PAPER NO. 451

ADDITION TO GUDDU THERMAL POWER STATION

BY

ENGR. M. HUSSAIN ALI

Ex- Chief Engineer, Thermal Power Project

GUDDU THERMAL POWER STATION EXTENSION FOR UNIT NO.4

BY (*)

M. Husain Ali

1.0 POWER DEMAND

1.1 The demand of electricity is directly proportional to the industrialisation and standard of living of the people in any country. In the developing countries therefore demand of electricity increases with high percentage every year. If the electricity generation, transmission and its distribution capacity is not increased proportionately the entire development of the country will be adversely affected. A load survey for future demand of electricity is, therefore, a basic necessity in every country specially so in the developing countries.

1.2 The top planners in Pakistan as it is everywhere else, are endeavouring to increase the rate of gorwth of per capita income of the people to increase the general standard of living. This is adversely affected by the growth of population. The higher standard of living increases per capita consumption of electricity. An idea of relationship between the growth of population and the sale of energy worked out from 1980-81 to 1984-85 may be had from Table No.1 below :

(*) Ex-Chief Engineer, Thermal Power Project, Guddu.

1.3 TABLE NO.1

POPULATION VERSUS POWER CONSUMPTION

Year	Population Million	Per Capita Income (Rs.)	Sale of Engergy (GWH)	Per Capita Consumption (KHW)	
					Actual
1980-81	78.82	725	8793	112	134
1981-82	81.18	751	9725	120	
1982-83	83.62	777	10755	129	
1983-84	86.13	804	11888	138	
1984-85	88.71	832	13136	148	

1.4 The pupulation projections have been taken at the rate of 3% compounded annually and the estimated rate of increase in per capita sale of energy is approximately 7% against 3.5% per year growth in per capita income.

1.5 This per capita consumption of electricity for some other countries is stated in Table No.2. The figures are available for 1976. Rate is still higher during 1981. Comparison will show that per capita consumption of electricity in Pakistan is one of the lowest in the world. This proves the importance of electrical development in Pakistan.

1.6 TABLE NO.2

PER CAPITA CONSUMPTION (KWh) OF DIFFERENT COUNTRIES

	1976	1981
India	110	(*)
Indonesia	23	(*)
Iran	348	(*)
Japan	4014	(*)

TABLE NO.2

	1976	1981	
Malaysia			
i) Sabah	234	(*)	
ii) Sarwak	149	(*)	
Mangolia	522	(*)	
Nepal	8	(*)	
Philippines	307	(*)	
Republic of Korea	547	(*)	
Samoa	116	(*)	
Singapore	1772	(*)	
Thailand	214	(*)	(*) indicates figures not available.
Soloman Islands	66	(*)	
Newzealand	5996	(*)	
Hongkong	1635	(*)	
Australia	4337	(*)	
Pakistan	94	134	

2.0 POWER DEMAND SURVEY

2.1 WAPDA also has a power market survey division functioning under the the Planning Department of the Power Wing. It carries out detailed and comprehensive load surveys of areas served by WAPDA. Load forecast is done on Micro Economic frame work basis through field surveys. The future loads of all types of communities are projected on the basis of present pattern of power consumption, taking into consideration industrial and agricultural development programmes. The electricity demand of districts in each Division and then of all the Divisions located in the entire System are worked out after accounting for transmission and distribution losses and applying appropriate diversity factors at different stages.

2.2 The Power requirement of the development programmes are determined on the basis of the information collected for the sanctioned industrial projects as well as for the expansion plans of the existing industrial units, the salinity control

and reclamation schemes, village electrification programme and targets fixed for the installation of private and public tubewells. The required information is collected by the Power Market Survey personnel by actual visit to sites and by contacting the sponsoring agencies of these projects and management of the industrial units.

2.3 The SCARP Division of WAPDA supplies information concerning public tubewells. The Planning and Development Departments of the four Provinces provide information regarding their development programme in various sectors of the Economy.

2.4 The result of latest survey carried out by Wapda has been given upto year 1999-2000 in Table No. 3 below :

TABLE NO. 3

DEMAND FORECAST

Year (July-June)	SEPTEMBER 1982 PEAK POWER DEMAND (MW)			
	WAPDA	KESC	total	
			Undiversified a/	Diversified b/
1982-83	3118			
1983-84	3536			

(continued)

TABLE No. 3 (continued)

Year (July-June)	SEPTEMBER 1982 PEAK POWER DEMAND (MW)			
	WAPDA	KESC	TOTAL	
			Undiversified a/	Diversified b/
1984-85	4011			
1985-86	4550	857 c/	5407	5320
1986-87	5118	934	6052	5954
1987-88	5707	1018	6725	6617
1988-89	6365	1107	7472	7352
1989-90	7129	1203	8332	8198
1990-91	7985	1304	9289	9139
1991-92	8903	1411	10314	10148
1992-93	9900	1520	11420	11240
1993-94	10940	1642	12582	12380
1995-96	13177	1898	15075	14832
1996-97	14363	2034	16397	16134
1997-98	15584	2177	17761	17475
1998-99	16831	2330	19161	18851
1999-2000	18092	2492	20584	20253

a/ Sum total of the individual maximum demands.

b/ Combined system considering that the two peaks do not occur at the same time.

c/ Integration with KESC on 500 KV extra high voltage line effective 1985

2.5 According to the programme power system of Wapda and Karachi Electric Supply Corporation (KESC) would be inter-connected on EHV in 1984-85. The demand of KESC has,therefore, been included from 1984 onwards.

3.0 CAPABILITY LAGGING BEHIND DEMAND

3.1 In industrial countries and even in some of the developing countries, where heavy industry has been developed to the extent that they are capable of manufacturing their own generating plants, the electricity generating capability is kept in line with the increasing demand with some percentage of reserve available all the time. In Pakistan we are handi-capped in this respect. So far we have to depend on the supply of equipment of generating plants and its spares from other countries. It takes a long delivery time as well as drains our foreign exchange resources. Since we look for aid from country to country we cannot standardize the type and make of the Plant in a Power Station, which adversely affects the maintenance efficiency. Due to this reason electricity generating capability in Pakistan is lagging behind the demand causing heavy load shedding. For example during the year 1979-80 heavy load shedding was carried out due to lack of adequate generating capability on the System, outages of the Machines extremely poor voltage conditions. The extent of load shedding during the period on the Wapda System is given in Table No. 4 below :

3.2

TABLE NO.4

EXTENT OF LOAD SHEDDING IN WAPDA SYSTEM

Month	Max. Load Shedding (MW)	Min. Load Shedding (MW)
July 1979	76.60	42.70
August	65.00	7.00
September	130.24	21.00

(continued)

TABLE NO.4

(continued)

Month	Max. Load Shedding	Min. Load Shedding
October 1979	79.30	30.30
November	44.70	3.80
December	287.10	4.05
January 1980	404.50	9.7
February	490.10	73.8
March	238.90	17.7
April	272.00	5.5
May	474.00	2.0
June	138.5	32.4

3.3 In the winter of 1981 and beginning of 1982 more extensive load shedding had to be carried out. This is expected to be in the extent of 557 MW in May 1983. The position of generating capability against estimated Peak demand has been shown in Tables for each month of the year from 1981-82 to 1999-2000 (Tables 7 to 24). The shortfall is expected to rise to 1103 MW in May 1985 after allowing the Spinning reserve of 200 MW being the size of largest Unit in the system at that time. From the tables referred to it will be seen that the capability of the Hydro-Electric Stations falls down in lower water months although this is staggered due to big storages in Mangla and Tarbela. Nevertheless, the electricity shortage during low water months indicates the necessity of installing additional thermal capacity in order to make for the reduced capability of Hydel Stations.

4.0 POWER GENERATION PROGRAMME

4.1 For installing Thermal or Gas Power Stations we need Coal and Gas resources. There is shortage of coal and the Gas reserves are also limited. Whereas Hydel resources are still available. Wapda has, therefore, framed a power generation

programme given in Table No.5 below :

TABLE No. 5

GENERATION PROGRAMME

S.No.	Name of Power Station	Installed Capacity (MW)	Date of commissioning b/	
01	Tarbela Unit 5	175	October	1982
02	Tarbela Unit 6	175	November	1982
03	Tarbela Unit 7	175	January	1983
04	Tarbela Unit 8	175	February	1983
05	Second Quetta Gas Turbine	25	June	1983
06	Pipri D-1 Steam (KESC)	200	Sept.	1983
07	Pipri D-2 Steam (KESC)	200	Sept.	1984
08	Tarbela Unit 9	175	December	1984
09	300 MW Gas Turbines	300	January	1985
10	Tarbela Unit 10	175	June	1985
11	Guddu Unit 4	210	August	1985
12	Pipri D-3 andD-4 Steam (KESC)	400	Sept.	1986
13	Mangla Units 9 & 10	200	December	1986
14	Combined cycle steam units to be added with 300 MW GT.	150	February	1987
15	Jamshoro Thermal	1000	February	1987
16	Pipri D-5 Steam (KESC)	200	Sept.	1987
17	Mid Country Thermal	600	December	1987
18	Tarbela Unit 11	406	May	1988
19	Tarbela Unit 12	406	Sept.	1988
20	Additional Thermal I	500	January	1989
21	Tarbela Unit 13	406	May	1989
22	Tarbela Unit 14	406	Sept.	1989
23	Lakhra Steam STage-I	600	February	1990
24	Additional Thermal-II	400	April	1990
25	Chashma Nuclear Unit-1	900	February	1991
26	Kohala Hydel	600	March	1991
27	Lakhra Steam Stage-II	600	October	1991
28	Thatta SteamS 'age-I	1000	July	1992
29	Duki Coal	100	February	1993
30	Tarbela Unit 15	406	April	1993
31	Tarbela Unit 16	406	August	1993
32	Kalabagh Stage-I	880	Sept.	1993
33	Tarbela Unit 17	406	April	1994
34	Abasian Hydel	600	Sept.	1994
35	Chashma Nuclear Unit 2	900	October	1994

(continued)

TABLE NO. 5 (continued)

Sr.No.	Name of Power Station	Installed Capacity (MW)	Date of Commissioning b/
36	Kalabagh Stage-II	880	Sept. 1995
37	Thatta Steam Stage-II	500	October 1995
38	Nuclear South Unit-1	900	August 1996
39	Additional Hydel-I (From Hydel Ranking)	800	October 1996
40	Additional Hydel-II (From Hydel Ranking)	1500	October 1997
41	Thatta Steam Stage-III	500	December 1997
42	Nuclear South Unit-2	900	October 1998
43	Additional Hydel-III (From Hydel Banking)	1400	December 1998
44	Additional Hydel-IV (From Hydel Ranking)	1600	December 1999
45	Thatta Steam Stage-IV	500	January 2000

a/ Updated September 1982

b/ Tentative

The above programme is to match the latest September 1982) combined energy requirements of agricultural, industrial and urban sectors including village electrification. The programme, is of course, tentative and would need periodic updating based on further power market surveys and load forecasts.

5.0 SUITABILITY OF GUDDU SITE FOR EXTENSION

5.1 Guddu site existing on the right bank of River Indus near Guddu Barrage was selected in 1967 for establishing a Thermal Power Station of the capacity of 800 to 1000 MW. It has the advantage of being close to Sui Gas Fields. The gas pipeline was installed for supplying gas upto 800 MW

capacity. It has a connection with the 500 KV Line in addition to 220 KV and 132 KV Lines for transmission of that power to the Province of Sind upto Hyderabad and to Baluchistan, as well as in the North it is connected with Multan. Infra structure is already built for a big steam station and some of the civil works and auxiliaries are already provided for extension of the power station during construction of 210 MW Unit No.3. The logical consequence was to add 500 MW generating capacity at Guddu to meet the power shortage in 1983-84. Unfortunately supply of gas from Sui Gas Fields, which was assured in 1970 for 800 MW generating capacity and for which a 16" diameter gas pipeline was built by WAPDA has now been declared as not available. With great difficulty additional gas supply has now been committed at Guddu for additional 200 MW from other sources near Sui.

5.2. Decision in making commitment for additional gas supply at Guddu for 200 MW capacity has taken more than two years. That delayed our procurement action for the plant and completion of the extension Project is therefore delayed at least two years. At the same time demand of electricity by public is not delayed. Therefore, Wapda is rushing to install 300 MW gas turbines at Guddu, where supply of gas for these gas turbines has been assured from Mari Gas Fields. These gas turbines will be completed quicker than the steam Unit at Guddu and will meet the shortage upto 300 MW in the beginning of 1985, whereas Unit No.4 at Guddu is now scheduled for middle 1985. That leaves a gap for heavy load shedding during 1983-84.

5.3 During the construction of Unit No.3 following structures and equipment has been installed, which is also to be used for Unit No. 4 :

1. ~~B.S. Feeder Pump House foundations.~~
2. Chemical Water Treatment Plant
3. Fuel and Oil Storage Facilities
4. Clarified Water Tank 500 M^3
5. Dirty and clarified Condensate Storage Tanks
6. Electrolyser Plant.
7. Mortar Preparation Plant.
8. Chimney for Boilers 3 & 4
9. Neutralization Pond.
10. 250 MVA 15.75/220 KV Block Transformer for Unit 4.
11. Foundations for Extension of 220 KV Switchyard.

5.4. That shows the advantages of Guddu site against any other site for installation of additional 200-250 MW Steam.Unit. The cost of this extension Project has been estimated as Rs. 2408 millions including a foreign exchange portion of Rs.1150 millions.

6.0 ECONOMICS OF GUDDU UNIT-4

6.1 The cost per unit generated is estimated at 30.05 Paisa per KWH at a benefit/cost ratio of 1.2 : 1. The rate of depreciation and salvage value of the Project is given in Table No. 6 below :

6.2

TABLE No.6

Year	Income	Interest on Foreign & Local Component.	O&M Charges	Depreciation Cost.	Total Charges	Profit (+) Loss (-)
1	2	3	4	5	6	7
1985	229.07	245.09	51.27	75.85	372.21	(-) 243.14
1986	246.17	241.39	54.35	75.85	371.59	(-) 125.42
1987	262.72	237.29	57.61	75.85	370.75	(-) 108.03
1988	277.74	232.76	60.49	75.85	369.10	(-) 91.36
1989	293.56	227.73	63.52	75.85	367.10	(-) 73.54
1990	310.33	222.18	66.69	75.85	364.72	(-) 54.39
1991	325.86	216.02	70.02	75.85	361.89	(-) 36.03

1	2	3	4	5	6	7	
1992	342.16	209.20	73.53	75.85	358.58	(-)	16.42
1993	352.42	201.65	75.74	75.85	353.24	(-)	0.82
1994	362.98	193.29	78.01	75.85	347.15	(+)	15.83
1995	373.88	184.02	80.35	75.85	340.22	(+)	33.66
1996	385.10	173.75	82.76	75.85	332.36	(+)	52.74
1997	396.66	162.35	85.24	75.85	323.44	(+)	73.22
1998	404.60	149.73	86.94	75.85	312.52	(+)	92.08
1999	412.68	135.73	88.62	75.85	300.20	(+)	112.48
2000	420.92	120.20	90.46	75.85	286.51	(+)	134.41
2001	429.34	102.98	92.27	75.85	271.10	(+)	158.24

6.3 At this stage it is pointed out that this is customary to justify a Project through cost benefit ratio worked out on the basis of cost of Unit generated and the selling price of the Unit. In fact this is not correct as the benefits of electricity are much more and much diversified than only selling price of the unit. This can be briefly described as:

6.3.1 a) The Project would yield an average annual rate of return of about 9.5% on equity after accounting for annual depreciation.

6.3.2 b) The Project would meet power shortage on the system during the coming years. The availability of power would provide impetus to undertake development programmes in the sectors of agriculture and industries. The increasing development activity would provide new job opportunities to the increasing work force.

6.3.3 c) There would be substantial increase in revenues of Federal and Provincial Governments due to levies and taxes on agricultural commodities and industrial goods. Provincial Governments will also be benefited by increased quantum of electricity duty.

7.0 MAN POWER REQUIREMENT

7.1 For execution of the Project approximately 103 persons of all categories skilled and unskilled are required while for operation about 150 persons mostly technical will be required at Guddu. If this is constructed somewhere else than at Guddu many more personnel will be needed.

7.2 The manpower trained during the execution of Stage-I and II of the Project is available for Unit No.4. In addition regular training programme is carried out at Guddu for training Engineers and staff in the Training Institute established at Guddu.

8.0 IMPORTANCE OF GUDDU POWER STATION

8.1 Guddu is going to be the biggest Thermal Power Station Complex with a total capacity of 950 MW till Jam-Shoro and Thatha Steam Power Stations are developed by the close of this century. Importance and central position of Guddu Thermal Power Station in the National Grid can be seen on the diagram of PAKISTAN ELECTRICITY GRID FIGURE No.1. Development of Baluchistan and Sind largely depends on the capability of Guddu.

8.2 In Guddu Raw Gas is being used for power generation which is approximately one third in price of purified gas and approximately one tenth of the cost of HSD being used in Gas Turbines. Therefore generation cost at Guddu is cheapest amongst all other thermal power stations of the country.

Table No.7

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
WAPDA GRID SYSTEM
(1982-1983)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	488(4)	900(4)	800(4)	712(4)	660(5)	972(6)	888(6)	856(7)	744(8)	536(8)	456(8)	504(8)	A11 A12A
2 MANGLA	920(8)	920(8)	920(8)	800(8)	744(8)	556(8)	592(8)	404(8)	400(8)	544(8)	656(8)	920(8)	
3 WARSAK	240(6)	240(6)	160(6)	120(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL MODELS	70(0)	70(0)	70(0)	65(0)	60(0)	50(0)	40(0)	50(0)	55(0)	70(0)	70(0)	70(0)	
MODEL TOTALS	1718	2030	1950	1697	1744	1758	1600	1469	1439	1390	1462	1734	
1 MULTAN	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	400(3)	400(3)	400(3)	400(3)	400(3)	400(3)	400(3)	400(3)	400(3)	400(3)	400(3)	400(3)	
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 HYDERABAD	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	
6 QUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
STEAM TOTALS	840	840	840	840	840	840	840	840	840	840	840	840	
1 SHAHDARA	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 QUETTA	30(3)	30(3)	30(3)	30(3)	30(3)	30(3)	30(3)	30(3)	30(3)	30(3)	30(3)	30(3)	
GAS TOTALS	416	416	416	416	416	416	416	416	416	416	416	416	
THERMAL TOTALS	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	
TOT GEN. CAP.	2974	3286	3206	2953	3000	3014	2856	2725	2695	2646	2716	2990	
PEAK DEMAND	2462	2862	2949	2877	2809	2968	3018	2956	2930	2905	3018	3118	
SURPLUS/DEFICIT	112	424	257	76	191	46	-162	-243	-235	-259	-300	-128	
SPINNING RESERVES	200	200	200	200	200	200	200	200	200	200	200	200	
MAINTENANCE RESERVES	122	314	314	314	314	164	148	56	100	68	57	126	
FIRM GEN. CAPABILITY	2652	2772	2692	2439	2486	2650	2508	2469	2395	2378	2461	2664	
NET SURPLUS/DEFICIT	-210	-90	-257	-438	-323	-318	-510	-501	-535	-527	-557	-454	

NOTE : IN REMARKS COLUMN :
"A"STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
"D"STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 8

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NPGA GRID SYSTEM
(1983-1984)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	9760 8)	11600 8)	11600 8)	11424 8)	11376 8)	12960 8)	11040 8)	10300 8)	7440 8)	5360 8)	4560 8)	5040 8)	
2 MANGLA	9200 8)	9200 8)	9200 8)	8000 8)	7440 8)	8560 8)	5920 8)	4040 8)	4000 8)	5440 8)	6960 8)	9200 8)	
3 WARSAK	2400 6)	2400 6)	1600 6)	1200 6)	800 6)	800 6)	800 6)	800 6)	2400 6)	2400 6)	2400 6)	2400 6)	
4 SMALL HYDELS	700 0)	700 0)	700 0)	650 0)	600 0)	500 0)	400 0)	500 0)	550 0)	700 0)	700 0)	700 0)	
HYDEL TOTALS	2206	2830	2750	2439	2260	2082	1896	1594	1439	1390	1462	1734	
1 MULTAN	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	2400 4)	
2 FAISALABAD	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	1200 2)	
3 GUDDU	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	4000 3)	
4 SUKKUR	400 4)	400 4)	400 4)	400 4)	400 4)	400 4)	400 4)	400 4)	400 4)	400 4)	400 4)	400 4)	
5 HYDERABAD	300 4)	300 4)	300 4)	300 4)	300 4)	300 4)	300 4)	300 4)	300 4)	300 4)	300 4)	300 4)	
6 QUETTA	100 2)	100 2)	100 2)	100 2)	100 2)	100 2)	100 2)	100 2)	100 2)	100 2)	100 2)	100 2)	
STEAM TOTALS	840	840	840	840	840	840	840	840	840	840	840	840	
1 SHAHDARA	700 6)	700 6)	700 6)	700 6)	700 6)	700 6)	700 6)	700 6)	700 6)	700 6)	700 6)	700 6)	
2 FAISALABAD	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	1950 8)	
3 KOTRI	1210 5)	1210 6)	1210 6)	1210 6)	1210 5)	1210 6)	1210 6)	1210 6)	1210 6)	1210 6)	1210 6)	1210 6)	
4 QUETTA	480 4)	480 4)	480 4)	480 4)	480 4)	480 4)	480 4)	480 4)	480 4)	480 4)	480 4)	480 4)	A 7
GAS TOTALS	434	434	434	434	434	434	434	434	434	434	434	434	
THERMAL TOTALS	1274	1274	1274	1274	1274	1274	1274	1274	1274	1274	1274	1274	
TOT GEN. CAP.	3480	4104	4024	3683	3534	3356	3170	2868	2713	2664	2736	3008	
PEAK DEMAND	3246	3246	3345	3263	3185	3366	3422	3360	3323	3295	3422	3536	
SURPLUS/DEFICIT	234	858	679	420	349	-10	-252	-492	-610	-631	-686	-528	
SPINNING RESERVES	200	200	200	200	200	200	200	200	200	200	200	200	
MAINTENANCE RESERVES	122	314	314	314	314	164	290	163	100	135	114	126	
FIRM GEN. CAPABILITY	3158	3590	3510	3169	3020	2992	2679	2435	2413	2329	2422	2682	
NET SURPLUS/DEFICIT	-88	344	165	-94	-165	-374	-748	-861	-910	-966	-1000	-854	

NOTE : IN REMARKS COLUMN :
"A" STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
"D" STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 9

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
WAPDA GRID SYSTEM
(1984-1985)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	9756(8)	11600(6)	11600(8)	11424(8)	11376(8)	11296(8)	11352(9)	11425(9)	8376(9)	6036(9)	5136(9)	5676(9)	A 1
2 MANGLA	9230(8)	9230(8)	9230(8)	8061(8)	7446(8)	6566(8)	5926(8)	4064(8)	4000(8)	5446(8)	6966(8)	5206(8)	
3 WARSAK	2400(6)	2400(6)	1600(6)	1206(6)	806(6)	806(6)	606(6)	806(6)	2406(6)	2406(6)	2406(6)	2406(6)	
4 SMALL HYDELS	706(0)	706(0)	706(0)	656(0)	606(0)	506(0)	406(0)	506(0)	556(0)	706(0)	706(0)	706(0)	
HYDEL TOTALS	2236	2830	2750	2409	2260	2082	2046	1719	1532	1457	1519	1797	
1 MULTAN	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	2406(4)	
2 FAISALABAD	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	1206(2)	
3 GUDDU	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	4006(3)	
4 SUKKUR	406(4)	406(4)	406(4)	406(4)	406(4)	406(4)	406(4)	406(4)	406(4)	406(4)	406(4)	406(4)	
5 HYDERABAD	306(4)	306(4)	306(4)	306(4)	306(4)	306(4)	306(4)	306(4)	306(4)	306(4)	306(4)	306(4)	
6 QUETTA	106(2)	106(2)	106(2)	106(2)	106(2)	106(2)	106(2)	106(2)	106(2)	106(2)	106(2)	106(2)	
STEAM TOTALS	840	840	840	840	840	840	840	840	840	840	840	840	
1 SHAHDARA	706(6)	706(6)	706(6)	706(6)	706(6)	706(6)	706(6)	706(6)	706(6)	706(6)	706(6)	706(6)	
2 FAISALABAD	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	1956(8)	
3 KOTRI	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	1216(6)	
4 QUETTA	486(4)	486(4)	486(4)	486(4)	486(4)	486(4)	486(4)	486(4)	486(4)	486(4)	486(4)	486(4)	
5 300 MW GAS TURBINES	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	3006(6)	3006(6)	3006(6)	3006(6)	3006(6)	A 2
GAS TOTALS	434	434	434	434	434	434	434	734	734	734	734	734	
THERMAL TOTALS	1274	1274	1274	1274	1274	1274	1274	1574	1574	1574	1574	1574	
TOT GEN. CAP.	3430	4104	4024	3683	3534	3356	3318	3293	3106	3031	3093	3371	
PEAK DEMAND	3682	3682	3794	3702	3613	3818	3862	3818	3770	3738	3862	4011	
SURPLUS/DEFICIT	-252	422	230	-19	-79	-462	-544	-525	-664	-707	-769	-640	
SPINNING RESERVES	200	200	200	200	200	200	200	200	200	200	200	200	
MAINTENANCE RESERVES	122	313	348	316	318	164	296	163	100	135	114	126	
FIRM GEN. CAPABILITY	3158	3586	3326	3165	3016	2992	2822	2910	2806	2696	2779	3045	
NET SURPLUS/DEFICIT	-524	-96	-268	-537	-597	-826	-1040	-908	-964	-1042	-1103	-966	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 10

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1985-1986)

GRID STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS *
1 TARBELA	1220(10)	2030(10)	2030(10)	1760(10)	1720(10)	1620(10)	1460(10)	1250(10)	930(10)	670(10)	570(10)	630(10)	A 7
2 MANGLA	320(8)	920(8)	920(8)	800(8)	740(8)	650(8)	590(8)	460(8)	400(8)	540(8)	650(8)	520(8)	
3 WARSAK	240(6)	240(6)	160(6)	120(6)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	70(0)	70(0)	70(0)	65(0)	60(0)	50(0)	40(0)	50(0)	55(0)	70(0)	70(0)	70(0)	
HYDEL TOTALS	2450	3230	3150	2765	2604	2406	2192	1844	1625	1524	1576	1860	
1 MULTAN	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	400(3)	400(3)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	A 5
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 HYDERABAD	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	
6 JUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
7 KESC STEAM	796(8)	796(8)	796(8)	796(8)	796(8)	796(8)	796(8)	796(8)	796(8)	796(8)	796(8)	796(8)	A 7
STEAM TOTALS	1636	1636	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	
1 SHAHDARA	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 JUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	A 7
GAS TOTALS	914	914	914	914	914	914	914	914	914	914	914	914	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	A 7
NUCLEAR TOTALS	100	100	100	100	100	100	100	100	100	100	100	100	
THERMAL TOTALS	2650	2650	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	
TOT GEN. CAP.	5100	5880	6000	5615	5454	5256	5042	4694	4475	4374	4426	4710	
PEAK DEMAND	4883	4833	5032	4810	4793	5064	5149	5064	5000	4958	5149	5320	
SURPLUS/DEFICIT	217	997	968	705	661	192	-107	-370	-525	-584	-723	-610	
SPINNING RESERVES	200	200	200	200	200	200	200	200	200	200	200	200	
MAINTENANCE RESERVES	122	537	567	507	587	164	276	183	193	135	114	126	
FIRM GEN. CAPABILITY	4778	5093	5213	4826	4667	4892	4566	4311	4082	4039	4112	4384	
NET SURPLUS/DEFICIT	-105	210	181	-82	-126	-172	-603	-753	-918	-919	-1037	-936	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 11

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1986-1987)

ENG STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	1220(10)	2930(10)	2930(10)	1930(10)	1720(10)	1620(10)	1430(10)	1250(10)	930(10)	670(10)	570(10)	630(10)	
2 MANGLA	930(8)	920(8)	920(8)	800(8)	740(8)	650(8)	790(10)	690(10)	550(10)	720(10)	870(10)	1140(10)	A 1
3 WARSAK	240(6)	240(6)	240(6)	120(6)	80(6)	80(6)	80(6)	60(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	70(0)	70(0)	70(0)	65(0)	60(0)	50(0)	40(0)	50(0)	55(0)	70(0)	70(0)	70(0)	
HYDEL TOTALS	2480	3230	3150	2795	2604	2406	2395	2021	1783	1701	1750	2081	
1 MULTAN	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 HYDERABAD	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	
6 QUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
7 COMBINED CYCLE STEAM	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	150(2)	150(2)	150(2)	150(2)	A 3
8 JAMSHORO THERMAL	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1000(2)	1000(2)	1000(2)	1000(2)	A 3
9 KESC STEAM	7960(8)	7960(8)	7960(8)	1196(10)	1196(10)	1196(10)	1196(10)	1196(10)	1196(10)	1196(10)	1196(10)	1196(10)	A10
STEAM TOTALS	1936	1936	1936	2236	2236	2236	2236	2236	3386	3386	3386	3386	
1 SHAHDARA	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 QUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	914	914	914	914	914	914	914	914	914	914	914	914	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
NUCLEAR TOTALS	100	100	100	100	100	100	100	100	100	100	100	100	
THERMAL TOTALS	2850	2850	2850	3250	3250	3250	3250	3250	4400	4400	4400	4400	
TOT GEN. CAP.	5330	6080	6000	6015	5854	5656	5645	5271	6183	6101	6150	6481	
PEAK DEMAND	5465	5465	5032	5465	5364	5668	5703	5306	5596	5549	5763	5954	
SURPLUS/DEFICIT	-135	615	968	520	490	-12	-118	-397	587	552	387	527	
SPINNING RESERVES	200	200	200	200	200	200	200	200	500	500	500	500	
MAINTENANCE RESERVES	266	712	712	712	712	164	296	165	193	135	114	126	
FIRM GEN. CAPABILITY	4865	5168	5088	5103	4942	5292	5149	4906	5490	5466	5536	5855	
NET SURPLUS/DEFICIT	-601	-297	-344	-362	-422	-375	-614	-780	-106	-83	-227	-55	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 12

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1987-1988)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	1283(10)	2003(10)	2303(10)	1736(10)	1720(10)	1620(10)	1480(10)	1250(10)	930(10)	670(10)	570(10)	834(11)	A 6
2 MANGLA	1163(10)	1159(10)	1193(10)	1030(10)	973(10)	874(10)	795(10)	841(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	240(6)	120(6)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	70(0)	70(0)	70(0)	65(0)	60(0)	50(0)	40(0)	50(0)	55(0)	70(0)	70(0)	70(0)	
HYDEL TOTALS	2690	3469	3806	2995	2833	2624	2365	2021	1783	1701	1750	2285	
1 MULTAN	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 HYDERABAD	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	
6 QUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
7 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
8 JAMSHORO THERMAL	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
9 MID COUNTRY THERMAL	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	A 1
10 KESC STEAM	1156(10)	1196(10)	1176(10)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	A10
STEAM TOTALS	3385	3336	3386	3596	3586	3586	4186	4186	4186	4186	4186	4186	
1 STANDARD	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KUNRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 QUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 300 MW GAS TURBINES	300(5)	300(6)	300(6)	300(5)	300(5)	300(6)	300(6)	300(5)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	914	914	914	914	914	914	914	914	914	914	914	914	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
NUCLEAR TOTALS	100	100	100	100	100	100	100	100	100	100	100	100	
THERMAL TOTALS	4400	4400	4400	4610	4600	4600	5200	5200	5200	5200	5200	5200	
TOT GEN CAP.	7190	7869	7780	7595	7433	7224	7565	7221	6983	6901	6950	7485	
PEAK DEMAND	6074	6074	6259	6107	5561	6299	6405	6279	6219	6167	6405	6617	
SURPLUS/DEFICIT	1006	1736	1521	1488	1472	925	1160	922	764	734	545	872	
SPINNING RESERVES	500	500	500	500	500	500	500	500	500	500	500	500	
MAINTENANCE RESERVES	244	812	812	812	812	164	240	241	193	203	114	126	
FIRM GEN CAPABILITY	5336	6543	6468	6283	6121	6560	6799	6480	6290	6198	6336	6863	
NET SURPLUS/DEFICIT	262	474	209	176	160	261	394	181	71	31	-65	246	

NOTE : IN REMARKS COLUMN :
"A" STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
"D" STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 13

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1988-1989)

GRID STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	1533(11)	2327(11)	2578(11)	2436(12)	2422(12)	2132(12)	1960(12)	1694(12)	1306(12)	946(12)	792(12)	1254(13)	A 6
2 MANGLA	1157(10)	1153(10)	1159(10)	1030(10)	973(10)	874(10)	795(10)	641(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	240(6)	120(6)	60(6)	60(6)	60(6)	60(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	54(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	D 7
HYDEL TOTALS	2993	3783	3746	3640	3349	3131	2877	2440	2153	1570	1965	2698	
1 MULTAN	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
4 SUKKUR	400(4)	400(4)	400(4)	400(4)	400(4)	400(4)	400(4)	400(4)	400(4)	400(4)	400(4)	400(4)	
5 HYDERABAD	300(4)	300(4)	300(4)	300(4)	300(4)	300(4)	300(4)	300(4)	300(4)	300(4)	300(4)	300(4)	
6 QUETTA	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)	
7 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
8 JAMSHORO THERMAL	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
9 KOT ADDU THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
10 ADDL. THERMAL I	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	500(1)	500(1)	500(1)	500(1)	A 2
11 KESC STEAM	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(12)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	
STEAM TOTALS	4136	4136	4136	4136	4136	4136	4136	4136	4636	4636	4636	4636	
1 SHAHDARA	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 QUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	914	914	914	914	914	914	914	914	914	914	914	914	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
NUCLEAR TOTALS	100	100	100	100	100	100	100	100	100	100	100	100	
THERMAL TOTALS	5200	5200	5200	5200	5200	5200	5200	5200	5700	5700	5700	5700	
TOT STATE CAP.	8193	8983	8946	8896	8549	8331	8077	7740	7853	7670	7665	8398	
PEAK DEMAND	6719	6749	6924	6785	6624	6999	7116	6799	6913	6852	7116	7352	
SURPLUS/DEFICIT	1436	2231	1992	2111	1525	1332	961	1101	543	818	549	1046	
SPINNING RESERVES	500	500	500	500	500	500	500	500	500	500	500	500	
MAINTENANCE RESERVES	244	1150	1150	1150	1150	326	290	241	286	203	114	208	
FIRM GEN. CAPABILITY	7441	7330	7296	7240	6899	7505	7261	7419	7067	6967	7051	7690	
NET SURPLUS/DEFICIT	692	581	342	461	275	506	163	420	157	115	-65	338	

NOTE : IN REMARKS COLUMN :
*A*STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
*D*STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 14

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1989-1990)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	2156(13)	2981(13)	3196(13)	3196(14)	2764(14)	2644(14)	2492(14)	2235(14)	1692(14)	1222(14)	1014(14)	1462(14)	A10
2 MANGLA	1150(10)	1150(10)	1150(10)	1130(10)	973(10)	874(10)	795(10)	641(10)	550(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	160(6)	120(6)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	58(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
HYDEL TOTALS	3609	4434	4492	4404	3871	3643	3363	2904	2529	2246	2187	2906	
1 MULTAN	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	240(4)	120(2)	120(2)	D 5
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 HYDERABAD	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	30(4)	10(2)	10(2)	D 5
6 QUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
7 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
8 JAMSHORO THERMAL	1100(2)	1100(2)	1100(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
9 MID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
10 LAKHRA STEAM	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	600(2)	600(2)	600(2)	600(2)	A 3
11 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
12 ADDL. THERMAL II	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	400(1)	400(1)	A 5
13 KESC STEAM	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1396(11)	1340(9)	1340(9)	D 5
STEAM TOTALS	4636	4636	4636	4686	4686	4586	4686	4686	5286	5286	5498	5498	
1 SHAHDARA	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 QUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 GT MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	914	914	914	914	914	914	914	914	914	914	914	914	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
NUCLEAR TOTALS	100	100	100	100	100	100	100	100	100	100	100	100	
THERMAL TOTALS	5700	5700	5700	5700	5700	5700	5700	5700	6300	6300	6512	6512	
TOT DEM. CAP.	9309	10134	10192	10104	9571	9343	9063	8604	8829	8546	8699	9418	
PEAK DEMAND	7525	7525	7755	7566	7386	7804	7935	7904	7706	7640	7935	8198	
SURPLUS/DEFICIT	1784	2609	2437	2538	2185	1539	1128	800	1123	906	764	1220	
SPINNING RESERVES	500	500	500	500	500	500	500	500	500	500	500	500	
MAINTENANCE RESERVES	624	1300	1300	1300	1300	326	444	241	286	270	168	271	
FIRM DEM. CAPABILITY	8185	8334	8392	8304	7771	8517	8119	7863	8043	7776	8031	8647	
NET SURPLUS/DEFICIT	660	809	637	738	385	713	184	59	337	136	96	449	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 15

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1990-1991)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	2488(14)	3308(14)	3492(14)	3190(14)	2764(14)	2644(14)	2492(14)	2136(14)	1682(14)	1222(14)	1014(14)	1462(14)	
2 MANGLA	1150(10)	1150(10)	1150(10)	1030(10)	973(10)	874(10)	795(10)	691(10)	558(10)	721(10)	970(10)	1141(10)	
3 WARSAK	240(6)	240(6)	240(6)	120(6)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	56(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 AJ&KEL	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	556(4)	600(4)	600(4)	A 4
HYDEL TOTALS	3921	4761	4845	4404	3871	3643	3363	2904	2529	2802	2787	3506	
1 MULTAN	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 HYDERABAD	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	
6 QUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
7 GUDDU CCGT STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
8 JAMSHORO THERMAL	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
9 MID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
10 LAKHRA STEAM	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
11 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
12 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
13 KESC STEAM	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	
STEAM TOTALS	5498	5498	5498	5498	5498	5498	5498	5498	5498	5498	5498	5498	
1 SHAHDARA	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	70(6)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 QUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	150(9)	180(9)	180(9)	180(9)	
GAS TOTALS	914	914	914	914	914	914	914	914	914	914	914	914	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	900(1)	900(1)	900(1)	900(1)	A 3
NUCLEAR TOTALS	100	100	100	100	100	100	100	100	1000	1000	1000	1000	
THERMAL TOTALS	6512	6512	6512	6512	6512	6512	6512	6512	7412	7412	7412	7412	
TOT GEN. CAP.	10433	11273	11357	10916	10383	10155	9875	9416	9941	10214	10199	10918	
PEAK DEMAND	8333	8389	8365	8435	8234	8700	8840	8700	8500	8517	8846	9139	
SURPLUS/DEFICIT	2044	2984	2792	2481	2149	1455	1029	716	1351	1697	1353	1779	
SPINNING RESERVES	500	500	500	500	500	500	500	500	900	900	900	900	
MAINTENANCE RESERVES	634	1407	1407	1407	1407	826	444	291	286	270	168	271	
FIRM GEN. CAPABILITY	9399	9366	9472	9009	8476	9329	8951	8675	8755	9044	9131	9747	
NET SURPLUS/DEFICIT	920	977	825	574	242	629	33	-25	185	527	285	608	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 16

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1991-1992)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	2468(14)	3303(14)	3472(14)	3196(14)	2704(14)	2644(14)	2452(14)	2136(14)	1882(14)	1222(14)	1014(14)	1462(14)	
2 MANGLA	1153(10)	1153(10)	1153(10)	1130(10)	973(10)	874(10)	795(10)	841(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	240(6)	120(3)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	51(0)	63(0)	63(0)	54(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 KOTLA	336(4)	408(4)	288(4)	164(4)	100(4)	148(4)	148(4)	240(4)	468(4)	556(4)	600(4)	600(4)	
HYDEL TOTALS	4452	5169	5121	4566	4031	3791	3511	3141	2997	2802	2787	3506	
1 MULTAN	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 HYDERABAD	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	
6 JUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
7 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
8 JAMSHORO THERMAL	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	
9 MID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
10 LAKHRA STEAM	600(2)	600(2)	600(2)	600(2)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	A11
11 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
12 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
13 KESC STEAM	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	
STEAM TOTALS	5438	5458	5458	5438	6098	6098	6098	6098	6098	6098	6098	6098	
1 SHAHDARA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	0 7
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 JUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 GTS 44 GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	892	892	892	892	892	892	892	892	892	892	892	892	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	
NUCLEAR TOTALS	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
THERMAL TOTALS	7330	7390	7330	7330	7990	7990	7990	7990	7990	7990	7990	7990	
TOT GEN. CAP.	11847	12559	12511	11958	12021	11781	11501	11134	10987	10792	10777	11496	
PEAK DEMAND	9315	9315	9690	9366	9143	9060	9823	9600	9539	9457	9823	10148	
SURPLUS/DEFICIT	2532	3244	2811	2592	2878	2121	1678	1474	1448	1335	954	1348	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	624	1632	1622	1622	1622	400	518	241	286	270	168	271	
FIRM GEN. CAPABILITY	10323	10037	9539	9436	9499	10481	10083	9993	9801	9622	9709	10325	
NET SURPLUS/DEFICIT	1008	722	339	70	356	821	260	333	262	165	-114	177	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH [illegible]

Table No. 17

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1992-1993)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	2448(14)	3303(14)	3422(14)	3131(14)	2764(14)	2644(14)	2492(14)	2136(14)	1682(14)	1222(14)	1125(15)	1673(15)	A 5
2 MANGLA	1163(10)	1150(10)	1150(10)	1030(10)	873(10)	874(10)	795(10)	691(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	240(6)	120(6)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	56(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 KOHALA	536(4)	403(4)	290(4)	164(4)	160(4)	148(4)	148(4)	240(4)	468(4)	556(4)	600(4)	600(4)	
HYDEL TOTALS	4451	5169	5121	4536	4031	3791	3511	3144	2997	2602	2858	3714	
1 MULTAN	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
2 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
3 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
4 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	
5 MUZAFFARGARH	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	
6 QUETTA	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	10(2)	
7 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
8 JAMSHORO THERMAL	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	
9 KEL COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
10 LAKHRA STEAM	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	
11 T.MATTA STEAM	0(0)	1000(2)	1100(2)	1000(2)	1000(2)	1000(2)	1000(2)	1100(2)	1000(2)	1000(2)	1000(2)	1000(2)	A 8
12 QUET COAL	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	100(1)	100(1)	100(1)	100(1)	A 3
13 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
14 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
15 KESC STEAM	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	
STEAM TOTALS	6038	7038	7038	7056	7098	7098	7096	7196	7198	7198	7198	7198	
1 SHAHDARA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	
4 QUETTA	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	48(4)	
5 GUD 9x GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	892	892	892	892	892	892	892	892	892	892	892	892	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	
NUCLEAR TOTALS	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
THERMAL TOTALS	7930	8590	8930	8590	8990	8990	8990	9090	9090	9090	9090	9090	
TOT GEN. CAP.	12447	14159	14411	13556	13021	12781	12501	12134	12087	11692	11948	12804	
PEAK DEMAND	10318	10318	10653	10374	10127	10700	10860	10700	10565	10475	10680	11240	
SURPLUS/DEFICIT	2129	3841	3758	3184	2894	2081	1641	1434	1522	1417	1268	1564	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	624	1597	1597	1597	1597	400	518	241	256	270	168	271	
FIRM GEN. CAPABILITY	10523	11262	11214	10661	10124	11481	11083	10993	10901	10722	10920	11633	
NET SURPLUS/DEFICIT	205	944	561	287	-3	781	223	293	336	247	40	393	

NOTE : IN REMARKS COLUMN :
"A" STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED

Table No. 14

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1994-1995)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	3433(17)	4281(17)	4421(17)	4236(17)	3547(17)	3412(17)	3161(17)	2804(17)	2246(17)	1436(17)	1347(17)	2086(17)	
2 MANGLA	1153(10)	1153(10)	1150(10)	1050(10)	973(10)	874(10)	795(10)	541(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	180(6)	120(6)	60(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	53(0)	63(0)	63(0)	58(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 KOHALA	536(4)	468(4)	284(4)	164(4)	160(4)	148(4)	146(4)	240(4)	468(4)	556(4)	600(4)	630(4)	
6 ABBASIAN	0(0)	0(0)	0(0)	580(4)	580(4)	472(4)	472(4)	580(4)	584(4)	596(4)	600(4)	600(4)	A10
7 KALABAGH	880(4)	880(4)	880(4)	830(4)	650(4)	450(4)	630(4)	530(4)	600(4)	600(4)	880(4)	880(4)	
HYDEL TOTALS	6273	7033	7120	7050	6644	5481	5312	4890	4745	4612	4600	5610	
1 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
2 GUDDU	630(4)	630(4)	630(4)	630(4)	600(4)	630(4)	630(4)	630(4)	600(4)	600(4)	600(4)	600(4)	
3 SUKKUR	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	40(4)	20(2)	20(2)	20(2)	D 4
4 HYDERABAD	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	18(2)	
5 QUETTA	15(2)	15(2)	15(2)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	D10
6 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
7 JAMSHORO THERMAL	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
8 AID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
9 LAKHRA STEAM	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	
10 THATTA STEAM	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
11 DUKI COAL	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
12 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
13 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
14 KESC STEAM	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	
STEAM TOTALS	7078	7078	7078	7068	7068	7068	7068	7068	7068	7046	7048	7048	
1 SHAHDARA	43(4)	43(4)	43(4)	46(4)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	D11
2 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
3 KOTRI	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	121(6)	96(4)	96(4)	D 5
4 QUETTA	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	
5 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
6 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	884	884	884	884	836	836	836	836	836	836	811	811	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	900(1)	900(1)	900(1)	900(1)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	A11
NUCLEAR TOTALS	1000	1000	1000	1000	1900	1900	1900	1900	1900	1900	1900	1900	
THERMAL TOTALS	8962	8962	8962	8952	9804	9804	9804	9804	9804	9784	9759	9759	
TOT GEN. CAP.	15235	15592	16082	16042	15648	15285	15116	14694	14549	14396	14359	15369	
PEAK DEMAND	12455	12465	12845	12533	12234	12927	13144	12927	12764	12655	13144	13579	
SURPLUS/DEFICIT	2780	3127	3237	3509	3414	2358	1972	1767	1785	1741	1215	1790	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	936	2226	2226	2226	2226	786	516	336	436	470	222	416	
FIRM GEN. CAPABILITY	13399	12466	12956	12916	12722	13599	13678	13426	13213	13026	13237	14053	
NET SURPLUS/DEFICIT	944	1	111	383	488	672	534	501	449	371	93	474	

NOTE : IN REMARKS COLUMN :

*D*STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED *Table No. 20*

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1995-1996)

SNO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	3433(17)	4285(17)	4511(17)	4256(17)	3547(17)	3412(17)	3131(17)	2654(17)	2246(17)	1636(17)	1347(17)	2086(17)	
2 MANGLA	1153(13)	1153(13)	1153(10)	1030(10)	973(10)	874(10)	795(10)	641(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	180(6)	120(6)	60(6)	30(6)	60(6)	60(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	53(3)	63(0)	63(0)	56(3)	54(3)	45(0)	36(0)	45(3)	49(0)	63(0)	63(0)	63(0)	
5 KUTALA	535(4)	409(4)	256(4)	164(4)	160(4)	148(4)	146(4)	240(4)	468(4)	556(4)	600(4)	600(4)	
6 ADJASIAN	592(4)	592(4)	584(4)	580(4)	580(4)	472(4)	472(4)	580(4)	584(4)	596(4)	600(4)	600(4)	
7 KALABAGH	330(4)	830(4)	868(4)	1760(8)	1300(8)	900(8)	1200(8)	1030(8)	1230(8)	1600(8)	1760(8)	1760(8)	A10
HYDEL TOTALS	6873	7622	7734	7970	6694	5931	5912	5390	5345	5412	5480	6490	
1 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
2 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
3 SUKKUR	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	
4 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
5 JAMSHORO THERMAL	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
6 AID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
7 LAKHRA STEAM	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	
8 THATTA STEAM	1000(2)	1000(2)	1000(2)	1000(2)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	A11
9 UCH COAL	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
10 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
11 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
12 KESC STEAM	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1340(9)	1240(9)	1340(9)	1340(9)	
STEAM TOTALS	7030	7030	7030	7030	7530	7530	7530	7530	7530	7530	7530	7530	
1 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
2 KOTRI	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	
3 QUETTA	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	
4 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
5 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	811	811	811	811	811	811	811	811	811	811	811	811	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	
NUCLEAR TOTALS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
THERMAL TOTALS	9741	9741	9741	9741	10241	10241	10241	10241	10241	10241	10241	10241	
TOT GEN. CAP.	16614	17363	17475	17711	16935	16172	16153	15631	15586	15653	15721	16731	
PEAK DEMAND	13615	13615	14061	13689	13363	14120	14357	14120	13942	13823	14357	14832	
SURPLUS/DEFICIT	2999	3748	3414	4022	3572	2052	1796	1511	1644	1830	1364	1899	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	936	2437	2437	2437	2437	904	636	511	582	470	222	416	
FIRM GEN. CAPABILITY	14778	14026	14138	14374	13598	14368	14617	14220	14104	14283	14599	15415	
NET SURPLUS/DEFICIT	1163	411	77	685	235	248	260	100	162	460	242	583	

NOTE : IN REMARKS COLUMN :
*A*STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
*D*STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. [illegible]

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1995-1997)

GRID STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	3430(17)	4289(17)	4511(17)	4256(17)	3547(17)	3412(17)	3151(17)	2604(17)	2246(17)	1636(17)	1347(17)	2086(17)	
2 MANGLA	1150(10)	1150(10)	1150(10)	1030(10)	973(10)	874(10)	795(10)	641(10)	559(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	150(6)	120(6)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	56(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 KOHALA	536(4)	408(4)	256(4)	164(4)	160(4)	148(4)	148(4)	240(4)	468(4)	556(4)	600(4)	600(4)	
6 ABBASIAN	600(4)	592(4)	584(4)	596(4)	580(4)	472(4)	472(4)	560(4)	584(4)	596(4)	600(4)	600(4)	
7 KALABAGH	1760(8)	1760(8)	1760(8)	1760(8)	1300(3)	900(8)	1200(8)	1000(3)	1200(8)	1600(8)	1760(8)	1760(8)	
8 ADDITIONAL HYDEL I	0(0)	0(0)	0(0)	0(0)	783(4)	724(4)	624(4)	530(4)	462(4)	425(4)	429(4)	603(4)	A11
HYDEL TOTALS	7703	8502	8584	7970	7477	6655	6536	5920	5807	5841	5909	7093	
1 FAISALABAD	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	120(2)	
2 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
3 SUKKUR	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	20(2)	0(0)	0(0)	D 5
4 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
5 JAMSHORO THERMAL	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
6 MID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
7 LAKHRA STEAM	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	
8 THATTA STEAM	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	
9 JOKI COAL	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
10 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
11 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
12 KESC STEAM	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	D 7
STEAM TOTALS	7420	7420	7420	7420	7420	7420	7420	7420	7420	7420	7400	7400	
1 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
2 KOTRI	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	
3 QUETTA	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	40(3)	36(2)	D 6
4 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
5 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	811	811	811	811	811	811	811	811	811	811	811	807	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	
3 NUCLEAR SOUTH	0(0)	0(0)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	A 9
NUCLEAR TOTALS	1900	1900	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	
THERMAL TOTALS	10131	10131	11031	11031	11031	11031	11031	11031	11031	11031	11011	11007	
TOT GEN. CAP.	17834	18633	19615	19001	18508	17686	17567	16951	16838	16872	16920	18100	
PEAK DEMAND	14611	14811	15262	14891	14536	15359	15617	15359	15155	15036	15617	16134	
SURPLUS/DEFICIT	3223	3822	4353	4110	3972	2327	1950	1592	1673	1836	1303	1966	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	536	2532	2332	2532	2532	934	934	636	562	670	222	416	
FIRM GEN. CAPABILITY	16048	15201	16133	15569	15076	15852	15731	15415	15356	15302	15790	16784	
NET SURPLUS/DEFICIT	1237	390	521	678	540	523	114	56	151	266	181	650	

NOTE 1 IN REMARKS COLUMN 1
A STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
D STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 22

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1997-1998)

S.NO STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	3434(17)	4289(17)	[illegible](17)	4258(17)	3547(17)	3412(17)	3181(17)	2604(17)	2246(17)	1636(17)	1347(17)	2086(17)	
2 MANGLA	1155(10)	1159(10)	[illegible](10)	1030(10)	973(10)	874(10)	795(10)	541(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	150(6)	120(6)	60(6)	80(6)	60(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	56(0)	54(0)	45(0)	50(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 KOHALA	535(4)	408(4)	256(4)	164(4)	160(4)	148(4)	148(4)	240(4)	468(4)	556(4)	600(4)	600(4)	
6 ABBASIAN	600(4)	592(4)	584(4)	580(4)	560(4)	472(4)	472(4)	580(4)	524(4)	596(4)	600(4)	600(4)	
7 KALABAGH	1750(8)	1760(8)	1760(8)	1760(8)	1300(8)	900(8)	1230(8)	1000(8)	1200(8)	1600(8)	1760(8)	1760(8)	
8 ADDITIONAL HYDEL I	800(4)	800(4)	800(4)	800(4)	783(4)	724(4)	624(4)	550(4)	462(4)	429(4)	429(4)	603(4)	
9 ADDITIONAL HYDEL II	0(0)	0(0)	0(0)	0(0)	1468(4)	1353(4)	1171(4)	994(4)	867(4)	804(4)	804(4)	1132(4)	A11
HYDEL TOTALS	8553	9332	9384	8770	8545	8013	7707	6914	6674	6645	6713	8225	
1 FAISALABAD	60(1)	60(1)	60(1)	60(1)	60(1)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	D12
2 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
3 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
4 JAMSHORO THERMAL	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	1000(2)	
5 MID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
6 LAKHRA STEAM	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	
7 THATTA STEAM	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	1500(3)	2000(4)	2000(4)	2000(4)	2000(4)	2000(4)	2000(4)	A 1
8 [illegible] COAL	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
9 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
10 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
11 KESC STEAM	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	
STEAM TOTALS	7340	7340	7340	7340	7240	7280	7780	7780	7780	7780	7780	7780	
1 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
2 KOTRI	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	
3 QUETTA	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	
4 300 MW GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
5 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	807	807	807	807	807	807	807	807	807	807	807	807	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	
3 NUCLEAR SOUTH	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	900(1)	
NUCLEAR TOTALS	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	
THERMAL TOTALS	10947	10947	10947	10947	10847	10887	11387	11387	11387	11387	11387	11387	
TOT GEN. CAP.	19500	20249	20331	19717	19392	18900	19094	18301	18061	18032	18100	19612	
PEAK DEMAND	16042	16042	15331	16129	15744	16635	16915	16636	16426	16286	16915	17475	
SURPLUS/DEFICIT	3458	4207	5000	3588	4148	2264	2179	1665	1635	1746	1185	2137	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	536	2721	2721	2721	2721	904	936	636	697	777	325	566	
FIRM GEN. CAPABILITY	17454	16429	16710	16094	16271	17096	17256	16765	16464	16355	16871	18146	
NET SURPLUS/DEFICIT	1033	586	175	-35	527	460	343	125	38	65	-44	671	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

*A*STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
*D*STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 3

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1998-1999)

SNO STATION NAME.	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	3404(17)	3423(17)	3411(17)	3425(17)	3547(17)	3412(17)	3161(17)	2804(17)	2246(17)	1636(17)	1347(17)	2006(17)	
2 MANGLA	1159(10)	1159(10)	1159(10)	1130(10)	973(10)	876(10)	795(10)	694(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	240(6)	120(6)	60(6)	30(6)	30(6)	30(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	56(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 KUNAR	535(4)	403(4)	256(4)	164(4)	160(4)	148(4)	148(4)	246(4)	469(4)	556(4)	600(4)	600(4)	
6 ADIABIAN	601(4)	592(4)	564(4)	580(4)	580(4)	472(4)	472(4)	580(4)	584(4)	596(4)	600(4)	600(4)	
7 KALABAGH	1750(8)	1176(8	1176(8	1176(8	1130(8	930(8)	1200(8)	1100(8	1200(8)	1600(8)	1176(8	1176(8	
8 ADDITIONAL HYDEL I	800(4)	800(4)	800(4)	800(4)	783(4)	724(4)	624(4)	530(4)	462(4)	429(4)	429(4)	603(4)	
9 ADDITIONAL HYDEL II	1500(4)	1150(4	1150(4	1150(4	1146(4	1135(4	1117(4	994(4)	867(4)	804(4)	804(4)	1132(4)	
10 ADDITIONAL HYDEL III	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1073(4)	726(4)	809(4)	751(4)	751(4)	1056(4)	A 1
HYDEL TOTALS	10063	10802	10364	10270	9545	8013	8800	7642	7483	7356	7464	9281	
1 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
2 GUDDU COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
3 JAMSHORO THERMAL	1000(2)	1000(2	1000(2	1000(2	1000(2	1000(2	1000(2	1000(2	1000(2	1000(2	1000(2	1000(2	
4 KOT ADDU COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
5 LAKHRA STEAM	1200(4)	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	
6 THATTA STEAM	2000(4)	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	1200(4	
7 QUAID COAL	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
8 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
9 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
10 KESC STEAM	1230(7)	1123(7	1123(7	1123(7	1123(7	1123(7	1123(7	1123(7	1123(7	1123(7	1123(7	1123(7	
STEAM TOTALS	7780	7780	7780	7780	7780	7780	7780	7780	7780	7780	7780	7780	
1 FAISALABAD	195(8)	195(8)	195(8)	155(8)	155(8)	195(8)	195(8)	195(8)	195(8)	195(8)	155(8)	155(8)	
2 KOTRI	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	
3 QUETTA	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	
4 GTG NG GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
5 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	807	807	807	807	807	807	807	807	807	807	807	807	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	1400(2)	1180(2	1180(2	1180(2	1180(2	1180(2	1180(2	1180(2	1180(2	1180(2	1180(2	1180(2	
3 NUCLEAR SOUTH	900(1)	900(1)	900(1)	900(1)	1300(2)	1300(2)	1300(2)	1300(2)	1300(2)	1300(2)	1300(2)	1300(2)	A11
NUCLEAR TOTALS	2800	2800	2300	2800	3700	3700	3700	3700	3700	3700	3700	3700	
THERMAL TOTALS	11387	11387	11387	11387	12287	12287	12287	12287	12287	12287	12287	12287	
TOT GEN. CAP.	21450	22189	22271	21657	21232	20300	21087	20129	19770	19643	19751	21568	
PEAK DEMAND	17305	17305	17353	17359	16984	17946	18247	17946	17719	17569	18247	18851	
SURPLUS/DEFICIT	4135	4884	4918	4298	4248	2354	2840	2183	2051	2114	1504	2717	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	938	2721	2721	2721	2721	904	1226	884	913	978	325	566	
FIRM GEN. CAPABILITY	19504	18568	18650	18036	17611	18496	18997	18345	17957	17805	18522	20102	
NET SURPLUS/DEFICIT	2259	1263	1297	677	627	550	712	399	238	236	275	1251	

NOTE : IN REMARKS COLUMN :
*A*STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
*D*STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED

Table No. 24

MONTHLY GENERATING CAPABILITY AGAINST PEAK DEMAND
NATIONAL GRID SYSTEM
(1999-2000)

GRID STATION NAME	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	REMARKS
1 TARBELA	3435(17)	4283(17)	4681(17)	4235(17)	3547(17)	3412(17)	3181(17)	2804(17)	2246(17)	1636(17)	1347(17)	2096(17)	
2 MANGLA	1153(10)	1350(10)	1515(10)	1030(10)	573(10)	374(10)	795(10)	941(10)	558(10)	721(10)	870(10)	1141(10)	
3 WARSAK	240(6)	240(6)	240(6)	120(6)	80(6)	80(6)	80(6)	80(6)	240(6)	240(6)	240(6)	240(6)	
4 SMALL HYDELS	63(0)	63(0)	63(0)	56(0)	54(0)	45(0)	36(0)	45(0)	49(0)	63(0)	63(0)	63(0)	
5 KOHALA	536(4)	403(4)	256(4)	164(4)	160(4)	148(4)	145(4)	240(4)	468(4)	556(4)	600(4)	600(4)	
6 ABBASIAN	600(4)	592(4)	544(4)	580(4)	580(4)	472(4)	472(4)	580(4)	584(4)	596(4)	600(4)	600(4)	
7 KALABAGH	1760(8)	1760(8)	1760(8)	1760(8)	1300(8)	900(8)	1200(8)	1300(8)	1200(8)	1600(8)	1760(8)	1760(8)	
8 ADDITIONAL HYDEL I	800(4)	800(4)	800(4)	800(4)	783(4)	724(4)	624(4)	550(4)	462(4)	429(4)	425(4)	603(4)	
9 ADDITIONAL HYDEL II	1500(4)	1500(4)	1500(4)	1500(4)	1468(4)	1358(4)	1171(4)	994(4)	867(4)	804(4)	804(4)	1132(4)	
10 ADDITIONAL HYDEL III	1400(4)	1400(4)	1400(4)	1400(4)	1370(4)	1267(4)	1093(4)	926(4)	809(4)	751(4)	751(4)	1056(4)	
11 ADDITIONAL HYDEL IV	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1249(4)	1080(4)	525(4)	858(4)	1207(4)	A 1
HYDEL TOTALS	11453	12202	12234	11676	10315	9283	10049	8902	8408	8254	8322	10486	
1 GUDDU	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	600(4)	
2 COMBINED CYCLE STEAM	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	150(2)	
3 JAMSHORO THERMAL	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	1100(2)	
4 MID COUNTRY THERMAL	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	600(2)	
5 LAKHRA STEAM	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	1200(4)	
6 THATTA STEAM	2000(4)	2000(4)	2000(4)	2000(4)	2000(4)	2000(4)	2000(4)	2500(5)	2500(5)	2500(5)	2500(5)	2500(5)	A 2
7 DUKI COAL	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
8 ADDL. THERMAL I	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	500(1)	
9 ADDL. THERMAL II	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	400(1)	
10 KESC STEAM	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	1230(7)	
STEAM TOTALS	7780	7780	7780	7780	7780	7780	7780	8280	8280	8280	8280	8280	
1 FAISALABAD	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	195(8)	
2 KOTRI	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	96(4)	
3 QUETTA	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	36(2)	18(1)	18(1)	18(1)	18(1)	18(1)	D 2
4 GT MM GAS TURBINES	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	300(6)	
5 KESC GAS	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	180(9)	
GAS TOTALS	807	807	807	807	807	807	807	789	789	789	789	789	
1 KANUPP	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	100(1)	
2 CHASHMA NUCLEAR	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	
3 NUCLEAR SOUTH	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	1800(2)	
NUCLEAR TOTALS	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	
THERMAL TOTALS	12287	12287	12287	12287	12287	12287	12287	12769	12769	12769	12769	12769	
TOT GEN. CAP.	23740	24489	24521	23963	22602	21567	22336	21671	21177	21023	21091	23257	
PEAK DEMAND	18592	18592	19153	18693	18247	19230	19604	19230	19037	18875	19604	20253	
SURPLUS/DEFICIT	5148	5897	5412	5264	4355	2287	2732	2391	2140	2148	1487	3004	
SPINNING RESERVES	900	900	900	900	900	900	900	900	900	900	900	900	
MAINTENANCE RESERVES	936	3071	3071	3071	3071	1220	1501	1115	1115	578	329	566	
FIRM GEN. CAPABILITY	21904	20518	20550	19936	18631	19447	19935	19656	19162	19145	19862	21791	
NET SURPLUS/DEFICIT	3312	1926	1357	1243	384	217	331	426	125	270	258	1538	

NOTE : IN REMARKS COLUMN :
'A' STANDS FOR ADDITION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE ADDED
'D' STANDS FOR DELETION AND THE NUMBER WITH IT MEANS THE CALENDAR MONTH IN WHICH UNITS ARE DELETED
END ISPOP

PAPER NO. 451

FIGURE NO. 1