

10. ENERGY

Meeting the energy needs triggered by economic development is a formidable challenge. Tamil Nadu has accordingly focused on demand management and addressing supply constraints to provide energy of desired quality to users in a sustainable manner and at reasonable costs. Further, to sustain the aspiration growth rate of 8-10 per cent, the quantity and quality of energy requirement would tend to increase over the 11th Plan Period. 'Energy' defined as the ability to do work has many forms viz. electricity, biomass, geothermal, fossil fuel (coal, oil and natural gas), hydro power and ocean energy, nuclear energy, solar energy, wind and transportation energy. Of all the said sources, electricity is considered as the prime source and the same has to be supplied at a reasonable rate in an uninterrupted manner by ensuring the quality, as availability of electricity is directly linked to the growth process of the economy. Hence, the State and Central Governments allocate a considerable portion of the plan outlay for strengthening the base of this sector. The plan allocation for power sector in the State at Rs.30.28 crores during the First five year plan period had increased to Rs.8029.65 crores during the Tenth Plan period. The elasticity of demand for energy in the State with respect to GSDP between 1993-94 and 2004-05 was 0.57 and that of per capita power consumption and per capita income was 0.76. The high elasticity proves energy as an important ingredient for the economic development. The National Electricity Policy (NEP), 2005 recognises electricity as a basic human need and targets a rise in per capita availability from 631 units to 1000 units per annum by the end of 2012.

National Scenario:

The overall electricity generation at the national level had decelerated to 6.6 percent during April – December, 2007-08 from 7.5 per cent in the corresponding period of 2006-07. At the national level, the total power generating capacity as on March 2007 was 132.3 thousand MW and the gross availability of power was 667.5 billion units. The electricity generation during 2007-08 was targeted to go up by 7.2 per cent to 710 billion units at the national level. Based on the available data, the growth of power generation in April-December 2007 was found to be lower than the targeted rate.

Table-1 : Power Sector : National Profile

Details	Units	2005-06	2006-07	2007-08(Apr-Dec)
1.Power Generation				
i. Hydro electric	Billion units	101.3	113.4	100.7
ii. Thermal	"	497.2	527.6	407.4
iii. Nuclear	"	17.2	18.6	12.8
2. Overall PLF	Percentage	73.6	76.8	77.2
3. Peak Demand	MW	93255	100715	106694
4.Peak Met	MW	81792	86818	90793
5. Peak Deficit	Percentage	(-)12.3	(-)13.8	(-)14.8
6. Energy Requirement	Mu	631757	690587	543394
7. Energy Availability	Mu	578819	624495	497793
8. Energy deficit/surplus	Mu	(-)8.4	(-)9.6	(-)8.4

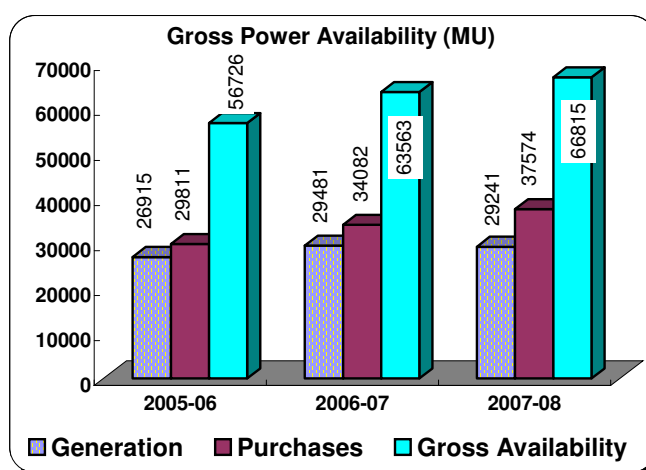
Source: Economic Survey, 2007-08, Government of India.

Power generation in all three segments i.e. thermal, hydro and nuclear sources showed a sharp decline during 2007-08 against the corresponding period of the previous year. Power deficits in terms of peak availability and energy availability was 14.8 per cent and 8.4 per cent respectively. The shortages experienced by each region is more acute in North-eastern and Western regions. Overall PLF of all-India power projects was 77.2 per cent during 2007-08 (April – December) against 75.3 per cent in the corresponding period of 2006-07.

Among all the major States, Tamil Nadu occupies a prominent place by standing third next only to Maharashtra and Gujarat in terms of size of operation as assessed by the generating capacity, energy sold and number of consumers served. It ranks sixth position with reference to per capita energy consumption.

State Profile : 2007-08:

The State power sector had continued its uninterrupted supply of power to its net work of consumers during 2007-08 also despite a number of difficulties. The gross supply of 66815 mu of power made available in the reference year, was 5.1 per cent higher than that of the previous year. The installed power generating capacity of the State was 10122.495 MW in 2007-08 against 10,097.895 MW in



2006-07. During the twelve months-period, the State was able to add 24.6 MW. To this addition, the State sector accounts for slightly more than fifty percent (92 MW from Valuthur Additional Gas Turbine in Ramanathapuram District in March 2008) and the remaining from the Central Sector's share (two units of 220 MW capacity each from Kaiga Atomic Power Station, Stage II).

Table – 2 : Power Sector Performance : 2007-08

	Unit	2005-06	% change	2006-07	% change	2007-08	% change
1. Installed Capacity	MW	10031.20	5.3	10097.895	0.7	10122.495	0.2
2. Power Generation	mu	26915	1.8	29481	9.5	29241	0.8
3. Power Purchases	mu	29811	12.3	34082	14.3	37574	12.0
3. Gross Availability	mu	56726	7.0	63563	11.1	66815	6.0
4. Net Availability-	mu	43582	4.8	48889	12.2	52849	7.3
5. Line Loss	%	18.0	-	18.0	-	18.0	-
6. Per capita consumption	Units	860	5.5	960	11.6	1000	4.2
7. No. of consumers	Lakhs	178.03	4.5	185.82	4.4	194.34	4.6
8. No. of Domestic consumers	Lakhs	119.74	4.5	125.28	4.6	130.64	4.3
9. Peak Demand	MW	8209	9.8	8803	7.2	8969	1.8

Source: 1. Statistics at a Glance, 2006-07, TNEB.

2. Monthly Review of Economy, Regional Services, CMIE.

During 2007-08, the gross availability of power accelerated at the rate of 6.0 per cent, from 63563 mu in 2006-07 to 66815 mu. The hydel sources which started with a submissive note in the beginning of the year (April to July) had picked up later and complimented the thermal performance. The advent of monsoon could not offset the decrease in generation by several plants of the State. Thermal plants in spite of coal shortages and other technical problems could add 21355 mu to the grid, witnessing a smaller increase of 0.6% in 2007-08 against 13.0% in 2006-07. Gas and wind power projects had a suppressed note and both together added 1431 mu in the current year. The losses of the State's projects were more or less compensated by the purchases made from the Central and Private sectors in a greater manner. Monthly performance of the sector in the current year depicted in the following table reveals the supply position.

Of the total number of 39 hydro power projects, generation from 11 projects had been reduced than that of 2006-07 and three projects had commenced their output for the first time after commissioning two years ago. The overall hydel generation has improved by 2.5 per cent over the previous year's level of 6292 mu.

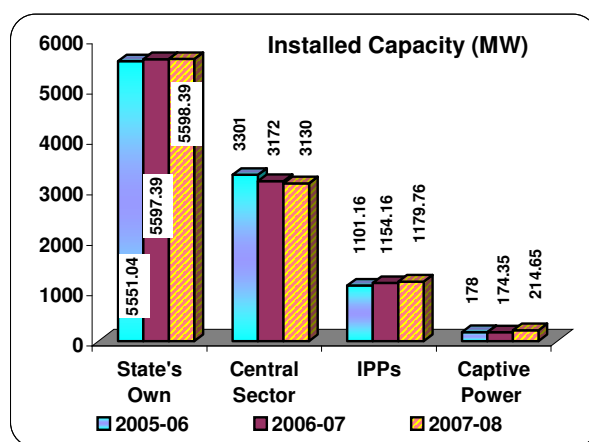
Table - 3 : Power Generation : State Picture 2007-08

Month	Gross generation		% change	Hydel generation		Thermal generation	
	2006-07	2007-08		2006-07	2007-08	2006-07	2007-08
April	4344.46	4892.26	12.6	363.62	301.14	3732.39	4365.97
May	4417.11	4814.76	9.0	331.76	280.88	3819.49	4342.44
June	4518.12	4571.41	1.2	589.75	258.44	3764.73	4159.71
July	4574.85	4715.33	3.1	791.72	738.47	3601.42	3890.76
August	4451.86	4539.71	2.0	761.23	891.94	3458.14	3587.85
September	4240.21	4172.59	(-)1.6	692.98	881.27	3321.35	3208.23
October	3992.56	4364.09	9.3	591.88	749.6	3170.28	3498.25
November		4405.25	11.6		720.9		3517.8
December	4523.41	4382.56	(-)3.1	624.0	434.5	3706.5	3775.9
Apr-Dec.	30539.17	40857.96	5.0	4122.94	4101.74	24867.8	27053.21

Source: Monthly Review of Economy, Regional Economic Services, CMIE.

Performance of Power Sector: 2007-08: An overview

Gross power availability is the accrual of generation of all the State's power projects and purchases made from the Central sector and IPP. During 2007-08, the gross generation of power thus converged 66815 mu against 63563 mu in 2006-07. The peak demand during 2002-03 at 6957 MW increased in a sustained manner to reach 8969 MW in 2007-08. In order to avoid the power shortages anticipated for the



State, additional allocation from the central sector projects was attempted, in concurrence with the Ministry of Power, Government of India. As a consequence, 300 MW were additionally allotted from the unallocated quantum of Southern Region to the State. Apart from this, the State proposed to go ahead with SWAP arrangement from Punjab, Madhya Pradesh, West Bengal, and Jammu & Kashmir. In spite of all the precautionary arrangements, the State also launched into demand management strategies. The demand reduction is achieved by (i) staggering of industrial holidays and (ii) using captive sets during peak hours.

Installed Capacity:

Increase in installed capacity is critical for ensuring stable supply and it is the objective of power sector. Towards attaining this objective, during the latest three Plan periods (1992-2007), the State added 4079 MW with an annual average addition of about 270 MW.

The Installed Power Generating Capacity of the State during 2007-08 was 10122.495 MW against 10097.895 MW reported in 2006-07. The additional units from the State's own sector (0.7 MW), Independent Power Projects (25.6 MW) and Captive Power Plants (40.3 MW) have raised the overall capacity of the State to 10122.495 MW. The shedding down of 42 MW in the Central Sector Projects had limited the total additions to 24 MW in 2007-08.

The prevailing situation in each of its components viz. State's own, Central Sector, Independent Power Projects (IPPs) and Captive Power Plants are captured below:

Table – 4 : Installed Capacity : State Performance (MW)

	2004-05	2005-06	2006-07	2007-08
1. State's own	5401.04 (Nil)	5551.04 (148.96)	5597.385 (47.39)	5598.085 (0.7)
2. Central Sector	3065.00* (213.0)	3201.0* (136.0)	3172.00 (-29.0)	3130 (-42.0)
3. IPP	988.16 (Nil)	1101.16 (113.0)	1154.160 (53.0)	1179.760 (25.6)
4. Captive Power Plants	77.16 (Nil)	178.0 (100.5)	174.35 (-3.65)	214.650 (40.3)
Total Capacity	9531.70 (213.0)	10031.20 (499.50)	10097.88 (66.68)	10122.495 (24.615)

**includes 360 MW from External Assistance.*

Net additions in absolute term is given in brackets.

Source: Statistics at a Glance, 2007-08, TNEB, Chennai – 2.

State's Own Projects:

The installed capacity of the State's own projects as on 31st March 2008 was 5598.085 MW against 5597.385 MW in the previous year. Since capital intensive, thermal and wind projects have been taken over by the private sector, the capacity additions of wind turbines under the State fold remains stagnant. Gas turbines after shedding a smaller quantum of 0.4 MW during 2005-06 stood at 423.9 MW in 2006-07 and 2007-08. In the current year, the capacity of Mettur dam has been expanded from 40 MW to 50.0 MW. Reviewing the Capacity additions during a plan period would be appreciated rather than year to year additions as this daunting task is not only capital intensive but also has longer gestation period. Going by this analysis, during the Tenth

Plan (2002-07), an overall increase of 2174 MW was witnessed against 1016 MW in the Ninth Plan and 889 MW in the Eighth Plan.

Table – 5: Installed Capacity : State’s Own Projects (MW)

	2003-04	2004-05	2005-06	2006-07	2007-08
Hydro	1987.40	1987.40	2137.4	2184.15	2186.65
Thermal	2970.0	2970.0	2970.0	2970.0	2970.00
Gas	424.28	424.28	424.28	423.880	423.88
Wind	19.36	19.36	19.355	19.355	17.555
Total (State’s own)	5401.04	5401.04	5551.04	5597.38	5598.085

Source: Statistics at a Glance, various issues, TNEB, Chennai – 2.

Central Sector Projects:

The State Government receives an assigned share of installed capacity from the Central Sector Power Projects established in Tamil Nadu and neighboring States. In that way, Neyveli Thermal Station I & II, National Thermal Power Corporation, Ramagundam, Talcher Stage II are the thermal and Madras Atomic Power Project and Kaiga Atomic Project are the Nuclear Projects offering their capacities to the State. While all the thermal sources put together extend 2310.0 MW, the atomic projects offer 531 MW to the State grid in 2005-06. Allotted but unused shares of neighbouring States utilized by Tamil Nadu earlier were taken away by the respective allottees during 2006-07. This process has pulled down the total central sector contribution from three projects, viz., Neyveli I, Neyveli I Ext and Kaiga atomic from 977 to 818 MW, by 16.3 per cent. This led to an overall reduction of 4.7 per cent in the Central sector’s contribution to Tamil Nadu. In the year 2007-08 capacity assigned from Kaiga Atomic had been raised from 117 MW in 2006-07 to 171 MW in 2007-08. From the Talcher Super Thermal Stage-II Project, about 66 MW were curled back. Consequently, the aggregate capacity extended from the central sector power projects during 2007-08 was contained at 2825 MW, reduced by 0.4 percent.

Table - 6 : Installed Capacity : Central Sector (MW)

	2005-06	% share	2006-07	% share	2007-08	% share
Neyveli TS – I	500	83.3	475	79.2	475	79.2
Neyveli TS – I Exp.	240	57.1	226	53.8	226	53.8
Neyveli TS-II	441	30.0	466	31.7	466	31.7
MAPP	294	62.5	330	70.2	330	75.0
NTPC Ramagundam	588	22.6	659	25.3	659	25.3
Kaiga Atomic	237	53.9	117	26.6	171	25.9
Talcher Super Thermal Stage II	541	27.1	564	28.2	498	24.9
Total (Central Sector)	2841		2837		2825	34.5

Source: Statistics at a Glance, 2007-08, TNEB, Chennai – 2.

Independent Power Projects (IPPs):

The appreciable contribution of IPPs in the State indicates a faster rate of growth compared to other sources. A total capacity of 1144.91 MW was gathered from the seven IPPs functioning in the State during 2006-07 as against 1092.11 MW in 2005-06. The latest addition in this group was Arkay Energy Limited with 52.8 MW capacity commissioned on July 2006. As such there is no creation of additional capacities under this category during 2007-08. The projects coming under IPP are: (i) Basin Bridge (GMR Vasavi) (196.00) (ii) Samalpatti (105.66) (iii) Pillaiperumalnallur (330.50) (iv)

Samayanallur (106.00) (v) Neyveli Zero Unit (250.00) (vi) Aban Power Co. Ltd. (120.00) and (vii) Arkay Energy Limited (71.6).

Captive Power Plants:

Since the implementation of Electricity Act, 2003 the captive power plants are liberalized to function independently and are not expected to enrol under the Electricity Board. The installed capacity of reported units with a total capacity of 214.65 MW as on 31st March 2008 alone are taken into consideration.

Power Supply against Demand:

The demand for power had increased at an annual rate of 4.8 per cent during the past five years ending with 2007-08. This rate of increase is taken as a yardstick to measure the quantum of demand risen from the consumers. Anticipating a higher industrial production and economic activities, the number of consumers is also expected to increase at a faster rate, probably not less than 6.0 per cent. At this rate, the average demand during the year would increase from 8969 MW in 2007-08 to 9459 MW by the end of the year. The monthly requirement and availability position of the power sector indicates a deficit during the current year.

Table – 7 : Peak Demand and Supply

Month	(MU)					
	Power Requirement (mu)		Power Availability (mu)		Surplus (+) / Deficit (-) %	
	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08
April	5072	5447	4897	5307	(-)3.45	(-)2.57
May	5006	5542	4924	5438	(-)1.64	(-)1.88
June	5006	5447	4924	5374	(-)1.03	(-)1.34
July	5259	5620	5205	5580	(-)0.33	(-)0.71
August	5415	5488	5397	5467	0.02	(-)0.38
September	5072	5460	5033	5467	(-)0.77	0.13
October	5069	5951	4985	5693	(-)1.66	(-)4.34
November	4252	5229	4175	4914	(-)1.81	(-)6.02
December	4859	5132	4732	4843	(-)2.6	(-)5.63
January	5087	5453	4958	5272	(-) 2.54	(-)3.32
February	5024	5570	4913	5302	(-) 2.21	(-)4.81
March	5787	5385	5648	5241	(-) 2.40	(-)2.67

Source: Monthly Review of Tamil Nadu Economy, Regional Monitoring Service, CMIE, December 2007 & June 2007 Issues.

The substantial new industrial investments in the State in the recent months have increased the annual incremental demand for power to 700 MW from 400 MW a year ago. Moreover, the change in wind pattern dried out 1500 MW of power through wind power generators much earlier than usual. Floods in Neyveli Lignite Corporation and short supply from central pool also deprived the State of another 1000 MW of electricity during the month. The minor deficit occurred during the earlier period of 2007-08 could easily be made good by the end of the year by efficient management.

Demand Management was the key driver of policy formulation and ensuring reliable supply. The State's performance on the power front was satisfactory to meet the

increasing demand. Installed Power Generating Capacity of the State which crossed 10000 MW during 2005-06 had added another 67 MW to its fold during 2006-07. The State caters to the need of about eight lakh consumers including 5.5 lakh domestic consumers. Average peak demand met by the State during 2007-08 was 8969 MW against 8803 MW in 2006-07 which increased by 1.9 per cent. The added demand was also met in an uninterrupted manner. The State's consolidated gains from various sources of generation during 2006-07 was 48889 mu, which increased from 43582 mu in 2005-06 by 12.2 per cent. The ultimate indicator, per capita consumption of power rose from 960 units in 2006-07 to 1000 units in 2007-08 which is a significant achievement.

Supply Side Factors:

The depleting nature of the conventional sources of energy and unreliable availability of the same are the crucial factors as far as the natural sources are concerned. The availability of energy resources plays a pivotal role in power generation. However, the State takes all out efforts to maximise the utility of the limited hydel and almost nil thermal resources. The availability of these power generating sources during 2006-07 is given here as a backdrop to understand the performance as this would reveal the causes for the achievements.

Supply of resources for the hydel stations depends on monsoons and inflows into the reservoirs. During 2007-08, all the 36 hydro stations functioning in Tamil Nadu had a total inflow of 4381 mu (energy equivalent) of water against 4583 mu received in 2006-07. In spite of the resource crunch the outgo from these hydro projects was appreciable.

Power Generation:

The quantum of power generation from the State's own sources put together had increased from 26915 mu. in 2005-06 to 29481 mu. in 2006-07, by 9.5 per cent. Thereafter, the generation decelerated to 0.8 per cent and a quantum of 29241 mu was realised in 2007-08.

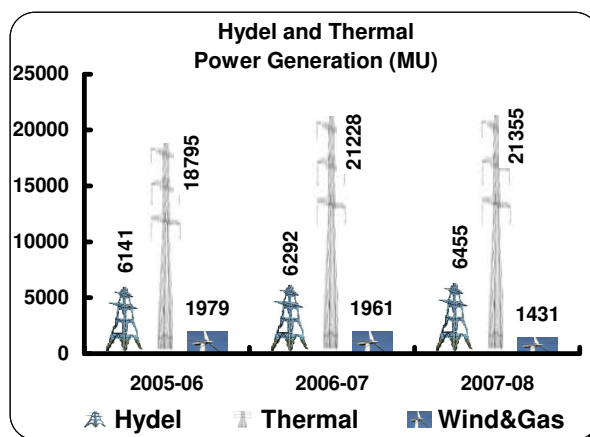


Table – 8: Power Generation : State's Sources (MW)

	2005-06	% share	2006-07	% share	2007-08	% share
Hydro	6141	22.8	6292	21.3	6455	22.1
Thermal	18795	69.8	21228	72.0	21355	73.0
Gas	1964	7.3	1944	6.6	1419	4.9
Wind	15	0.1	17	0.1	12	0.04
Generation	26915	100.0	29481	100.0	29241	100.00

Source: Statistics at a Glance, 2007-08, TNEB, Chennai – 2.

The generation mix of various sources excluding wind during 2006-07 in the ratio of 21: 72: 7 was slightly altered in favour of hydro and thermal sources (22:73:5). As the wind mills under the State Government are kept as demonstration units, a minimum

quantum alone was realized. The hydel sources were able to generate an all time high quantum of 6455 mu over and above a high base of 6292 mu is highly commendable. The overall PLF of hydel projects at 33 per cent during 2006-07 was slightly raised to 34 per cent in 2007-08.

The four thermal projects functioning in the State contributed effectively by generating an all time high quantum of 21355 mu for the State grid. Thermal plants maintained the overall PLF of 82 per cent during 2006-07 and 2007-08, an increase from 72 per cent recorded in 2005-06. The gas and wind sources remained at the earlier levels.

Purchases:

Power purchases from the Central Sector Projects and IPPs constitute more than 50 per cent of the gross availability of power. The quantum of purchases increased year after year, especially after the introduction of IPPs. The IPPs' contribution to the overall purchases increased from 18 per cent during 1998-99 (year of introduction) to 59 per cent in 2006-07. Consequently, power supply from the purchases component reached 33557 mu during 2006-07 from 29811 mu in 2005-06, increased by 12.6 per cent. To the incremental 3746 mu of 2006-07, IPPs had a higher share of 88 per cent (3300 mu) and Central sector 12 per cent (446 mu).

Table – 9 : Power Purchases (MU)

	2005-06	% change	2006-07	% change
I. Central Sector Projects	13306	5.5	13752	3.4
i. Neyveli I & II	7319	(-)5.8	7194	(-)1.9
ii. MAPP	1173	28.5	1684	(-)1.7
iii. NTPC	4814	20.0	4887	1.5
II. IPPs & Others	16505	24.2	20317	23.1
Total purchases	29811	15.1	33557	12.6

Source: Statistics at a Glance, 2007-08, TNEB, Chennai – 2.

Gross Power Availability:

Power generation from the State's Own Projects and Purchases from the Central sector and Independent Power Projects are converged as gross power availability. The overall contribution from these two sources rose from 56726 mu in 2005-06 to 63038 mu in 2006-07, by 12.6 per cent. Additional units generated during 2006-07 at 6312 mu were against 4381 mu in 2005-06. The contribution mix of generation and purchases remained at the ratio of 47:53 in both 2005-06 and 2006-07.

Table – 10 : Gross Power Availability (MU)

	2005-06	Net Addition	2006-07	Net Addition	2007-08	Net Addition
Generation	26915	465	29481	2566	29241	(-)240
	(47.4)		(46.8)		(43.8)	
Purchases	29811	3916	34082	3746	37574	3492
	(52.6)		(53.6)		(56.2)	
Gross Power availability	56726	4381	63563	6312	66815	3252
	(100)		(100.0)		(100.0)	

Percentage share to total is given in brackets

Source: Statistics at a Glance, 2006-07, TNEB, Chennai – 2.

Net Power Availability:

The net power available for consumption within the State at 50159 mu in 2006-07 was against 43582 mu in 2005-06, registering an increase of 15.1 per cent. The incremental net power availability to the tune of 6577 mu during a single year is an important achievement. Every year about 3.5 per cent of the gross availability of power energy is utilised as auxiliary consumption about 1.0 per cent sold to other States and 16 to 18 per cent is wasted in the process of transmission as line losses. Even though 18 per cent of line loss recorded in Tamil Nadu is lower than that of all India (22%), reducing it to a minimum level of 12 per cent was targeted for the X Plan which needs much investments for strengthening the net work. The reduction of auxiliary consumption in the latest two years indicates better performance of the power plants.

Table – 11 : Net Power Availability (MU)

	Net Power Availability			% Change		
	2005-06	2006-07	2007-08*	2005-06	2006-07	2007-08
Gross Availability	56726	63563	66815	8.4	12.1	5.1
Auxiliary consumption@	2346	2393	2304	11.7	2.0	(-)3.7
Sales to other States	1010	811	521	186.9	(-)19.7	(-)35.8
Line Loss	9788	11011	11715	8.2	12.5	6.4
Net Availability	43582	48889	52275	6.7	13.0	6.1

@ including Kadamparai pumping. * Provisional.

Source: Statistics at a Glance, 2007-08, TNEB, Chennai – 2.

Power Consumption:

The net power available is the total consumption of the consumers. While the power availability increased at a rate of 6.4 per cent during 2007-08, the number of consumers and connected load increased at the rates of 4.3 per cent and 6.3 per cent respectively.

Table – 12 : Power Distribution – Network

	2005-06	Net Addition	2006-07	Net Addition
1. Distribution Transformers (Lakh nos.)	1.67	0.06	1.73	0.06
2. Length of HT & LT Lines (000 km)	636.58	12.58	655.91	19.33
HT lines (000 km.)	149.11	2.11	154.10	4.99
LT lines (000 km.)	487.47	10.47	501.81	14.34

Source: Statistics at a Glance, 2006-07, TNEB, Chennai – 2.

Consumers and Pattern of Consumption:

It is the endeavour of the State to cater to the requirement of all the consumers which is estimated at about 185.82 lakhs. During 2006-07 a total number of 7.79 lakh consumers were added, of whom 5.54 lakhs were domestic consumers and 1.04 lakhs commercial consumers.

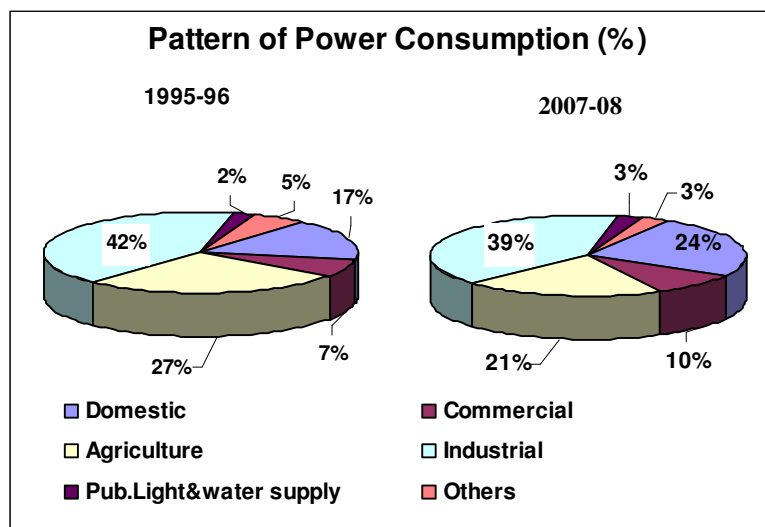
Table – 13: Consumption Pattern of Power

Category	No. of consumers (lakhs)			Consumption of power (mu)		
	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08
1. Domestic	119.74 (67.3)	125.28 (25.2)	130.64 (67.2)	11052 (25.4)	12034 (24.4)	12997 (24.8)
2. Public Lighting & Water works	3.21 (1.8)	3.45 (1.9)	3.87 (2.0)	1179 (2.7)	1295 (2.6)	1331 (2.5)
3. Industries	4.36 (2.4)	4.51 (2.4)	4.71 (2.4)	16312 (37.4)	19237 (39.0)	21100 (40.5)
HT supply	0.06	0.06	0.07			
LT supply	4.30	4.45	4.65			
4. Agriculture	17.68 (9.9)	18.02 (9.7)	18.39 (9.5)	9804 (22.5)	10610 (21.5)	10922 (20.9)
5. Commercial	21.23 (11.9)	22.27 (12.0)	23.43 (12.1)	3967 (9.1)	4698 (9.5)	5024 (9.6)
6. Others	11.81 (6.7)	12.29 (6.6)	13.3 (6.8)	1268 (2.9)	1389 (2.8)	1475 (2.8)
Total	178.03 (100.0)	185.82 (100.0)	194.34 (100.0)	43582 (100.0)	49263 (100.0)	52849 (100.0)

Figures in brackets indicate percentage share to total.

Source: Statistics at a Glance, 2006-07, TNEB, Chennai – 2.

Domestic (25.2%), industrial (39.2%) and agricultural (21.2%) consumers together emerged as major user categories by taking away about 85 per cent of the total consumption. Commercial category, another notable shareholder had increased its consumption three times accounting for nearly one tenth of the total consumption.



Taking into consideration the pattern of consumption in two earlier periods, 1990-01 and 2000-01, a visible shift could be seen.

- The domestic category, with a relative share of 16.8 per cent during 1990-91, had improved to 20.9 per cent in 2000-01 and further to 25.2 per cent in 2006-07. Increasing number of nuclear families and their respective consumption needs due to raised standard of living and wider usage of electrical gadgets induce this situation;
- The industrial category enjoying 42.4 per cent share in early 1990s had narrowed to 39.2 per cent in 2006-07 after a great fall during 2000-01 (35.6%); improvement in the industrial production and technology has pushed up the consumption;
- Agricultural category which scrap away 27.6 per cent during 2000-01 from 25.5 per cent in 1990-91 due to free supply had shrunk to 21.2 per cent in the reference

- year. In the later years after 2001-02, the monsoons were favourable for better canal irrigation which ultimately reduced the ground water withdrawal; and
- The commercial category moving at a faster rate took away about 10.0 per cent share in 2000-01 from 6.8 per cent in 1990-91 remained more or less in the same position. The boom in the advertisement industry promoted the commercial activities which has a direct impact on power consumption.

Table – 14: Relative Share of Consumers (%)

	1990-01	2000-01	2006-07	2007-08
1. Domestic	16.3	20.9	24.4	24.8
2. Commercial	6.8	9.9	9.5	9.6
3. Industrial	42.4	35.6	39.0	40.3
4. Agricultural	25.5	27.6	21.5	20.9
Total (mu)	16239	33216	49263	52849

Source: Computed from Statistics at a Glance, 2007-08, TNEB, Chennai – 2.

Rural Electrification:

Rural electrification, a programme implemented in the State is vital for the socio-economic development of rural areas. The objective of the programme is to trigger economic development and generate employment by providing electricity as an input for productive use in agriculture and rural industries, besides improving the quality of life of rural people. The definition of rural electrification has been revised. A village at present is deemed to be 'electrified' if electricity is used when the following conditions are met.

- basic infrastructure such as distribution transformer and distribution lines are provided in each habitation of every village;
- electricity is provided to all public places like schools, panchayat offices, community centres etc; and
- number of households electrified should at least be 10 per cent of the total households in the village.

As per the new definition of village electrification (with effect from 2004-05) number of unelectrified villages is estimated to be around 1.25 lakhs at the National level. Government of India has formulated a time bound plan Bharat Nirman in which Rural Electrification is a component in partnership with State Governments and Panchayat Raj Institutions. Rural Electrification Corporation will be the nodal agency for implementing this plan. Under this action plan every village is to be provided electricity by 2009. Stand alone grid set up in partnership with Ministry of Non-Conventional Energy sources with generation where grid supply is not feasible.

Under the scheme, 90 per cent subsidy on capital cost of the project would be provided. Electrification of unelectrified below poverty line households is financed by 100 per cent capital subsidy at Rs.1500 per connection in all rural habitations. Others have to pay at the prescribed charges without subsidy. During the process, priority will be given to unelectrified villages and preference to Dalit Bastis, Tribal settlements and habitations of weaker sections.

Box - 1					
Reported Status of Rural Electrification					
Better Electrified States			Poorly Electrified States		
State	Electrified		State	Electrified	
	Villages (%)	Households (%)		Villages (%)	Households (%)
H P	99.4	94.8	Rajasthan	98.4	54.7
Punjab	100.0	91.9	Chhattisgrah	94.0	53.1
Haryana	100.0	82.9	West Bengal	83.6	37.5
Gujarat	100.0	80.4	NE Region	75.3	33.2
Karnataka	98.9	78.5	UP	58.7	31.9
Tamil Nadu	100.0	78.2	Orissa	80.2	26.9
Maharashtra	100.0	77.5	Jharkhand	26.0	24.3
Kerala	100.0	70.2	Bihar	50.0	10.30
Madya Pradesh	97.4	70.0			
Andra Pradesh	100.0	67.3			

Source: Mid term Appraisal of Tenth Plan, GOI.

As per 2001 Census about 44 per cent of the households at the National and 22 per cent at the State levels do not have electricity. As on 31st March 2008, the towns numbering 439 and 15400 Villages, 48117 hamlets (Out of 48452 existing in the State) and 26764 Adi-Dravidar colonies of the State were electrified. This apart, across the State 10.56 lakh huts were electrified.

Progress in Tenth Plan:

Even after receiving greater importance in the Tenth Plan, i.e. after getting an outlay of Rs.270276 crores (18.2 % of Total outlay), this sector remains as the 'area of concern' in the State. The attributable factors for this conclusion are:

- the poor quality power imposes a heavy burden on trade and industry;
- aggregate technical and commercial losses exceed 40%; in few states like Orissa, it is over 45 % even after six years of privatisation;
- many of SEBs are financially weak- loss on sale of electricity is increasing since 2002-03;
- at the national level, 56 per cent of households are not electrified;
- reported peaking and energy shortages are 7 and 11 per cent respectively at the national level;
- the relative share of Central power sector under takings to State and private sectors is increasing and leads to a guaranteed 14/16 per cent returns under a

cost plus tariff regime : a situation unique to India which cannot be sustained in the prevailing high AT&C losses. The need to make industrial / commercial tariffs inter nationally competitive limits the scope of increasing the tariffs for these two categories. Less than 42 % is sold to these two which, however, yields 70 per cent of the actual revenue collected by the state utilities; and

- generation and transmission investments continue to dominate the sector with 90 % of investment.

A total number of 18.39 lakh pumpsets were energised by the end of March 2008 against 10.56 lakhs in the previous year. Every year on an average 30000 pumpsets are newly energized.

Table – 15: Number of Pump-sets Energised

Year	Number Energised	Cumulative Total
2002-03	29863	1676113
2003-04	27484	1702541
2004-05	33039	1736946
2005-06	31786	1768052
2006-07	34325	1801972
2007-08	34642	1839241

Source: Statistics at a Glance, 2007-08, TNEB, Chennai – 2.

Renewable Sources of Energy:

The impact of global warming and subsequent climate changes made the whole world to think of harnessing renewable energy sources. Tamil Nadu is in the forefront in this respect. The Eleventh Five Year Plan proposes to harness potential renewable sources of energy viz., wind energy, solar energy, bio-mass and other forms of energy, Tidal energy, fuel cell and hydrogen energy, ocean thermal energy, geo thermal energy etc., to provide clean and green energy.

As on 31st March 2007, the aggregate installed capacity of power from renewables in the State was 3868 MW, against 10255 MW in the country which indicates that about 38 per cent of the capacity is harnessed by the State. Of all the sources, wind plays a major role with 3475 MW (against all India's 7092 MW) or 50 per cent of the national capacity. To the State grid these renewable sources of energy had a share of 22 per cent.

During 2007-08, a capacity addition of 469 MW was made taking the aggregate capacity from renewables in the State to 4304 MW as on 31.03.2008 as against 12400 MW in the country, indicating the State share as 35 per cent of the country's capacity. Wind power continues to be the major source among the renewables. The share of renewable power in the State grid has also increased to 27 per cent. Further, the total units of power generated from Renewables and exported to the State grid during 2007-08 was 7532 million units which is about 11 per cent of the grid consumption.

State efforts in harnessing non-conventional source:

Tamil Nadu is the largest contributor in respect of tapping various non-conventional renewable sources of energy. The cumulative efforts as on 31.3.2008 are given below.

Table – 16 : Non-Conventional Sources of Energy

	Installed capacity as on 31.3.2008		
	Tamil Nadu	India	State's share in %
Wind Power	3856	8757	44
Biomass	99	605	16
Bagasse co-generation surplus	256	800	32
Bio-mass Gasifier	1	1	100
Energy recovery from waste	4.25	55	8
Small Hydro (upto 25 MW)	87.70	2180	4
SPV	0.165	2	8
Total	4304	12400	35

Source: TEDA, Chennai – 6.

Wind Power:

The installed capacity of wind power in India as on March 2008 was 8757 MW, mainly spread across Tamil Nadu (3856 MW), Maharashtra (1756 MW), Karnataka (1011 MW), Rajasthan (539 MW), Gujarat (1253 MW), Andhra Pradesh (122 MW), Madhyapradesh (188 MW), Kerala (2 MW), West Bengal (1.6 MW). The Tamil Nadu Energy Development Agency has taken early steps in assessing the potential of wind power and established demonstration wind mills in eight sites with a total capacity of 19 MW. Noticeable yield from these demonstration units had paved way for additional units in the State. As on date, 41 potential sites in eight different districts, having annual mean wind speed of 18 Km/h and wind power density of 200 W/m² at 50 m. level are found to be suitable for wind projects. The total potential tapped in the State are about 5500 MW. To gear up this operation every year, it is proposed to study three new sites throughout the State. Tamil Nadu, endowed with lengthy mountain regions on its western side with three passes like Palghat Pass in Coimbatore, Shengottah pass in Tirunelveli and Aralvoymozhi pass in Kanniyakumari district. In many of these places, the PLF of the plant is about 30 per cent. Out of all the farms, Muppandal (Kanniyakumari district) has the highest capacity of 1000 MW - 55 KW capacity machines established in 1980s have widened and the capacity of each of these machines was increased to 2 MW. During 2006-07, from this single source of renewable energy, about 5269 mu were generated and in 2007-08, it was 6067 mu.

Bio-gas based co-generation:

Tamil Nadu plays a pioneering role in this respect by harnessing power from the sugar mills as co-generation. Since 1992, there are three Co-operative and 15 private sugar mills which have set up co-generation projects for a total capacity of 337 MW as on 31.3.2007. The total capacity has increased to 446.10 MW as on 31.03.2008 from 3 co-operative sugar mills and 18 private sugarmills.

Bio-fuels:

Energy security concerns and environmental imperatives have brought ethanol and bio-fuels into the policy matrix. Jatropha has potential and the liquid fuels from biological materials have the potential to substitute petrol / diesel oil. Government of India has permitted blending of petrol upto 5 per cent alcohol based 'Ethanol' mix from molasses in sugar mills in 9 States including Tamil Nadu. Bio-diesel extracted from Jetropha / Pungan seeds can be used as an alternative fuel for existing diesel engines.

Electrification of Remote Habitations Using SPV systems:

Tamil Nadu has achieved total electrification of villages long time ago. But there are still a few remote habitations in forest areas which could not be electrified due to problems of long distance, forest clearance etc. Based on the list of habitations furnished by TNED, which might not be electrified through grid, the Government of India (MNRE) sanctioned the Remote Village Electrifications (RVE) Phase-I programme for electrification of 150 remote habitations using solar lighting systems. The cost of which including 5 years maintenance is to be shared by the Central and State Governments. The work has been completed in March 2007 by providing 5190 Nos. SPV Home lighting and 283 SPV Street lighting systems in 128 habitations in 12 Districts at a total cost of Rs.8.25 crores. Some of the other habitations were subsequently electrified by TNEB.

Further under Phase-II, another 32 habitations in 6 Districts, will be taken up for electrification through SPV systems.

Box - 2

Special Economic Zone –Renewable Energy

A Special Economic Zone (SEZ), exclusively for manufacturing renewable energy equipments and development of renewable energy technologies is likely to be set up in Tamil Nadu, first of its kind in the world facilitated by Tamil Nadu Energy Development Agency. The SEZ is likely to be set up in the villages of Chenglepet Taluk, Kancheepuram District. MOU has been signed by Government of Tamil Nadu with private promoters on July 2007.

XI Plan Objectives:

The objectives of the power sector during the Eleventh plan period are (i) to augment generating capacity to meet increasing demand from industrial and other developmental activities. (ii) Expansion in the transmission and distribution system to absorb the capacity additions. (iii) Increase PLF of the power stations to increase the revenue and provide comfortable financial position to TNEB. (iv) to formulate policy to regulate commission of private power projects. (v) to formulate long range plan to reduce line losses, pilferage and power thefts and (vi) to achieve 100% household electrification both in urban and rural areas.

During XI plan, a total capacity addition of 7808 mw is planned. Of this 3270 mw from State sector, 2008 mw from Central sector, 1210 mw from Joint Venture and 1320 mw from private sector projects. To achieve these targets, a total outlay of Rs.593.70 crores is proposed for Renovation and Modernisation and upgrading scheme. To expand transmission and distribution network, it is planned to establish 300 new sub-stations and erect 4000 circuit kms of Electric High Tension Lines.

The capacity additions proposed for this plan period from various sources are as follows:

Box – 3 : Tamil Nadu : Major Power Projects as of 20 May, 2008					
Name	Capacity		Cost (Rs. crore)	Status	Location
	Value	Unit			
Coal Based Power Plant Project	4000	MW	16000	Announcement	Cuddalore
Kudankulam Atomic Power Project	2000	MW	13171	Under implementation	Kudankulam
Coal Based Power Project	2000	MW	10000	Announcement	Thirukkuvalai
Tuticorin Thermal Power Plant Project-Phase I	2000	MW	4200	Announcement	Tuticorin
Ennore Power Project	1885	MW	6417	Under implementation	Ennore
Udangudi Power Project	1600	MW	8500	Announcement	Udangudi
Jayamkondam Power Project	1500	MW	5500	Under implementation	Jayamkondam
Cuddalore Thermal Power Project	1320	MW	6000	Under implementation	Thyagavalli
Chennai Coal Based Power Project	1200	MW	6000	Announcement	Chennai
Kuruvimedu Thermal Power Project	1000	MW	5500	Announcement	Kuruvimedu
Tuticorin Coal Based Power Project	1000	MW	4909	Under implementation	Tuticorin
Neyveli Power III Project	1000	MW	3969	Announcement	Neyveli
Ramanathapuram Power Project	1000	MW		Announcement	Ramanathapuram
Manali Power Project	842	MW	2837	Under implementation	Manali
North Chennai Thermal Power Generating Unit Project	600	MW	2475	Announcement	North Chennai
Kalpakkam Power Project (Prototype Fast Breeder Reactor)	500	MW	3492	Under Implimentation	Kalpakkam
Captive Power Project	500	MW	2400	Under implementation	Tirunelveli
Neyveli Power Project – Stage II (Cfbc Technology)	500	MW	2031	Under implementation	Neyveli
Rasimanal Hydel Power Project	200	MW		Announcement	Rasimanal
Thermal Power Project	189	MW	598	Under implementation	Keezhavela-yuthampalayam
Total of the above			103999		
Total investment			108122		

Source: Monthly Review of Tamil Nadu Economy, June 2008, CMIE.