-Peak	400.00	7.00	8.00	7.00	8.00	8.00	9.80	8.00	7.00
C2 Supply at 11 kV	380.00	9.15	10.40	9.40	10.40	9.90	13.40	9.40	9.40
Time of Use (TOU) - Peak		13.90	14.40	13.90	14.40	14.40	17.80	15.40	15.40
Time of Use (TOU) - Off-Peak	380.00	6.90	7.90	6.90	7.90	7.90	9.70	7.90	6.90
C3 Supply above 11 kV	360.00	9.05	10.30	9.30	10.30	9.80	13.30	9.30	9.30
Time of Use (TOU) - Peak		13.80	14.30	13.80	14.30	14.30	17.70	15.30	15.30
Time of Use (TOU) - Off-Peak	360.00	6.80	7.80	6.80	7.80	7.80	9.60	7.80	6.80
Agricultural									
SCARP		10.00	10.00	10.00	10.00	10.50	13.50	12.00	12.00
Agricultural Tube-wells	200.00	6.00	7.00	6.00	7.00	7.00	8.00	7.50	9.60
Time of Use (TOU) - Peak		14.00	14.50	13.00	14.50	14.50	17.90	15.50	15.50
Time of Use (TOU) - Off-Peak	200.00	5.00	6.00	5.00	6.00	6.00	6.00	5.00	7.00
Public Lighting		13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
Residential Colonies attached to Industries		13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
Railway Traction			10.00			10.00			
AJK	360.00	7.75		8.75			11.00		
Time of Use (TOU) - Peak		14.00		14.00			16.82		
Time of Use (TOU) - Off-Peak	360.00	7.00		7.00			9.80		
Rawat		9.25							

TABLE 77
Electricity Tariff of Distribution Companies 3rd Quarter (2009-10)

Description	Fixed Charges (Rs./kW/M)	NEPRA Determined Tariff							
		IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO
		Variable Charges (Rs./kWh)							
Residential For Sanctioned Load less than 5 kW									
Up to 50 Units		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
For consumption exceeding 50 Units									
01-100 Units		7.15	8.30	8.25	8.00	8.00	9.80	9.00	9.00
101-300 Units		10.00	11.25	10.95	11.00	10.55	15.40	11.00	11.00
301-700 Units		12.00	13.75	13.50	13.25	13.50	16.20	12.75	12.50
Above 700 Units		14.00	15.50	14.75	15.00	15.50	17.85	14.00	14.00
For Sanctioned Load 5kW & above									
Time of Use (TOU) - Peak		13.00	14.50	14.00	14.50	14.50	17.85	14.00	14.50
Time of Use (TOU) - Off-Peak		6.70	8.00	7.50	8.00	8.00	10.30	7.50	7.00
Commercial									
For Sanctioned Load less than 5kW		13.00	14.00	14.35	14.50	15.50	17.85	14.50	14.00
For Sanctioned Load 5kW & above									
Regular	400.00	11.00	11.50	11.50	12.00	12.00	14.00	14.00	14.00
Time of Use (TOU) - Peak		13.00	14.50	14.00	14.50	14.50	17.85	14.00	14.50
Time of Use (TOU) - Off-Peak	400.00	6.50	8.00	7.00	8.00	8.00	9.80	7.50	7.00
Industrial									
B1 Less than 5 kW (at 400/230 Volts)		8.90	10.00	10.00	10.70	10.50	13.50	10.00	10.00
B2 5-500kW (at 400 Volts)	400.00	8.00	9.50	9.00	9.50	9.50	12.50	9.50	9.00
B2 - TOU (Peak)		13.00	14.50	14.00	14.50	14.50	17.85	14.00	14.50
B2 - TOU (Off-Peak)	400.00	6.50	8.00	7.00	8.00	8.00	9.80	7.50	7.00
B3 - TOU (Peak) (upto 5000kW at 11kV, 33kV)		12.90	14.40	13.90	14.40	14.40	17.75	13.90	14.40
B3 - TOU (Off-Peak)	380.00	6.25	7.80	6.50	7.50	7.50	9.30	7.00	6.50
B4 - TOU (Peak) (at 66kV, 132kV & above)		12.80	14.30	13.80	14.30	14.30	17.65	13.80	14.30
B4 - TOU (Off-Peak)	360.00	6.00	7.60	6.00	7.00	7.00	8.80	6.50	6.00
Bulk Supply									
C1(a) Supply at 400 Volts- less than 5 kW		9.90	10.50	10.50	11.20	11.00	13.00	10.50	10.50
C1(b) Supply at 400 Volts- 5 kW & above	400.00	8.75	10.50	9.50	10.50	10.00	13.50	10.00	9.50
Time of Use (TOU) - Peak		13.00	14.50	14.00	14.50	14.50	17.85	14.00	14.50
Time of Use (TOU) - Off-Peak	400.00	6.50	8.00	7.00	8.00	8.00	9.80	7.50	7.00
C2 Supply at 11 kV	380.00	8.65	10.40	9.40	10.40	9.90	13.40	9.90	9.40
Time of Use (TOU) - Peak		12.90	14.40	13.90	14.40	14.40	17.75	13.90	14.40
Time of Use (TOU) - Off-Peak	380.00	6.25	7.80	6.50	7.50	7.90	9.70	7.40	6.90
C3 Supply above 11 kV	360.00	8.55	10.30	9.30	10.30	9.80	13.30	9.80	9.30
Time of Use (TOU) - Peak		12.80	14.30	13.80	14.30	14.30	17.65	13.80	14.30
Time of Use (TOU) - Off-Peak	360.00	6.00	7.60	6.00	7.00	7.80	9.60	7.30	6.80
Agricultural									
SCARP		10.00	10.00	10.00	10.00	10.50	13.50	12.00	12.00
Agricultural Tube-wells	200.00	6.00	7.00	6.00	7.00	7.00	8.00	7.50	8.78
Time of Use (TOU) - Peak		13.00	14.50	13.00	14.50	14.50	17.85	14.00	14.50
Time of Use (TOU) - Off-Peak	200.00	5.00	6.00	5.00	6.00	6.00	6.00	5.00	7.00
Public Lighting		13.00	13.00	13.00	12.00	13.00	13.00	13.00	13.00
Residential Colonies attached to Industries		13.00	13.00	13.00	12.00	13.00	13.00	13.00	13.00
Railway Traction			10.00			10.00			
AJK	360.00	7.75		8.75			11.00		
Time of Use (TOU) - Peak		13.00		14.00			16.82		
Time of Use (TOU) - Off-Peak	360.00	6.50		7.00			9.80		
Rawat									

TABLE 78
GoP Applicable Tariff (Notified)

Particulars	w.e.f. 01-07-2009		w.e.f. 01-10-2009		w.e.f. 01-01-2010		w.e.f. 01-07-2010	
	Fixed Charge Rs./kW/ Month	Variable Charge Rs./kWh	Fixed Charge Rs./kW/ Month	Variable Charge Rs./kWh	Fixed Charge Rs./kW/ Month	Variable Charge Rs./kWh	Fixed Charge Rs./kW/ Month	Variable Charge Rs./kWh
Residential For Sanctioned Load less than 5kW								
Up to 50 Units		1.4		1.4		1.66		1.79
For consumption exceeding 50 Units								
01-100 Units		3.29		3.49		3.91		4.20
101-300 Units		4.96		5.26		5.89		6.34
301-700 Units		8.03		8.5		9.52		10.24
Above 700 Units		10.00		10		11.87		12.77
For Sanctioned Load 5kW & above								
Time of Use (TOU) - Peak		9.21		9.76		10.93		11.77
Time of Use (TOU) - Off-Peak		5.62		5.96		6.67		7.18
Commercial								
For Sanctioned Load less than 5kW		9.81		10.4		11.65		12.53
For Sanctioned Load 5kW & above								
Regular	315	6.12	315	6.49	315	7.27	339	7.82
Time of Use (TOU) - Peak		8.65		9.17		10.27		11.05
Time of Use (TOU) - Off-Peak	315	5.28	315	5.6	315	6.27	339	6.74
Industrial								
B1 Less than 5 kW (at 400/230 Volts)		7.38		7.5		8.76		9.00
B2 5-500kW (at 400 Volts)	315	5.71	315	6.05	315	6.78	339	7.29
B2 - TOU (Peak)		8.65		9.17		10.27		11.05
B2 - TOU (Off-Peak)	315	5.28	315	5.6	315	6.27	339	6.74
B3 - TOU (Peak) (upto 5000kW at 11kV, 33kV)		8.34		8.84		9.9		10.65
B3 - TOU (Off-Peak)	305	4.79	305	5.08	305	5.69	328	6.12
B4 - TOU (Peak) (at 66kV, 132kV & above)		8.04		8.52		9.55		10.27
B4 - TOU (Off-Peak)	295	4.49	295	4.76	295	5.33	317	5.74
Bulk Supply								
C1(a) Supply at 400 Volts- less than 5 kW		7.46		7.91		8.86		9.53
C1(b) Supply at 400 Volts- 5 kW & above	315	6.88	315	7.29	315	8.17	339	8.79
Time of Use (TOU) - Peak		8.51		9.02		10.1		10.87
Time of Use (TOU) - Off-Peak	315	5.2	315	5.51	315	6.17	339	6.64
C2 Supply at 11 kV	305	6.52	305	6.91	305	7.74	328	8.33
Time of Use (TOU) - Peak		8.21		8.7		9.75		10.49
Time of Use (TOU) - Off-Peak	305	4.72	305	5	305	5.6	328	6.03
C3 Supply above 11 kV	295	6.4	295	6.78	295	7.6	317	8.18
Time of Use (TOU) - Peak		7.91		8.38		9.39		10.10
Time of Use (TOU) - Off-Peak	295	4.42	295	4.69	295	5.25	317	5.65
Agricultural								
SCARP		6.37		6.75		7.56		8.14
Tube-wells (Punjab & Sindh)	90	4	90	4	90	4.47	97	5.11
Tube-wells (Khyber Pakhtunkhwa & Balochistan)	90	4	90	4	90	4.47	97	5.11
Time of Use (TOU) - Peak		7.61		8.07		9.03		9.72
Time of Use (TOU) - Off-Peak	315	3.42	315	3.63	315	4.06	200	4.37
Public Lighting		9.62		10.2		11.42		12.29
Residential Colonies attached to Industries		8.65		9.17		10.27		11.00
Railway Traction								9.58
AJK	295	3.17	295	3.36	295	3.76	317	4.05
Time of Use (TOU) - Peak		8.72		9.24		10.35		11.14
Time of Use (TOU) - Off-Peak	295	4.82	295	5.11	295	5.72	317	6.16
Rawat		6.58		6.97		7.81		8.41

TABLE 79
Electricity Tariff of DISCOs and KESC

Description	Fixed Charges	GoP Applicable Tariff with effect from 1st July, 2010								
		IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO	KESC
		Variable Charges								
	Rs./kW/M.	Rs./kWh								
Residential										
For Sanctioned Load less than 5kW										
Up to 50 Units		1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
For consumption exceeding 50 Units										
01-100 Units		4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
101-300 Units		6.34	6.34	6.34	6.34	6.34	6.34	6.34	6.34	6.34
301-700 Units		10.24	10.24	10.24	10.24	10.24	10.24	10.24	10.24	10.24
Above 700 Units		12.77	12.77	12.77	12.77	12.77	12.77	12.77	12.77	12.77
For Sanctioned Load 5kW & above										
Time of Use (TOU) - Peak		11.77	11.77	11.77	11.77	11.77	11.77	11.77	11.77	11.77
Time of Use (TOU) - Off-Peak		7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18
Commercial										
For Sanctioned Load less than 5kW		12.53	12.53	12.53	12.53	12.53	12.53	12.53	12.53	12.53
For Sanctioned Load 5kW & above										
Regular	339.00	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82
Time of Use (TOU) - Peak		11.05	11.05	11.05	11.05	11.05	11.05	11.05	11.05	11.05
Time of Use (TOU) - Off-Peak	339.00	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
Industrial										
B1 Less than 5 kW(at 400/230 Volts)		9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
B2 5-500kW (at 400 Volts)	339.00	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29
B2 - TOU (Peak)		11.05	11.05	11.05	11.05	11.05	11.05	11.05	11.05	11.05
B2 - TOU (Off-Peak)	339.00	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74	6.74
B3 - TOU (Peak) (upto 5000kW at 11kV, 33kV)		10.65	10.65	10.65	10.65	10.65	10.65	10.65	10.65	10.65
B3 - TOU (Off-Peak)	328.00	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12
B4 - TOU (Peak) (at 66kV, 132kV & above)		10.27	10.27	10.27	10.27	10.27	10.27	10.27	10.27	10.27
B4 - TOU (Off-Peak)	317.00	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74
Bulk Supply										
C1(a) Supply at 400 Volts- less than 5 kW		9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53
C1(b) Supply at 400 Volts- 5 kW & above	339.00	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
Time of Use (TOU) - Peak		10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
Time of Use (TOU) - Off-Peak	339.00	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64
C2 Supply at 11 kV	328.00	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
Time of Use (TOU) - Peak		10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49	10.49
Time of Use (TOU) - Off-Peak	328.00	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03

C3 Supply above 11 kV	317.00	8.18	8.18	8.18	8.18	8.18	8.18	8.18	8.18	8.18
Time of Use (TOU) - Peak		10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10
Time of Use (TOU) - Off-Peak	317.00	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65
Agricultural										
SCARP		8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Agricultural Tube-wells (Punjab & Sindh)	97.00	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11
Agricultural Tube-wells (Khyber Pakhtunkhwa & Balochistan)	97.00	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11
Time of Use (TOU) - Peak		9.72	9.72	9.72	9.72	9.72	9.72	9.72	9.72	9.72
Time of Use (TOU) - Off-Peak	200	4.37	4.37	4.37	4.37	4.37	4.37	4.37	4.37	4.37
Public Lighting		12.29	12.29	12.29	12.29	12.29	12.29	12.29	12.29	12.29
Residential Colonies attached to Industries		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Railway Traction		9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58
AJK	317.00	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05
Time of Use (TOU) - Peak		11.14	11.14	11.14	11.14	11.14	11.14	11.14	11.14	11.14
Time of Use (TOU) - Off-Peak	317.00	6.16	6.16	6.16	6.16	6.16	6.16	6.16	6.16	6.16
Rawat		8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41

TABLE 80
Current Tariff of GENCOs as Determined by NEPRA

Block	Unit	Fuel	Capacity Charge (Rs./kW/Hr.)	Energy Charge (Rs./kWh)	Total Tariff (Rs./kWh)
Jamshoro Power Company Limited					
Block i	Jamshoro Unit 1	RFO	0.4808	10.2734	11.0748
Block ii	Jamshoro Units 2,3,4	RFO	0.4808	11.8309	12.6323
Block ii	Jamshoro Units 2,3,4	Gas	0.4808	4.8324	5.6338
Block iii	Kotri Units 3,4,5,6,7	Gas	0.4808	4.0312	4.8326
Block iv	Kotri Units 1,2	Gas	0.4808	8.1917	8.9931
Central Power Generation Company Limited					
Block i	Guddu 11,12,13	Gas	0.2313	2.8706	3.2560
Block ii	Guddu 5,6,7,8,9,10	Gas	0.2313	3.1894	3.5748
Block iii	Guddu Units 3,4	Gas	0.2313	3.8272	4.2126
Block iii	Guddu Units 3,4	RFO	0.2313	9.0335	9.4189
Block iv	Guddu Units 1,2	Gas	0.2313	4.1005	4.4859
Northern Power Generation Company Limited					
Block i	Muzaffargarh Units 1,2,3	RFO	0.3320	10.8203	11.3736
Block ii	Muzaffargarh Unit 4	RFO	0.3320	10.7237	11.2771
Block iii	Muzaffargarh Units 5,6	RFO	0.3320	12.1943	12.7476
Block v	SPS Faisalabad Units 1,2	RFO	0.3320	14.3037	14.8570
Block vii	NGPS Multan Units 1,2,3,4	RFO	0.3320	13.9664	14.5197
Block i	Muzaffargarh Units 1,3	Gas	0.3320	4.2481	4.8015
Block ii	Muzaffargarh Unit 4	Gas	0.3320	4.2104	4.7637
Block iii	Muzaffargarh Units 5,6	Gas	0.3320	4.7876	5.3409
Block iv	GTPS Faisalabad Units 5,9	Gas	0.3320	3.3841	3.9374
Block v	SPS Faisalabad Units 1,2	Gas	0.3320	5.6578	6.2112
Block vi	GTPS Faisalabad Units 1,4	Gas	0.3320	6.0509	6.6043
Block vii	NPGS Multan Units 1,4	Gas	0.3320	5.5579	6.1113
Block iv	GTPS Faisalabad Units 5,9	HSD	0.3320	16.2048	16.7582
Block vi	GTPS Faisalabad Units 1,4	HSD	0.3320	28.9741	29.5275
Lakhra Power Generation Company Limited					
		Coal	0.9032	2.5021	4.0074

** For the purpose of calculating total tariff, 60% plant factor is assumed to convert capacity charge in to Rs./kWh.*

TABLE 81
NEPRA Tariff (Monthly Fuel Price Adjustments)

Month	Rs./kWh							
	IESCO	LESCO	GEPCO	FESCO	MEPCO	PESCO	HESCO	QESCO
September, 2008	0.40	0.37	(0.11)	0.35	0.30	0.63	0.49	0.06
October, 2008	1.27	1.50	1.78	1.76	1.39	2.13	1.85	1.18
November, 2008	(0.12)	0.10	(0.16)	0.32	0.01	(0.10)	0.07	(0.46)
December, 2008	0.09	0.77	0.14	0.80	0.62	0.26	1.05	(0.22)
January, 2009	0.51	0.84	0.85	1.35	1.48	0.79	1.97	0.33
February, 2009	0.23	0.68	0.08	0.87	0.48	0.56	1.21	0.04
March, 2009	0.44	0.46	0.18	0.39	0.42	0.86	0.42	(0.84)
April, 2009	0.29	0.26	(0.02)	0.32	0.27	0.49	0.38	(1.54)
May, 2009	0.97	1.15	0.92	1.04	1.02	1.87	1.59	0.81
June, 2009	0.83	0.96	0.84	1.11	0.87	1.45	1.29	0.53
July, 2009	(0.38)	0.15	0.03	0.09	(0.24)	-	(0.07)	(1.31)
August, 2009	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
September, 2009	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
October, 2009	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
November, 2009	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
December, 2009	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
January, 2010	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
February, 2010	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
March, 2010	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
April, 2010	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
May, 2010	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
June, 2010	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64

CORPORATE PROFILES OF SOME OF NEPRA LICENSEES

Company	Hub Power Company Limited
Salient Features	
SECP Incorporation No. and Date	No.1-00746 Date 01-08-1991
Plant Location	Tehsil Hub, District Lasbela, Balochistan
Registered Address	Hub Power Company Limited Islamic Chamber Building, Block-9, Clifton, Karachi
Contact Nos. and Email	info@hubpower.com
Installed Generation Capacity (Gross)	1292 MW (Gross)
Technology	Oil Fired, Steam Turbines
Plant Configuration	4x323 MW Steam Turbines
Fuel (Primary/Alternative)	RFO
Plant as on 30th June, 2010	
Net/Dependable Capacity	1200
Heat Rate (Gross/Net)	2228
Efficiency (Gross/Net)	38.6
Plant during 2009-10	
Units Generated (GWh)	8337
Average Cost of Generation (Rs./kWh)	11.93
Plant Load Factor (%)	-
Plant Utilization Factor (%)	79.3
Plant Availability Factor (%)	88.4
Running Hours	7742
Shutdown Hours	1018
Standby Hours	-
No. and Hours of Planned Outages	467
No. and Hours of Forced Outages	551
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	27-Apr-94
Issuance of Letter of Support (LoS)	None
Date of Financial Closing	26-Jan-95
Required Commercial Operation Date (COD)	June, 1996
COD Achieved	31-Mar-97
Implementation Agreement (IA)	3-Aug-92
Power Purchase Agreement (PPA)	3-Aug-92
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	3-Aug-92
Generation Licence No. and issued on	No.IGPL/013-2003 issued on 26-08-2003
Term of Generation Licence	22 Years
Source: GM (WPPO), WAPDA	

Company	AES Lalpir Limited
Salient Features	
SECP Incorporation No. and Date	No.L-07085 Date 08-05-1994
Plant Location	Mehmood Kot, Muzaffargarh, Punjab
Registered Address	AES Thermal Power Station, Near Mehmood Kot, Muzaffargarh, Punjab
Contact Nos. and Email	shahzad.raj@aes.com
Installed Generation Capacity (Gross)	362 MW (Gross)
Technology	Oil Fired, Steam Turbine
Plant Configuration	1x362 MW Steam Turbine
Fuel (Primary/Alternative)	Residual Fuel Oil Diesel
Plant as on 30th June, 2010	
Net/Dependable Capacity	349.6
Heat Rate (Gross/Net)	8842
Efficiency (Gross/Net)	38.6
Plant during 2009-10	
Units Generated (GWh)	2153
Average Cost of Generation (Rs./kWh)	12.02
Plant Load Factor (%)	-
Plant Utilization Factor (%)	70.7
Plant Availability Factor (%)	83.9
Running Hours	7352
Shutdown Hours	1408
Standby Hours	-
No. and Hours of Planned Outages	687
No. and Hours of Forced Outages	721
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	19-May-94
Issuance of Letter of Support (LoS)	22-Jun-94
Date of Financial Closing	16-May-95
Required Commercial Operation Date (COD)	6-Nov-97
COD Achieved	6-Nov-97
Implementation Agreement (IA)	24-Sep-94
Power Purchase Agreement (PPA)	3-Nov-94
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	6-Nov-94
Generation Licence No. and issued on	No.IGPL/06/2003 issued on 26-08-2003
Term of Generation Licence	24 Years

Source: GM (WPPO), WAPDA

Company	AES Pak Gen (Pvt.) Limited
Salient Features	
SECP Incorporation No. and Date	No.L-08018 Date 22-06-1995
Plant Location	Mehmood Kot, Muzaffargarh, Punjab
Registered Address	AES Thermal Power Station, Near Mehmood Kot, Muzaffargarh, Punjab
Contact Nos. and Email	shahzad.raj@aes.com
Installed Generation Capacity (Gross)	365 MW (Gross)
Technology	Oil Fired, Stream Turbine
Plant Configuration	1x365 MW Steam Turbine
Fuel (Primary/Alternative)	Residual Fuel Oil Diesel
Plant as on 30th June, 2010	
Net/Dependable Capacity	348.6
Heat Rate (Gross/Net)	8842
Efficiency (Gross/Net)	38.6
Plant during 2009-10	
Units Generated (GWh)	2019
Average Cost of Generation (Rs./kWh)	12.86
Plant Load Factor (%)	-
Plant Utilization Factor (%)	66.3
Plant Availability Factor (%)	77.2
Running Hours	6767
Shutdown Hours	1994
Standby Hours	-
No. and Hours of Planned Outages	723
No. and Hours of Forced Outages	1271
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	22-Jun-94
Issuance of Letter of Support (LoS)	24-Aug-94
Date of Financial Closing	5-Jan-96
Required Commercial Operation Date (COD)	1-Feb-98
COD Achieved	1-Feb-98
Implementation Agreement (IA)	24-Sep-94
Power Purchase Agreement (PPA)	5-Sep-95
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	7-Sep-95
Generation Licence No. and issued on	No.IGPL/07/2003 issued on 26-08-2003
Term of Generation Licence	24 Years

Source: GM (WPPO), WAPDA

Company	Altern Energy Limited
Salient Features	
SECP Incorporation No. and Date	No.L-07649 Date 17-01-1995
Plant Location	Fateh Jang, Attock
Registered Address	Altern Energy Limited, 1st floor, DESCON House, 18 km, Ferozepur Road, Lahore
Contact Nos. and Email	smiqbal@descon.com.pk
Installed Generation Capacity (Gross)	29 MW (Gross)
Technology	Gas Fired, Diesel Engine
Plant Configuration	4x3.5 MW Engines (Phase-I) 4x3.75 MW Engines (Phase-II)
Fuel (Primary/Alternative)	Indigenous Natural Gas
Plant as on 30th June, 2010	
Net/Dependable Capacity	13.441/13.597
Heat Rate (Gross/Net)	
Efficiency (Gross/Net)	32.7/42
Plant during 2009-10	
Units Generated (GWh)	148
Average Cost of Generation (Rs./kWh)	5.42
Plant Load Factor (%)	
Plant Utilization Factor (%)	63.7
Plant Availability Factor (%)	63.1
Running Hours	-
Shutdown Hours	-
Standby Hours	-
No. and Hours of Planned Outages	-
No. and Hours of Forced Outages	-
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	18-Dec-94
Issuance of Letter of Support (LoS)	4-May-95
Date of Financial Closing	July 2, 1996 (Phase-I)
Required Commercial Operation Date (COD)	6-Jun-01
COD Achieved	6-Jan-01
Implementation Agreement (IA)	19-Jul-95
Power Purchase Agreement (PPA)	18-Sep-95
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	11-Apr-95
Generation Licence No. and issued on	No.IGPL/021/2004 issued on 22-9-2004
Term of Generation Licence	17 Years

Source: GM (WPPO), WAPDA

Company	Fauji Kabirwala Power Company Limited
Salient Features	
SECP Incorporation No. and Date	No.I-01486 Date 28-07-1994
Plant Location	Kabirwala, District Khanewal
Registered Address	Fauji Kabirwala Power Co. Limited, 14 Harley Street, Rawalpindi Cantt
Contact Nos. and Email	fkpcl567@comsats.net.pk
Installed Generation Capacity (Gross)	157 MW (Gross)
Technology	Combined Cycle + Steam Turbines
Plant Configuration	2 Gas Turbines of 48.4 MW each and a Steam Turbine of capacity 59.4 MW
Fuel (Primary/Alternative)	Gas
Designed Heat Rate (Gross/Net)	8202.9/2390
Designed Efficiency (Gross/Net)	41.6/46.17
Plant as on 30th June, 2010	
Net/Dependable Capacity	151.2
Heat Rate (Gross/Net)	8345.4/7518.4
Efficiency (Gross/Net)	40.88/45.38
Plant during 2009-10	
Units Generated (GWh)	1155/1123
Average Cost of Generation (Rs./kWh)	5.67
Plant Load Factor (%)	93.33
Plant Utilization Factor (%)	84.8
Plant Availability Factor (%)	86.1
Running Hours	8340
Shutdown Hours	417
Standby Hours	3
No. and Hours of Planned Outages	283
No. and Hours of Forced Outages	134
No. of Start-up (Hot/Warm/Cold)	07(H) 05(W) 04(C)
Important Milestones	
Issuance of Letter of Interest (LoI)	19-May-94
Issuance of Letter of Support (LoS)	30-Jun-94
Date of Financial Closing	2-Jun-96
Required Commercial Operation Date (COD)	-
COD Achieved	21-Oct-99
Implementation Agreement (IA)	24-Sep-94
Power Purchase Agreement (PPA)	12-Jan-95
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	-
Generation Licence No. and issued on	26-08-2003
Term of Generation Licence	26 Years

Source: GM (WPPO), WAPDA

Company	Habibullah Costal Power Company Limited			
Salient Features				
SECP Incorporation No. and Date	No.O-00175 Date 17-12-1995			
Plant Location	Quetta			
Registered Address	Habibullah Coastal Power (Pvt.) Company, 1st Floor, Nacon House, 270 Moulana Din Mohammad Wafai Road, Karachi-74200			
Contact Nos. and Email	hel@cyber.net.pk			
Installed Generation Capacity (Gross)	140 MW (Gross)			
Technology	Combined Cycle			
Plant Configuration	3 Gas Turbines + 1 Steam Turbines			
Fuel (Primary/Alternative)	Natural Gas/Diesel			
Designed Heat Rate (Gross/Net)	7982.15			
Designed Efficiency (Gross/Net)	42.76			
Plant as on 30th June, 2010				
Net/Dependable Capacity	129.15			
Heat Rate (Gross/Net)	7982.15			
Efficiency (Gross/Net)	42.76			
Plant during 2009-10				
Units Generated (GWh)	950			
Average Cost of Generation (Rs./kWh)	4.43			
Plant Load Factor (%)	96.9			
Plant Utilization Factor (%)	84.0			
Plant Availability Factor (%)	86.7			
	GT1	**GT2**	**GT3**	**GT4**
Running Hours	8404	8319	7942	8474
Shutdown Hours	357	442	819	287
Standby Hours	nil			
No. and Hours of Planned Outages	285	295	571	168
No. and Hours of Forced Outages	72	247	248	119
No. of Start-up (Hot/Warm/Cold)	28	32	51	29
Important Milestones				
Issuance of Letter of Interest (LoI)	14-Jun-94			
Issuance of Letter of Support (LoS)	31-Jul-94			
Date of Financial Closing	4-Apr-96			
Required Commercial Operation Date (COD)	1-Mar-98			
COD Achieved	11-Sep-99			
Implementation Agreement (IA)	20-Mar-96			
Power Purchase Agreement (PPA)	25-Mar-96			
Term of PPA	30 Years			
Fuel Supply Agreement (FSA)	28-Feb-96			
Generation Licence No. and issued on	No.IGSPL/012/2003 issued on 26-08-2003			
Term of Generation Licence	13 Years			

Source: GM (WPPO), WAPDA

Company	Japan Power Generation Limited
Salient Features	
SECP Incorporation No. and Date	No.L-07388 Date 29-09-1994
Plant Location	Off Raiwind Road, Near Jia Bagga
Registered Address	Japan Power Generation Limited, Jia Bagga, Raiwind Road, Lahore.
Contact Nos. and Email	jpgl@brain.net.pk
Installed Generation Capacity (Gross)	120 MW (Gross)
Technology	Diesel Engines
Plant Configuration	24 Oil Fired Units
Fuel (Primary/Alternative)	HFO/Diesel
Plant as on 30th June, 2010	
Net/Dependable Capacity	65
Heat Rate (Gross/Net)	2047
Efficiency (Gross/Net)	42
Plant during 2009-10	
Units Generated (GWh)	198
Average Cost of Generation (Rs./kWh)	12.37
Plant Load Factor (%)	-
Plant Utilization Factor (%)	25.5
Plant Availability Factor (%)	25.7
Running Hours	2243
Shutdown Hours	6517
Standby Hours	-
No. and Hours of Planned Outages	545
No. and Hours of Forced Outages	5972
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	29-Jun-94
Issuance of Letter of Support (LoS)	27-Jul-94
Date of Financial Closing	24-Jan-96
Required Commercial Operation Date (COD)	14-Mar-00
COD Achieved	14-Mar-00
Implementation Agreement (IA)	30-May-95
Power Purchase Agreement (PPA)	21-Mar-95
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	2-Feb-95
Generation Licence No. and issued on	No.IGPL/019/2004 issued on 11-05-2004
Term of Generation Licence	16 Years

Source: GM (WPPO), WAPDA

Company	Kohinoor Energy Limited
Salient Features	
SECP Incorporation No. and Date	No.L-07064 Date 26-04-1994
Plant Location	Raiwind-Manga Road, Near Lahore
Registered Address	Kohinoor Energy Limited, 17 Aziz Avenue, Unit No. 4, Canal Bank, Gulberg, Lahore
Contact Nos. and Email	info@kel.com.pk
Installed Generation Capacity (Gross)	131 MW (Gross)
Technology	Diesel Engines
Plant Configuration	8 Diesel Generator Sets each of 15.68 MW and a Steam Turbine Generating Set of 6.0 MW at alternator Terminal
Fuel (Primary/Alternative)	RFO
Plant as on 30th June, 2010	
Net/Dependable Capacity	124
Heat Rate (Gross/Net)	7989
Efficiency (Gross/Net)	42.7
Plant during 2009-10	
Units Generated (GWh)	900
Average Cost of Generation (Rs./kWh)	10.59
Plant Load Factor (%)	-
Plant Utilization Factor (%)	82.8
Plant Availability Factor (%)	88.9
Running Hours	7791
Shutdown Hours	969
Standby Hours	-
No. and Hours of Planned Outages	370
No. and Hours of Forced Outages	153
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	19-May-94
Issuance of Letter of Support (LoS)	22-Jun-94
Date of Financial Closing	13-Jun-95
Required Commercial Operation Date (COD)	20-Jun-97
COD Achieved	20-Jun-97
Implementation Agreement (IA)	29-Sep-94
Power Purchase Agreement (PPA)	8-Nov-95
Term of PPA	22 Years
Fuel Supply Agreement (FSA)	22-Jan-95
Generation Licence No. and issued on	No.IGPL/016/2003 issued on 26-08-2003
Term of Generation Licence	16 Years

Source: GM (WPPO), WAPDA

Company	Liberty Power Limited
Salient Features	
SECP Incorporation No. and Date	No.I-01785 Date 20-01-2003
Plant Location	Daharki, District Ghotki, Sindh
Registered Address	Liberty Power Limited, 90 Razia Sharif Plaza, 4th Floor, Blue Area, Islamabad
Contact Nos. and Email	saidismail@liberty.com.pk
Installed Generation Capacity (Gross)	235 MW (Gross)
Technology	Combined Cycle
Plant Configuration	One Gas Turbine + One Steam Turbine + One Heat Recovery Steam Generator
Fuel (Primary/Alternative)	HSD
Designed Heat Rate (Gross/Net)	6982.8
Designed Efficiency (Gross/Net)	51.55
Plant as on 30th June, 2010	
Net/Dependable Capacity	213.055
Heat Rate (Gross/Net)	7627.06
Efficiency (Gross/Net)	44.75
Plant during 2009-10	
Units Generated (GWh)	1527
Average Cost of Generation (Rs./kWh)	8.43
Plant Load Factor (%)	86.3
Plant Utilization Factor (%)	100
Plant Availability Factor (%)	88.2
Running Hours	8176
Shutdown Hours	742
Standby Hours	-
No. and Hours of Planned Outages	473
No. and Hours of Forced Outages	363
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	6-Jul-95
Issuance of Letter of Support (LoS)	17-Jul-95
Date of Financial Closing	21-Jul-96
Required Commercial Operation Date (COD)	10-Sep-01
COD Achieved	10-Sep-01
Implementation Agreement (IA)	22-Nov-95
Power Purchase Agreement (PPA)	26-Nov-95
Term of PPA	25 Years
Fuel Supply Agreement (FSA)	1-Sep-00
Generation Licence No. and issued on	No.IPGL/08/2003 issued on 26-08-2003
Term of Generation Licence	23 Years

Source: GM (WPPO), WAPDA

Company	Rousch (Pakistan) Limited
Salient Features	
SECP Incorporation No. and Date	No.I-01491 Date 04-08-1994
Plant Location	Abdul Hakeem (Near Sidhnai Barrage), District Khanewal (about 85 KM North-East of Multan)
Registered Address	Rousch (Pakistan) Power Ltd. ,39-C/IV, Block-6, P.E.C.H.S., Karachi
Contact Nos. and Email	rousch@rouschpak.com
Installed Generation Capacity (Gross)	412 MW (Gross)
Technology	Combined Cycle
Plant Configuration	Two Gas Turbines + One Steam Turbine
Fuel (Primary/Alternative)	Natural Gas/HSD
Plant as on 30th June, 2010	
Net/Dependable Capacity	395
Heat Rate (Gross/Net)	6497
Efficiency (Gross/Net)	40.7
Plant during 2009-10	
Units Generated (GWh)	3256
Average Cost of Generation (Rs./kWh)	4.9
Plant Load Factor (%)	-
Plant Utilization Factor (%)	94.1
Plant Availability Factor (%)	94
Running Hours	8237
Shutdown Hours	523
Standby Hours	-
No. and Hours of Planned Outages	370
No. and Hours of Forced Outages	153
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	22-Jun-94
Issuance of Letter of Support (LoS)	8-Aug-94
Date of Financial Closing	7-Apr-96
Required Commercial Operation Date (COD)	11-Nov-99
COD Achieved	11-Dec-99
Implementation Agreement (IA)	15-Jun-95
Power Purchase Agreement (PPA)	25-Feb-96
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	23-Jul-95
Generation Licence No. and issued on	No.IGPL/015-2003 issued on 26-08-2003
Term of Generation Licence	26 Years

Source: GM (WPPO), WAPDA

Company	Saba Power Company
Salient Features	
SECP Incorporation No. and Date	No.I-01580 Date 07-12-1994
Plant Location	Farouqabad, Shiekhupura, Punjab
Registered Address	El Paso Technology Pakistan (Pvt.) Limited, 3rd Floor, GD Arcade, Fazal-ul-Haq Road, Islamabad
Contact Nos. and Email	Nasir.chishti@elpaso.com
Installed Generation Capacity (Gross)	114 MW (Gross)
Technology	Steam Turbines
Plant Configuration	One Furnace Oil Fired Unit
Fuel (Primary/Alternative)	RFO/Diesel
Plant as on 30th June, 2010	
Net/Dependable Capacity	125.55
Heat Rate (Gross/Net)	2200
Efficiency (Gross/Net)	39.1
Plant during 2009-10	
Units Generated (GWh)	628
Average Cost of Generation (Rs./kWh)	12.17
Plant Load Factor (%)	-
Plant Utilization Factor (%)	57
Plant Availability Factor (%)	63.6
Running Hours	5571
Shutdown Hours	3189
Standby Hours	-
No. and Hours of Planned Outages	581
No. and Hours of Forced Outages	2608
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	28-Jun-94
Issuance of Letter of Support (LoS)	18-Sep-94
Date of Financial Closing	3-Apr-96
Required Commercial Operation Date (COD)	31-12-1999
COD Achieved	10-Sep-01
Implementation Agreement (IA)	31-Mar-96
Power Purchase Agreement (PPA)	26-Dec-94
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	9-Apr-95
Generation Licence No. and issued on	No.IGPL/011/2003 issued on 26-08-2003
Term of Generation Licence	26 Years

Source: GM (WPPO), WAPDA

Company	Southern Electric Power Company
Salient Features	
SECP Incorporation No. and Date	No.I-01592 Date 20-12-1994
Plant Location	Raiwind, Lahore
Registered Address	Southern Electric Power Co. Limited, 90-West, 6th Floor, Razia Sharif Plaza, Islamabad
Contact Nos. and Email	info@sepcol.com
Installed Generation Capacity (Gross)	135 MW (Gross)
Technology	Diesel Engines
Plant Configuration	5 Units
Fuel (Primary/Alternative)	HFO
Plant as on 30th June, 2010	
Net/Dependable Capacity	19.458
Heat Rate (Gross/Net)	2028
Efficiency (Gross/Net)	42.4
Plant during 2009-10	
Units Generated (GWh)	393
Average Cost of Generation (Rs./kWh)	12.64
Plant Load Factor (%)	-
Plant Utilization Factor (%)	37.8
Plant Availability Factor (%)	39.5
Running Hours	3459
Shutdown Hours	5302
Standby Hours	-
No. and Hours of Planned Outages	278
No. and Hours of Forced Outages	5024
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	28-Jun-94
Issuance of Letter of Support (LoS)	3-Aug-94
Date of Financial Closing	25-Oct-95
Required Commercial Operation Date (COD)	10-Mar-99
COD Achieved	10-Mar-99
Implementation Agreement (IA)	23-Nov-94
Power Purchase Agreement (PPA)	17-Nov-94
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	30-Nov-94
Generation Licence No. and issued on	No.IGPL/08/2004 issued on 11-05-2004
Term of Generation Licence	15 Years

Source: GM (WPPO), WAPDA

Company	Uch Power Limited
Salient Features	
SECP Incorporation No. and Date	No.I-01470 Date 07-07-1994
Plant Location	Dera Murad Jamali, District Nasirabad, Balochistan
Registered Address	Uch Power Limited, House No. 48, Khayaban-e-Iqbal, Main Margalla Road, F-7/2, Islamabad
Contact Nos. and Email	info@uchpower.com
Installed Generation Capacity (Gross)	586 MW (Gross)
Technology	Combined Cycle
Plant Configuration	3 Gas Turbines + 1 Steam Turbine
Fuel (Primary/Alternative)	Natural Gas/HSD
Plant as on 30th June, 2010	
Net/Dependable Capacity	551.25
Heat Rate (Gross/Net)	8000
Efficiency (Gross/Net)	45
Plant during 2009-10	
Units Generated (GWh)	4119
Average Cost of Generation (Rs./kWh)	4.99
Plant Load Factor (%)	-
Plant Utilization Factor (%)	85.3
Plant Availability Factor (%)	86
Running Hours	7536
Shutdown Hours	1224
Standby Hours	-
No. and Hours of Planned Outages	569
No. and Hours of Forced Outages	655
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	19-May-94
Issuance of Letter of Support (LoS)	22-Jun-94
Date of Financial Closing	24-May-96
Required Commercial Operation Date (COD)	
COD Achieved	18-Oct-96
Implementation Agreement (IA)	24-Sep-94
Power Purchase Agreement (PPA)	23-Nov-95
Term of PPA	30 Years
Fuel Supply Agreement (FSA)	4-Aug-94
Generation Licence No. and issued on	No.IGPL/014/2003 issued on 26-08-2003
Term of Generation Licence	20 Years

Source: GM (WPPO), WAPDA

Company	Kot Addu Power Company Limited
Salient Features	
SECP Incorporation No. and Date	No.I-01977 Date 25-04-1996
Plant Location	Kot Addu District Muzaffargarh, Punjab
Registered Address	Kot Addu Power Complex, Kot Addu, District Muzaffargarh, Punjab
Contact Nos. and Email	info@kapco.com.pk
Installed Generation Capacity (Gross)	1638 MW (Gross)
Technology	Combined Cycle
Plant Configuration	10 multi fuel fired gas turbines and 5 steam turbines
Fuel (Primary/Alternative)	FO/HSD
Plant as on 30th June, 2010	
Net/Dependable Capacity	1345
Heat Rate (Gross/Net)	7400
Efficiency (Gross/Net)	44
Plant during 2009-10	
Units Generated (GWh)	7767
Average Cost of Generation (Rs./kWh)	12.63
Plant Load Factor (%)	-
Plant Utilization Factor (%)	66
Plant Availability Factor (%)	77
Running Hours	6752
Shutdown Hours	2008
Standby Hours	-
No. and Hours of Planned Outages	676
No. and Hours of Forced Outages	1332
No. of Start-up (Hot/Warm/Cold)	-
Important Milestones	
Issuance of Letter of Interest (LoI)	28-Jun-94
Issuance of Letter of Support (LoS)	3-Aug-94
Date of Financial Closing	25-Oct-95
Required Commercial Operation Date (COD)	-
COD Achieved	-
Implementation Agreement (IA)	23-Nov-94
Power Purchase Agreement (PPA)	17-Nov-94
Term of PPA	25 Years
Fuel Supply Agreement (FSA)	30-Nov-94
Generation Licence No. and issued on	No.IGPL/020/2004 issued on 22-09-2004
Term of Generation Licence	17 Years
Note: Initially KAPCO was a Public Sector Power Project; however, through its strategic sale by the Privatization Commission, it was converted into IPP through privatization.	
Source: GM (WPPO), WAPDA	

Company	Engro Energy Limited
Salient Features	
SECP Incorporation No. and Date	-
Plant Location	Qadirpur, District Ghotki, Sindh
Registered Address	7th Floor, the Harbor Front Building, HC# 3, Marine Drive, Block 4, Clifton, Karachi
Contact Nos. and Email	kmansoor@engro.com
Installed Generation Capacity (Gross)	227 MW (Gross)
Technology	Combined Cycle
Plant Configuration	1GT x 1HRSG x 1ST with Supplementary firing
Fuel (Primary/Alternative)	-
Designed Heat Rate (Gross/Net)	7660/7907
Designed Efficiency (Gross/Net)	47/45.53
Plant as on 30th June, 2010	
Net/Dependable Capacity	216.8
Heat Rate (Gross/Net)	7660/7907
Efficiency (Gross/Net)	47/45.53
Plant during 2009-10	
Units Generated (GWh)	540
Average Cost of Generation (Rs./kWh)	-
Plant Load Factor (%)	85.26
Plant Utilization Factor (%)	96.53
Plant Availability Factor (%)	85.74
Running Hours	2596
Shutdown Hours	452
Standby Hours	17
No. and Hours of Planned Outages	126
No. and Hours of Forced Outages	308
No. of Start-up (Hot/Warm/Cold)	12
Important Milestones	
Issuance of Letter of Interest (LoI)	6/1/2006
Issuance of Letter of Support (LoS)	10/8/2007
Date of Financial Closing	30-04-2008
Required Commercial Operation Date (COD)	30-Jun-10
COD Achieved	27-Mar-10
Implementation Agreement (IA)	29-10-2007
Power Purchase Agreement (PPA)	26-10-2007
Term of PPA	25 Years
Fuel Supply Agreement (FSA)	22-04-2008
Generation Licence No. and issued on	-
Term of Generation Licence	-

Source: GM (WPPO), WAPDA

Company	Jamshoro Power Company Limited						
Thermal Power Station, Jamshoro							
	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**			
Designed Heat Rate (Gross/Net)	9063	10253	10253	10253			
Designed Efficiency (Gross/Net)	36.63%	33.89%	33.89%	33.89%			
Plant as on 30th June, 2010							
Net/Dependable Capacity	shut down	156	156	156			
Heat Rate (Gross/Net)	nil	12006/13182 Btu/kWh	11248/12270 Btu/kWh	14883/ 15708 Btu/kWh (unit was under startup process so, the heat rate is increased)			
Efficiency (Gross/Net)	nil	28.43%/ 25.89%	30.34%/ 27.82%	22.93%/ 21.73%			
Plant during 2009-10							
Units Generated	955.165 MkWh	1118.280 MkWh	1025.604 MkWh	1182.256 MkWh			
Average Cost of Generation	Rs.8.26 per kWh						
Plant Load Factor	54.52%	70.92%	65.04%	77.12%			
Plant Utilization Factor	49.56%	75.09%	68.87%	79.39%			
Plant Availability Factor	73.42%	88.25%	84.64%	90.54%			
Running Hours	6431	7731	7414	7931			
Shutdown Hours	2329	1029	1346	829			
Standby Hours	nil						
No. and Hours of Planned Outages	3 Nos. 1941 hrs	2 Nos. 248 hrs	2 Nos. 771 hrs	1 No. 141 hrs			
No. and Hours of Forced Outages	7 Nos. 388 hrs	17 Nos. 781 hrs	13 Nos. 575 hrs	12 Nos. 688 hrs			
No. of Start-up (Hot/Warm/Cold)	H=3, W=2, C=5	H=8, W=1, C=10	H=7, W=3, C=5	H=6, W=2, C=5			
Gas Turbine Power Station, Kotri							
	GT-1	**GT-2**	**GT-3**	**GT-4**	**GT-5**	**GT-6**	**GT-7**
Designed Heat Rate (Gross/Net)	1392.5	1392.5	12250	12250	12293.6	12293.6	combined cycle
Designed Efficiency (Gross/Net)	24.40%	24.40%	27.85%	27.85%	27.75%	27.75%	
Plant as on 30th June, 2010							
Net/Dependable Capacity	10	10	21	21	21	21	40
Heat Rate (Gross)	23082.1	23082.1	16400.7	16400.7	16400.7	16400.7	combined cycle
Heat Rate (Net)	23082.1	23082.1	16412.9	16410.6	16534.5	16538.7	
Efficiency (Gross)	14.78%	14.78%	20.80%	20.80%	20.80%	20.80%	
Efficiency (Net)	14.78%	14.78%	20.79%	20.79%	20.64%	20.63%	
Plant during 2009-10							
Units Generated	14.083	12.951	135.22	110.876	140.286	84.275	184.958
Average Cost of Generation	Rs.4.96 (overall cost as per E-Form)						
Plant Load Factor	16.10%	14.78%	70.20%	57.50%	69.60%	50.60%	55.60%
Plant Utilization Factor	16.10%	14.78%	73.50%	60.30%	76.30%	45.80%	52.80%
Plant Availability Factor	99.20%	99.30%	94.30%	81.20%	98.70%	96.30%	90.50%
Running Hours	1966	1905	7257	6119	7321	5193	7892
Shutdown Hours	71	59	502	1651	116	320	836
Standby Hours	6723	6794	1001	90	1323	3246	32
No. and Hours of Planned Outages	0	0	1 No. 486 hrs	5 Nos. 1644 hrs	0	2 Nos. 238 hrs	3 Nos. 580 hrs
No. and Hours of Forced Outages	12 Nos. 71 hrs	19 Nos. 59 hrs	5 Nos. 16 hrs	4 Nos. 7 hrs	13 Nos. 116 hrs	9 Nos. 83 hrs	24 Nos. 337 hrs
No. of Start-up (Hot/Warm/Cold)	56	49	15	22	43	46	25

Source: GENCO-I

Company	Central Power Generation Company Limited			
Salient Features				
	Units 1&2	**Units 3&4**	**Units 5-10**	**Units 11-13**
	Block IV	**Block III**	**Block II**	**Block I**
Designed Heat Rate (Gross/Net)	9099	8942	10770	10607
Designed Efficiency (Gross/Net)	37.5	38.5	31.7 on S.C	32 on S.C
Plant as on 30th June, 2010				
Net/Dependable Capacity (MW)	100	260	300	245
Heat Rate (Gross/Net) Btu/kWh	13955	12907	10855	9770
Efficiency (Gross/Net) (%)	25	26	on S.C 25% on C.C 30%	on S.C 27% on C.C 33%
Plant during 2009-10				
Units Generated (kWh)	7,212,119,440			
Average Cost of Generation (Paisa/kWh)	418			
Plant Load Factor (%)	79			
Plant Utilization Factor (%)	63			
Plant Availability Factor (%)	77			
Running Hours	6758			
Shutdown Hours	-			
Standby Hours	79			
No. and Hours of Planned Outages	31 / 1465			
No. and Hours of Forced Outages	275 / 458			
No. of Start-up (Hot/Warm/Cold)	238 / 33			
Source: GENCO-II				

Company	Northern Power Generation Company Limited									
Salient Features										
	TPS Muzaffargarh					**NGPS Multan**		**Faisalabad**		**GTPS Shahdara Lahore**
	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Units5&6**	**Unit 1**	**Unit 3**	**GTPS**	**SPS**	
Designed Heat Rate (Gross/Net) Btu/kWh	9279.962	9279.962	9279.962	8462	10790	10342	10342	13700	10845	14292
Designed Efficiency (Gross/Net) (%)	36.77	36.77	36.77	40.3	31.65	33	33	27.5	32.082	24
Plant as on 30th June, 2010										
Net/Dependable Capacity (MW)	185	200	160	220	300 (2 units)	35	25	210 (9 units)	70 (2 units)	Plant was standby due to non-availability of gas
Heat Rate (Gross) (%)	10976.12	10766.72	11099.67	11737.28	12332.39	15440.35	17570.91	12132	12965.19	
Heat Rate (Net) (%)	12093.06	11548.08	12121.31	10297.53	14316.6	18531.56	21088.66		14444.84	
Efficiency (Gross) (%)	31.09	31.7	30.75	29.08	27.65	22.1	19.45	28.13	26.32	
Efficiency (Net) (%)	28.22	29.55	28.16	33.14	23.84	18.42	16.18		23.83	
Plant during 2009-10										
Units Generated MkWh	1065.75	1341.515	834.23	1887.053	927.03	97.56	96.32	478.35	453.56	
Average Cost of Generation (Rs./kWh)	11.12	11.12	11.12	10.51	13.08	18.32	18.31	9.24	13.43	
Plant Load Factor (%)	67.59	76.57	47.62	86.16	48.1	34.05	34.05	27.58	69.03	
Plant Utilization Factor (%)	60.83	76.57	47.62	87.92	26.45	11.35	11.35	27.26	53.93	
Plant Availability Factor (%)	90.28	87.5	87.59	97.26	60.5	14.76	14.76	95.21	86.35	
Running Hours	7667.08	7665.19	7504.53	8520.98	10596	4167	5198	22545.31	77.21	
Shutdown Hours	852.05	1095.81	1088.11	240.02	5498	3443	2628	3777.81	10.29	
Standby Hours	241.87	0	168.36	0	0	184	232	52516.87	9.96	
Hours of Planned Outages	0	685.26	193.33	0	1428	966	701	2768.97	902	
No. of Planned Outages	0	2	1	0				4		
Hours of Forced Outages	852.05	410.55	894.78	240.02	5498	3443	2628	1008.85	818	
No. of Forced Outages	18	14	18	0				96		
No. of Start-up (Hot)	5	6	2	16	46	35	51	519	32	
No. of Start-up (Cold)	14	8	18	0	14	7	5		20	
Source: GENCO-III										

Company	**Lakhra Power Generation Company Limited**
Salient Features	
Designed Heat Rate (Gross/Net)	11,209.60 Btu/KWh (Gross) 15,116.00 Btu/kWh (Net)
Designed Efficiency (Gross/Net)	30.44%
Plant as on 30th June, 2010	
Net/Dependable Capacity	31.200 MW
Heat Rate (Gross/Net)	14,570.98 (Gross) 19,778.59 (Net)
Efficiency (Gross/Net)	23.42 (Gross) 17.26 (Net)
Plant during 2009-10	
Units Generated	116,379,000 (kWh)
Average Cost of Generation	Rs.8.25/kWh
Plant Load Factor	34.96%
Plant Utilization Factor	33.21%
Plant Availability Factor	38.62%
Running Hours	3,383.18 hrs
Shutdown Hours	5,376.82 hrs
Standby Hours	nil
No. and Hours of Planned Outages	nil
No. and Hours of Forced Outages	5,376.82 hrs
No. of Start-up (Hot/Warm/Cold)	17 (Cold)
Source: GENCO-IV	

Company	WAPDA Hydro Electric Power Company									
Hydel Power Station	Units Generated (GWh)	Average Cost of Generation (Rs.)	Plant Load Factor (%)	Plant Utilization Factor (%)	Plant Availability Factor (%)	Running Hours	Shutdown Hours	Standby Hours	No. and Hours of Planned Outages	No. and Hours of Forced Outages
Tarbela	13,904.54	0.73	43.58	45.63	88.63	87,324.00	14,013.00	21,315.00	11,383.00	2,625.00
Ghazi Barotha	6,795.96	1.80	53.50	53.50	94.07	5,223.11	n.a.	3,017.38	462.11	57.40
Mangla	4,772.40	0.68	47.37	54.47	86.74	5,988.04	1,161.98	1,610.98	600.27	561.71
Warsak	1,063.26	0.48	56.98	70.16	81.00	5,568.38	3,191.62	1,549.85	1,631.38	10.38
Chashma	1,058.08	2.53	65.64	74.34	92.65	62,314.75	5,155.22	2,618.00	4,626.73	5,283.48
Rasul	90.57	0.66	60.82	46.99	99.27	13,807.25	2,111.96	1,602.78	1,744.83	367.13
Dargai	110.71	0.71	68.31	63.19	73.67	25,813.77	9,222.23	6,614.20	2,494.60	113.27
Nandipur	39.16	1.12	51.98	32.39	53.83	11,801.43	9,506.55	4,974.05	745.58	8,760.97
Shadiwal	38.96	0.82	52.93	32.94	94.19	11,702.00	937.00	4,881.00	920.00	17.00
Chichoki	29.61	1.04	42.25	25.61	77.94	9,089.00	5,795.25	11,395.75	3,078.75	2,716.50
K/Garhi	16.16	1.21	46.11	46.11	97.00	6,241.68	2,518.32	2,231.68	286.63	-
Renala	3.45	4.06	51.15	35.80	76.04	27,524.45	7,515.55	1,916.93	1,763.67	5,751.88
Chitral	4.45	5.62	48.98	52.58	98.00	6,890.37	1,869.63	1,690.02	179.60	-

Source: GM (Hydel), WAPDA

List of Tables

Acronyms and Abbreviations

ADB	Asian Development Bank
AEDB	Alternative Energy Development Board
AJKHEB	Azad Jammu Kashmir Hydel Electricity Board
BPC	Bulk Power Consumer
BQCCPP	Bin Qasim Combined Cycle Power Plant
BQTPS	Bin Qasim Thermal Power Station
CAIDI	Customers Average Interruption Duration Index
CCPP	Combined Cycle Power Plant
CHASNUPP	Chashma Nuclear Power Plant
Ckt	Circuit
COD	Commercial Operation Date
CPGCL	Central Power Generation Company Limited
CPI	Consumer Price Index
CPP	Captive Power Plant
CPPA	Central Power Purchasing Agency
DEs	Diesel Engines
DISCO	Distribution Company
DOP	Development of Power
ECC	Economic Coordination Committee
ECNEC	Executive Committee of the National Economic Council
EHV	Extra High Voltage
ELR	Energy Loss Reduction
EMD	Electricity Marketing Data
FBC	Fluidized Bed Combustion
FDI	Foreign Direct Investment
FEC	Foreign Exchange Certificate
FESCO	Faisalabad Electric Supply Company Limited
FO	Furnace Oil
FY	Financial Year or Fiscal Year
GENCO	Generation Company
GEPCO	Gujranwala Electric Power Company Limited
GEs	Gas Engines
GoP	Government of Pakistan
GST	General Sales Tax
GTPS	Gas Thermal Power Station
GWh	Giga Watt – hour
HESCO	Hyderabad Electric Supply Company Limited
HFO	Heavy Furnace Oil
HPP	Hydropower Project
HSD	High Speed Diesel
IA	Implementation Agreement
ICB	International Competitive Bidding
IESCO	Islamabad Electric Supply Company Limited

IMF	International Monetary Fund
IPP	Independent Power Producers
IRR	Internal Rate of Return
ISO	International Standards Organization
JPCL	Jamshoro Power Company Limited
KANUPP	Karachi Nuclear Power Plant
KCCPP	Korangi Combined Cycle Power Plant
KESC	Karachi Electric Supply Company Limited
km	Kilometer
KTGTPS	Korangi Town Gas Turbine Power Station
KTPS	Korangi Thermal Power Station
kV	Kilo Volt
KVA	Kilovolt Ampere
kWh	Kilowatt – hours
LDO	Light Diesel Oil
LESCO	Lahore Electric Supply Company Limited
LPGCL	Lakhra Power Generation Company Limited
Ltr.	Litre
MEPCO	Multan Electric Power Company Limited
MMBTU	Million British Thermal Unit
MMCFT	Million Cubic Feet
MMF	Multitranche Financing Facility
MPKR	Million Pak Rupees
MTOE	Million Tonnes of Oil Equivalent
MVA	Megavolt Ampere
MW	Megawatt
MWh	Megawatt – hour
MYT	Multi-year Tariff
n.a.	Not available
NEPRA	National Electric Power Regulatory Authority
NGC	National Grid Company
NGPS	Natural Gas Power Station
NPCC	National Power Control Centre
NPGCL	Northern Power Generation Company Limited
NTDC	National Transmission and Despatch Company Limited
O&M	Operation and Maintenance
OCPP	Open Cycle Power Plant
PAEC	Pakistan Atomic Energy Commission
PASMIC	Pakistan Steel Mills Corporation
PC	Privatisation Commission
PEPCO	Pakistan Electric Power Company Limited
PESCO	Peshawar Electric Supply Company Limited
PLF	Plant Load Factor
PNRA	Pakistan Nuclear Regulatory Authority
PPA	Power Purchase Agreement

PPIB	Private Power and Infrastructure Board
PSDP	Public Sector Development Project
PSI	Pakistan Standards Institute
QESCO	Quetta Electric Supply Company Limited
RFO	Residue Furnace Oil
RPP	Rental Power Plants
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCARP	Salinity Control and Reclamation Project
SECP	Security Exchange Commission of Pakistan
SGTPS	Site Gas Turbine Power Station
SHYDO	Sarhad Hydel Development Organization
SPP	Small Power Producer
SPS	Steam Power Station
STG	Secondary Transmission and Grid
STs	Steam Turbines
SVC	Static Var Compensators
T&D	Transmission and Distribution
TESCO	Tribal Area Electricity Supply Company Limited
ToD	Time of Day
ToU	Time of Use
TPS	Thermal Power Station
UNDP	United Nations Development Program
WAPDA	Water and Power Development Authority
WB	World Bank
WPPO	WAPDA Power Privatisation Organization

Source of Information

The following sources of information have been used in the compilation of this State of Industry Report 2010:

i) Alternative Energy Development Board (AEDB)
ii) Economic Survey of Pakistan 2008-09
iii) Ex-WAPDA Distribution Companies
iv) Irrigation and Power Departments of Provincial Governments
v) Karachi Electric Supply Company Limited (KESC)
vi) National Power Control Centre (NPCC)
vii) National Transmission and Despatch Company (NTDC)
viii) Pakistan Energy Yearbook, Hydrocarbon Development Institute of Pakistan
ix) Private Power and Infrastructure Board (PPIB)
x) Electricity Marketing Data (EMD-Power System Statistics), WAPDA
xi) Sarhad Hydel Development Organization (SHYDO)
xii) Tariff Petitions submitted to NEPRA by Ex-WAPDA Distribution Companies
xiii) Water and Power Development Authority (WAPDA)
xiv) World Development Indicators, the World Bank, and
xv) Others

National Electric Power Regulatory Authority
2nd Floor, OPF Building, Shahra-e-Jamhuriat
G-5/2, Islamabad. Ph: 051-9207200, Fax: 051-9210215
Email: info@nepra.org.pk
Website: www.nepra.org.pk