

Chapter 9

Power

9.1 General

In the present developing stage of the country's economy, there is a huge requirement of power both in the agricultural as well as industrial sectors, as the productivity in both these sectors is closely linked with the availability of electric power. The electric power is also required for domestic use in towns and villages and energisation of tube wells and pumped canals. Electricity being the most convenient and versatile form of energy, the demand for it has been growing at a faster rate than any other form of energy.

The economy of the state is dependent on agriculture and industries. Rural electrification has been receiving high priority to meet the needs of agriculture. There is a great need to plan for additional power keeping in view the above requirements.

9.2. Present Status of Power Development in the State

The present installed capacity of power in the state of Andhra Pradesh as on 31.3.1998 is 6380 MW, which comprises 2953 MW of thermal power, 2673 MW of hydel power, 696 MW of gas power, 55 MW of wind power and 3 MW of co-generated power. In addition, Andhra Pradesh is also getting its share to the tune of 897 MW from the Central Sector schemes. Thus the total installed capacity of power generation in Andhra Pradesh is 7277 MW.

9.3 Present Status of Utilisation of Power

The present status of the utilisation of power for various purposes in Andhra Pradesh State during the year 1997-98 is indicated in Table 9.1.

Table 9.1
Present Status of various uses of power

Sl.No.	Use	Percent
a)	Domestic	19.20
b)	Irrigation & Agriculture	39.54
c)	Industrial including cottage industries	5.85
d)	High tension industries	29.56
e)	Non domestic	3.93
f)	Others	1.92
	Total	100.00

Source : Power development in Andhra Pradesh (Statistics) -1997-98 published by APSEB.

9.4 Shortage/Surplus of Power in the State

Andhra Pradesh is able to meet its unrestricted requirement of power demand fully from August to February every year from power produced/available. During the rest of the period, power cut on HT consumers is being imposed, which ranges from 30% to 40% on energy and 25% to 35% on demand apart from regulatory measures on other categories of consumers such as rostering of agricultural loads etc.

Assistance from Madhya Pradesh is availed during the months from April to May every year for meeting the power demand in this period. In addition, energy is also imported from Western Region Electricity Board (WREB) throughout the year except during the month of April.

9.5 Transmission System

In Andhra Pradesh state, there are 53 Nos. of 220 kV, 161 Nos. of 132 kV, 6 Nos. of 66 kV and 1520 Nos. of 33 kV sub stations established as on 31.3.1998. The power system is connected to 400 kV system of Power Grid Corporation of India for drawal of power from Central generating stations and exchange of power with other states. The Power Finance Corporation (PFC) was incorporated in July 1996 to provide term finance for power generation projects, transmission and distribution, system improvements etc.

9.6 Schemes under Construction

The various power generating schemes under construction in the State are given in Table 9.2.

Table 9.2
Schemes under construction

Sl. No.	Scheme	Capacity(MW)	
A.	Hydel		
1	Srisaillam left bank	6x 150	900.00
2	Singur HES	2x7.5	15.00
3	Power House at Balimela	2x30	60.00
4	Mini hydel scheme		5.15
B.	Thermal		
1	KTPS stage-V	2x250	500.00
C.	Gas based (Private sector)		
1	Jegurupadu CCPP		216.00
2	Godavari CCPP		208.00
3	APGPCL CCPP		172.50

Source : Power development in Andhra Pradesh (Statistic) -1997-98 published by APSEB.

9.7 Future Plans of Power Development in the State

The various schemes likely to be taken up in future for power development in the region are furnished in Table 9.3.

Table 9.3
Proposed schemes

Sl. No.	Name of the scheme	No. of Units x Capacity	Capacity (MW)
A.	Hydel		
1	Priyadarsini Jurala HES	6 x 36.9	221.00
2	Pulichintala HES	2 x 30	60.00
3	Nelakota irrigation cum power project	2 x 30	60.00
4	Tail pond dam PH below Nagarjuna- sagar	2 x 25	50.00
5	Inchampalli HES	13 x 75	975.00
6	Polavaram HES	9 x 80	720.00
7	Jalaput dam	3 x 6	18.00
8	Pochampad unit – IV	1 x 9	9.00
9	Lower Machkund	3 x 9	27.00
10	Lower Sileru Stage-III	2 x 115	230.00
	Mini hydel		
11	Pedduru Reservoir	1x0.15	0.15
12	Mini hydel projects allotted to private sector		81.00
B.	Thermal		
1	Rayalaseema TPS stage-II	2x210	420.00
2	Ramagundam TPS extension	2x260	520.00

3	Krishnapatnam TPS station-A	2x260	520.00
4	Krishnapatnam TPS station-B	2x260	520.00
5	Kothagudem TPS stage-VI	2x250	500.00
6	Visakhapatnam TPS stage-I	2x520	1040.00
7	Simhadri TPS	2x500	1000.00
8	Vijayawada TPS stage-IV	1x0.5	0.50
9	Machilipatnam TPS	2x0.5	1.00
10	Krishnapatnam stage-II	4x0.5	2.00
11	Bhoopalapally	1x0.25	0.25
12	Chennur	2x0.06	0.12
13	Anantapuram	2x0.25	0.50
14	Pannyam TPS	2x0.25	0.50
15	Srikakulam TPS	2x0.5	1.00
C.	Gas based		
1	Hyderabad metro combined cycle power project		650.00
2	Visakhapatnam (HPCL & APSEB)	2x250	500.00
3	Gas/Naptha/Furnace/oil/Diesel/LSHS based mini power plants allotted to private sector		2781.00
D.	Wind based		
1	Projects allotted to private sector		370.00

Source : Power development in Andhra Pradesh (Statistic) -1997-98 published by APSEB.

9.8 Power Generation at Srisaillam Project

The present installed capacity at Srisaillam power project is 770 MW. According to Central Electricity Authority, the ultimate firm power generation at Srisaillam by the year 2006-07 will be 60 MW considering full upstream utilisation as per KWDT award. As already discussed, simulation studies have been carried out for Srisaillam reservoir, considering the water transfer proposal through link canal. From the simulation studies, it is observed that 61 MW of power can be generated at Srisaillam after considering the diversion through the link proposal. Hence, at the ultimate stage, the power generation situation at Srisaillam will not change because of this inter-basin water transfer.

Details of power generated at Srisaillam during recent years are given in Table 9.4.

Table 9.4
Power Generated at Srisailam

Year	Power generated (MU)
1982-83	448.73
1983-84	660.68
1984-85	2006.20
1985-86	2116.42
1986-87	2864.43
1987-88	2783.04
1988-89	2616.48
1989-90	2958.36
1990-91	3589.99
1991-92	3269.14
1992-93	3181.58
1993-94	3797.89
1994-95	3306.11
1995-96	2666.50
1996-97	2960.55
1997-98	2955.00

Source : Report on power house at Srisailam project

9.9 Power Generation Proposals from the Krishna (Srisailam) - Pennar Link

Krishna (Srisailam) - Pennar link project envisages to transfer 2310 Mm³ of water available at Srisailam to the river Pennar through natural streams viz. Nippulavagu, Galeru and Kunderu. Andhra Pradesh is planning to install a few mini hydel schemes on these natural streams.

Based on the survey work carried out by NWDA along these natural streams, it is found that there are small drops at certain places. Since water transfer is for six months from July to December, attempts have been made to explore the possibility of producing hydropower at the natural drops of the above streams while transferring 2310 Mm³ of water to Pennar River. Four such natural falls are identified in the natural streams enroute of the link alignment at the locations mentioned in Table 9.5. The locations where the head available is about 3 m and above only have been considered for installation of power house. The details of power that could be generated from these power houses are furnished in Table 9.5.

Table 9.5
Details of powerhouses

Sl. No.	power house location at (RD)	Stream	Net Quantum of diversion* (Mm ³)	Period of diversion (Days)	Discharge (cumec)	Available Head		Installed capacity		Actual energy Generation (mu)
						Gross (m)	Net (m)	Actual (kw)	Proposed (kw)	
1.	2.00	NippulaVagu	2303	184	145	4.50	4.275	5199	5200	22.958
2.	13.02	NippulaVagu	2262	184	142	3.15	2.993	3565	3600	15.743
3.	22.11	Galeru	2244	184	141	3.00	2.850	3371	3400	14.886
4.	127.7	Kunderu	2160	184	136	4.40	4.180	4768	4800	21.197
		Total							17000	74.784

*Note : *After deducting transmission losses
@After deducting 5% overall losses*

The total cost of installation of four powerhouses with a total installed capacity of 17 MW works out to Rs. 7694.36 lakh. Details of cost of estimation are given in the Chapter on "Estimates". Cost of installation works out to Rs. 452.61 lakh per MW of installed capacity. Actual annual energy that could be generated from all the four power houses works out to 74.784 MU. Cost of generation per unit works out to Rs. 1.51. While calculating the working expenses, interest charges at 10%, depreciation charges at 3%, operation and maintenance charges at 1% and general reserves at 0.5% of capital cost of power components are considered. Energy available for sale is 74.036 MU after deducting 1% for auxiliary consumption. Sale price of energy at prevailing HT tariff is assumed as Rs. 4.00 per unit. Gross revenue works out to Rs. 2961.44 lakh and net revenue would be Rs. 2615.20 lakh. The financial return of the power component works out to 33.99%. The details of financial return are given in Table 9.6.

Table 9.6
Financial return

1.	Total cost of the power component		Rs 7694.36 lakh
2.	Total installed capacity		17.00 MW
3.	Actual energy generation		74.784 MU
4.	Energy available for sale		74.036 MU
5.	Gross revenue that would be realised at prevailing HT tariff rate of Rs. 4.00 per unit		Rs. 2961.44 lakh
	Working expenses		
6.	a)	Interest charges @ 10%	Rs. 769.44 lakh
	b)	Depreciation charges @ 3%	Rs. 230.83 lakh
	c)	O&M charges @ 1%	Rs. 76.94 lakh
	d)	General revenue @ 0.5%	Rs. 38.47 lakh
	Total working expenses		
	1. With interest charges		Rs. 1115.68 lakh
	2. Without interest charges		Rs. 346.24 lakh
7.	Net revenue realised		Rs. 2615.20 lakh
8.	Cost of generation per unit (Total working expenses/Energy available for sale)		Rs. 1.51
9.	Financial return (Net revenue/ Total cost of power component)		33.99%