Enabling Environment for Industrial Growth – KPTCL'S Role

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Abstract--**The concern of the state governments has always focused on the delivery mechanism, which could implement new projects with infrastructure and enable the environment for industrial growth. The article published by Mr. Samuel Paul in Economic and Political weekly October 2000, has raised some vital issues regarding problems faced by the investors in the state. Being most important inputs for the very industrial growth the power management concern is responding / responded and tackled the various issues as an enabler in the state's industrial growth have been brought out in this article.**

INTRODUCTION

We are aware that the Karnataka is the most progressive state in the country. The first Hydel generating station in Asia & first longest 78 KV transmission line in the world was established in the state during 1902 A.D. The state encouraged industrial development even during pre independence period also. The Bangalore City called as the Silicon Valley of India & Karnataka State has drawn the attention of the whole world, particularly in the field of Information Technology. The Government of Karnataka has already initiated measures for developing infrastructure facilities and creating a good atmosphere for industrial development in the State for creating more employment opportunities and to improve State's economy.

We may recall here that, Government of Karnataka also convened the global investors' conference. The MNC's & the leading industrialists in the country have already proposed to establish industries in the State.

The power sector is most vital for economical development of any State/country. The per capita power consumption of Karnataka is of the order of about 450 kwhrs, against per capita consumption of more than 8000 kwhrs in advanced countries of Europe and United States.

The state visualizes an annual GDP of at least 7%. The present sensitivity ratio of increase in power requirement to GDP is 1.5, which means that the power requirement should increase at the rate of 10.5% per annum.

The mission statement of Karnataka Power Transmission Corporation Limited is to ensure Reliable & Quality power to its customers at competitive prices. Our endeavor is to develop infrastructure in power sector to provide reliable and quality power supply to all categories of consumers particularly to industrial sector for overall economical progress of the state, in tune with efforts of Government of Karnataka.

The KPTCL is committed to achieve mission through:

- Encouraging best practices in transmissions and distribution.
- Ensuring high order maintenance of all its technical facilities.
- Emphasizing the best standards in customer service.

Further, to be best electricity utility in the country, the KPTCL pledges to optimize its human and technical resources for the benefit of all its existing & prospective customers.

Customer charter and internal standards have been brought in and are being adopted in the following:

- Power supply operation
- Billing and collection
- Customer service, and grievance redressal.
- Safety

As a part of the reform process the regional business centers have been formed for each zone to function as independent profit/cost centers at zones with the following capabilities:

- Decentralization of decision-making.
- Specific responsibilities and authority assigned to RBC's
- Aims & Objectives of RBC's specified with targets to be achieved.

What exactly is required?

- Rational Tariffs based on cost of power.
- Elimination of Hidden state subsidies and dismantling administered pricing mechanism.
- Pressure to reduce losses and eliminate inefficiencies
- Mandatory standards in customer service quality accounting and disclosures.

With the above brief introduction, I would like to bring some more highlights on "how KPTCL is acting as an enabler" for states industrial growth, apart form its own growth.

The SYSTEM PLANNING.

The objectives of Power System Planning is to design and plan power system for a long period of at least 10 years to achieve the required pre-set goals.

- Projection of demand and energy requirements.
- Generation planning for a period of decade to meet the projected load growths on least cost options taking into consideration capital investment on evacuation lines and transmission losses.
- To develop an optimal power system to meet the forecasted power demand in the various horizon years.
- To arrange reliable and quality power supply to the entire consumer entity, that is uninterrupted, reliable & stable power supply at rated voltages and frequencies.
- To reduce the system T&D losses to the minimum level.
- To improve the stability of the system by proper designing of transmission and distribution network suitable to meet the contingency conditions of loss of generation and line outages.

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- To identify and provide adequate reactive compensation at different locations in the system for optimum utilization of all power supply equipment's viz. generators, power transformers, transmission & distribution lines, distribution transformers, and also to reduce system losses & improve voltage levels.
- Identification and strengthening of weak transmission and distribution network to meet the projected load growth.

Projection of demand and energy requirements for a period of ten years, it is necessary to carry out the exercise of load forecast to assess realistically the unrestricted energy and demand requirements for the base year 1999-00 and project the requirements based on the following methodology and data.

A Brief on Methodologies followed:

The following tools are generally followed for scientific projection of demand and energy. The software is also available for carrying out this exercise.

- Time series model
- Regression model
- Multiple regression using econometric parameters
- End use method

PARAMETERS REQUIRED FOR LOAD PROJECTIONS

The various parameters shown below are required for the use in the above-mentioned tools for load projections.

- Population
- Number of consumers State domestic product at constant prices
- Per capita income
- Value of industrial production
- Index of industrial production
- General wholesale price index
- Gross cropped area
- Net area sown
- Number of connected pumps
- Number of registered factories
- Number of industrial workers
- Degree of urbanization
- Values of agricultural produce
- Number of registered workers in industry
- Per capita energy consumption
- Some statistics on peak demand etc…
- Number of schools.

EXISTING SCENARIO ON GENERATION, DEMAND & ENERGY:

Table – 1 DETAILS ON GENERATING CAPACITIES.

Year	State units in mw	State Share in CGS	IPP mw	Total mw	Addition	% Addition
90-91	2970.20	459	-	3429.20		
91-92	2970.20	574	-	3544.20	115.00	3.35
92-93	3029.00	574	-	3603.00	58.80	1.66
93-94	3303.85	574	-	3877.85	274.85	7.63
94-95	3518.35	574	-	4092.35	214.50	5.53
95-96	3520.35	574	2.50	4096.85	4.50	0.11
96-97	3520.35	574	2.50	4096.85	0.00	0.00
97-98	3576.35	574	2.50	4152.85	56.00	1.37
98-99	3876.35	574	169.50	4619.85	467.00	11.25
99-00	4216.35	628	373.50	5217.85	598.00	12.94
Addition	Over a	Decade			1788.65	52.16

Load projections as per historical load growth:

The load growth in Karnataka during 90's is to an extent of about 6% under restricted conditions as the State was reeling under severe power shortage since 1971.

The present shortage to meet the peak demand and energy requirement is approximately to an extent of 25% and 10% respectively.

Table – 2 GROWTH OF DEMAND AND ENERGY DURING LAST DECADE OF 20TH CENTURY UNDER RESTRICTED CONDITIONS.

Year	Consumption mu	% Growth	Peak demand mw	% Growth
90-91	15243		2422	
91-92	15629	2.53	2619	8.13
92-93	16106	3.05	2634	0.57
93-94	17444	8.31	2939	11.58
94-95	19741	13.17	3224	9.70
95-96	19769	0.14	3164	-1.86
96-97	18771	-5.05	3126	-1.20
97-98	21753	15.89	3527	12.83
98-99	22882	5.19	3829	8.56
99-00	26166	14.35	4066	6.19
Growth over 10 years	10923	71.7	1644	67.9
Average growth	Per year	7.17		6.79

Table – 3 FORECAST FOR THE NEXT 10 YEARS: UNRESTRICTED PEAK DEMAND FOR THE YEAR 1999-10:

1	Peak demand recorded on 30th Jan 2000	4066 MW
2	Load shedding during peak hour	200 MW
3	Loss of load due to single phasing	200 MW
4	Frequency correction factor at the rate of 2% increase in generation for every 1% of frequency correction as per the principle laid down by M/S CEA. For correction of frequency from 48 Hz to 50 Hz – additional generation requirement.	325 MW
5	Voltage correction factor	200 MW
	Total	4991 MW
6	Unrestricted peak demand of Karnataka for 1999-2000 is	5000 MW
7	Unrestricted power demand by 2009-10 at the rate of 6% growth considering reduction in peak power losses and 15% spinning reserve	9100 MW
8	Existing generation capacity including share in CGS	5144 MW
9	Existing generation capacity available during peak seasons between January and April as some of the seasonal hydro plants to an extent of about 344 MWs will not be available	4800 MW
10	Additional generation capacity requirement during next ten years	4300 MW

Considering the present shortage and moderate growth to an extent of 6% per annum for the next one decade, the demand and energy projections for the year 2009-10 will be about 9000 MWs, 47,300 mu respectively.

The details of load projections and indicated in the following:

Table – 4 YEAR WISE LOAD AND ENERGY PROJECTIONS FOR THE PERIOD FROM 2000-01 TO 2009-10

Sl. No	Year	Unrestricted energy requirement at 6% load growth in mu	Unrestricted energy requirement at 6% load growth with reduction in energy losses at 1.2 % p.a. in mu	Unrestricted peak requirement at 6% load growth in MW	Unrestricted peak requirement at 6% load growth with 1.2% reduction in peak power losses in MW	Requirement generation capacity to the peak demand with15% spinning reserve.
1	99-00	29000		5000		
2	00-01	30740	30371	5300	5236	6021
3	01-02	32584	31802	5218	5477	6299
4	02-03	34540	33297	5955	5741	6602
5	03-04	36612	34855	6312	6009	6910
6	04-05	38809	36480	6691	6290	7233
7	05-06	41137	38175	7093	6582	7570
8	06-07	43605	39942	7518	6886	7918
9	07-08	46222	41785	7970	7205	8285
10	08-09	48995	43704	8447	7534	8665
11	09-10	51935	45702	9854	7880	9061
		Say	46000			9100

KPTCL'S ROLE as an Enabler for a positive industrial Growth. :

In view of the above it is necessary to gear up the for developing infra-structure in the power sector for increased **Generation,** strengthening of the **Transmission & Distribution** network to meet the fast growing load demands & for arranging reliable and quality power supply to all the classes of consumers, for overall growth of state's economy.

GENERATION:

The state owned generating company M/S KPCL and Central sector establishments M/S NTPC have already drawn up plans for establishing new generating units in the state. The IPP's have also come up with proposals for establishing new generating plants in the state.

Table –5 GENERATING CAPACITIES

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TRANSMISSION AND DISTRIBUTION NETWORK:

KPTCL presently looking after Transmission and Distribution in the state has to develop infrastructure in T & D for evacuation of power from the generating stations, strengthen the Transmission and Distribution system to achieve the objective of providing reliable and quality power supply to all the classes of consumers, in a phased manner synchronizing with generation programs & load growth.

TRANSMISSION LINES:

The execution of transmission lines will take longer time due to following problems.

- Conducting surveys
- Obtaining statutory clearances
- Forest clearances
- PTTCC clearance
- Engineering, tying up with finances, floating the tenders and awarding the contracts.
- Solving way leave problems.

EVACUATION LINES:

KPTCL has already evolved proposals for reliable evacuation transmission system from all the proposed generating plants and most of them have already been approved by CEA.

It is necessary that the execution of evacuation lines shall be well planned, finances tied up, obtaining statutory clearances and taken up for execution immediately after generation proposals are crystallized, & closely monitored to complete them before the generating plants are commissioned. The detailed pert charts are to be drawn up for each scheme.

STRENGTHENING OF TRANSMISSION SYSTEM:

The KPTCL has assessed that the present transmission network is sufficient to handle the peak load of about 3500 MWs only and handling more than 4000 MWs peak load at present is causing unreliable & poor quality of the power supply and high transmission losses. Hence it is necessary to strengthen the transmission network to meet the fast growing load demands.

KPTCL has already prepared 10 years perspective Transmission plan up to the year 2009-10 with a total capital expenditure of about Rs. 8500 crores including evacuation lines from the proposed generating plants, providing reactive compensation in the system (apart from evacuation lines proposed under Central sector in the state), to achieve the objectives of providing reliable and quality power supply.

KPTCL has already initiated the following measures for strengthening transmission network.

- Taken up for execution many of the transmission projects, which are under progress.
- Finances for the new projects have been tied up with PFC & REC and initiated action for the execution.

The new project reports are being prepared for obtaining financial tie up with financial institutions like PFC & REC. The simultaneous action for land acquisition for new substations and conducting surveying for transmission lines has to be taken up.

DISTRIBUTION NETWORK:

The distribution network needs immediate attention for its improvement and to reduce the losses in the distribution network. Except in few urban areas, the situation is not encouraging with unreliable & poor quality of power, high distribution losses and large-scale failure of distribution transformers, which has become a heavy burden on the finances of the KPTCL. The reason might be due to steep growth of irrigation loads in the rural areas during the last two decades, which has raised from about 8% during early 80's to about 45% during late 90's and insufficient capital expenditure allocated for improvement of distribution network to commensurate with load growth. It is also found that distribution network data is not readily available for analysis and evolving improvement measures.

KPTCL has conducted detailed distribution network studies of 125 Nos. 11 KV feeders in 12 divisions and evolved the techno-economical improvement proposals to bring them to ideal distribution system at a cost of about Rs. 125 crores, as a pilot project but the same has not been implemented.

KPTCL has already availed the consultancy services from M/s ESCI, Hyderabad for detailed analysis of distribution system in Gulbarga and Bidar districts and for preparing most economical proposals for improvement schemes. This is a first major step in the state for distribution improvement in a systematic way on a large scale.

However it is estimated that approximately an amount of Rs. 3000 cores is required for improving the present distribution network, and an additional amount of Rs. 2000 crores for distribution expansion during the next ten years. The total capital investment of Rs. 5000 crores is required

for improvement of distribution system during next ten years.

CAPITAL INVESTMENT ON T & D NETWORK:
The capital investment of Rs. 13,500 crores at present schedule of rates is required for next ten years period to develop ideal T& D network including evacuation lines to achieve the objectives of providing reliable & quality power supply and to reduce the system losses to accepted levels of less than 15%. The proposed T & D network is designed to meet the forecasted power demand in the various horizon years.

CAPITAL INVESTMENT REQUIREMENT ON T & D NETWORK:
First five years from 2000-01 to 2004-05,Rs. 6,000 crores
Last five years from 2005-06 to 2009-10, Rs. 7,500 crores
Total Rs. 13,500 crores

IMPLEMENTATION:
KPTCL is required to spend Rs. 13,500 crores on capital expenditure alone during next ten years at the rate of Rs. 1200 crores per annum during the first five years and at the rate of Rs. 1500 crores during the last five years.
KPTCL heather to spent maximum of Rs. 500 to 600 crores per annum only on capital expenditure. Now it has to gear up its activities for massive implementation of programs to achieve the desired objectives.

KPTCL has a vast experience for executing transmission works. The following works have been executed in a record time.

- RTOS – Guttur 400 KV SC line for a distance of about 300 Kms for evacuating RTPS 5^{TH} and 6^{th} units power has been completed and commissioned within a record period of 16 months from the date of award, which is an all India record. Proper & effective monitoring and co-ordination at the field level achieved this. Regular spot co-ordination meetings have been conduced and the monitoring officials have solved field problems on the spot.
- 220 KV station at Bidadi along with associated transmission lines
- 220 KV station at Mallur along with associated transmission line at Volvo
- Strengthening of 66 KV DC line between S. pura & Somanahalli.

But there was an inordinate delay for execution of several major transmission works.
The delay in execution of SVPTR – Talaguppa 220 KV DC line has severely affected the evacuation of power from the Hydel station at Sharavathi Tail race project. The delay is caused due to forest clearances, adverse weather conditions, hilly terrains, which are not approachable by motor.
Hence it is absolutely necessary to streamline the procedures and gear up its machinery for execution of works on a massive scale during next ten years to properly develop the infrastructure in power sector to provide reliable & quality power supply at all consumers in the state for overall economical development. The probable problems/difficulties for execution of each work shall be anticipated and remedial measures shall be taken to complete the projects as per schedule. This requires lot of thinking and effective planning.

THE FOLLOWING MEASURES ARE SUGGESTED IN THIS DIRECTION.

- The three years/five year's plans shall be prepared and necessary budgets shall be approved after typing up the finances at least six months in advance of taking up the project for execution.
- The yearly budget/three years budget shall be approved at least six months in advance to facilitate taking up action for tendering etc.
- The approved DPR's shall be made available to the executive agencies along with the approved budgets.
- The store budgets for both Major works and distribution shall be approved at least six months in advance to facilitate procurement agencies to initiate action well in time.
- Acquisition of land for substations

The ten years perspective plan and five years T & D up gradation plan wherein the details of the substations proposed to be established are clearly indicated.

The measures are to be initiated for selection of the suitable land at respective places and acquisition proceedings are to be initiated well in advance for implementation of the project as per schedule.
The following measures are suggested:

- The Executive Engineers of the transmission division shall be entrusted with the full powers for
- Acquisition of the land including payments to be made.
- Availing services of the Private agencies for surveying of the land, taking block levels wherever necessary & for soil investigations.

Surveying of transmission lines.
The details of the transmission line works to be executed during next five years and ten years have been clearly identified in five years T & D up gradation plan and ten years perspective plan. An advance action has to be taken for conducting detailed surveys of these transmission lines which facilitates obtaining statutory clearances like forest clearance, PTCC clearances and preparation of project reports & tender documents. The following action is suggested:

- The corporate office shall fix rate contracts per km of surveying the transmission line of different voltage class.
- Scope of the works shall include
- Surveying & drawing ground profiles
- Tower spotting & preparing tower schedules
- Measurement of earth resistance of the soil
- Soil classifications where ever necessary
- Preparation of necessary documents for getting statutory clearances from Forest department and Telecommunication department.
- The Executive Engineers of Major works divisions shall be entrusted with the full powers of availing the services of private surveyors for these works at the approved rate contract.
- Statutory clearances shall be obtained well in time before taking up the works for execution. Monitoring cell in the Corporate office shall monitor closely this very important aspect.

- The Executive Engineers of Major works divisions shall be entrusted with the full powers of availing the services of Advocates locally for solving litigations and way leave problems.

Tendering and procurement of materials:

KPTCL has already adopted the following procedure for execution of transmission works;

400 KV, 220 KV, 110 KV & 66 KV transmission lines and substations by total turnkey contract including supply of equipments.

33 KV substation and lines by procuring materials departmentally and execution through labour contract.

Augmentation of power transformers capacities by procuring materials departmentally and execution through labour contract.

It is found there is a considerable delay with the present procedures and following measures are suggested:

- The necessary software is under process of procurement for technical evaluation and commercial evaluation of the tender documents to facilitate the evaluations to be completed within seven days instead of four to five months being taken at present.
- The necessary software is under process of procurement for auditing the tenders with in two to three days.
- The concerned officers, who shall be empowered to solve the problems on the spot subject to ratification by the appropriate authorities, shall closely monitor each works.
- Shortage of supervisory staff:

There is a shortage of supervisory staff at the level of Assistant Engineers and Junior Engineers, which has also affected the progress of the works. Appointing retired officials like retired Assistant Engineers and Junior Engineers, experience in the particular field on contract basis for supervising the execution of works can be considered till privatization of distribution system. The sufficient staff will be available for transmission works after the privatization of distribution system.

FINANCIAL STATUS OF POWER SECTOR

INTRODUCTION

Power sector in the state was comfortable financially till early 80s. The scenario then was as follows.

- The generation was only cheap Hydro Power.
- All the installations including IP sets were metered & regularly billed every month.
- BJ / KJ installations were not existing.
- The T & D network was quite adequate to handle then peak loads and hence T&D system losses were minimum, quality of power was good.
- All the reactive loads including IP sets were fully compensated by providing capacitors at load points.
- There was sufficient staff for 100% billing & collection, and effective maintenance of T&D system.

PRESENTS SCENARIO.

The financial position of the power sector in the country in general and Karnataka in particular is in a critical state. Almost all the electricity Boards in the Country are in red and facing huge revenue deficits. The power sector is not in a position to pay towards power purchase bills, supplier's bills regularly. The internal resources are not available for capital investments on strengthening and expansion of T&D network. This has further deteriorated T & D network resulting in further increase in T & D losses and unreliable & poor quality of power supply.

The financial position of KPTCL is also not comfortable. The estimated revenue gap for the year 2000-01 is to an extent of Rs. 2299 crores, which is a matter of serious concern.

The revenue gap of KEB/KPTCL is steeply increased from 380 crores for the year 1997-98 to Rs 2299 crores for the year 2000-01. The main reasons for steep Increase of revenue gap is due to following facts.

- The steep increase in the power purchase cost which was Rs. 2381 crores during the year 1998-99 to about Rs. 4169 crores for the year 2000-01.
- The steep increase in the power purchase cost is due to the fact that the high fuel cost of following new generating plants.
- 5^{th} and 6^{th} units at RTPS by M/s. KPC
- Share from Kaiga atomic power plant by M/s. NPC
- Share from other thermal units of CGS.
- Power from IPPs like Jindal tractable & Rayalseema Alkalies
- Cogeneration plants at sugar mills
- Windmill generating plants.

The power purchase cost in the state was significantly low till early 80's as only Hydel plants were operating. The complete Hydel potential in the state could not be utilized due to inter state water disputes mainly in Kaveri & Krishna river basins and protests from environmentalists in the West flowing river basins in the state. The state was forced to opt for thermal generating plants to meet the growing load demands. The thermal units at RTPS, and other generating plants of NPC, IPPs and CGS contributed to the increased average power purchase cost. The following table indicates average power purchase cost and average realization cost from 1994-95 to 199-00.

Table – 6

Sl. No.	Year	Average power purchase cost per Kwhr at Bus bar in Rs.	Average delivered cost per Kwhr at consumer point in Rs	Average realization rate per Kwhr in Rs.
1	1994-95	0.57		
2	1995-96	0.79		
3	1996-97	0.96	1.91	141
4	1997-98	0.91	1.83	152
5	1998-99	1.03	2.47	192
6	1999-00	112	2.84	206
7	2000-01	148	3.35	198

- Includes power purchases cost, T & D losses establishment charges, interest & finance charges and other expenditures.

The industrial sector, the major revenue contributors to KPTCL have drifted away from the state grid and switched over to captive generation due to following reasons. About 3000 MVA captive generating sets have been installed in the state.

Increase in tariff for industrial sector mainly for cross subsidizing agriculture and domestic sectors.

Unreliable power supply due to following reasons:

Scheduled and unscheduled load sheddings consequent to clubbing industrial and rural loads on the same feeders.

Poor quality of supply. The voltage levels throughout the grid are poor consequent to inadequate T&D system and high reactive loads without proper compensation. The

frequency of southern grid is operating at less than 48 Hz during most part of the year.
Restrictions imposed on industries not to use power for production purposes during peak hours of 6 pm – 9 pm earlier to 1997-98.
Sever power cuts imposed on industries earlier to 1997-98.
General recession in the industrial sector. Many of the power oriented industries like steel mills; Aluminium plants, mini cement plants, Calcium carbonate plants and textile mills have been closed down.

The HT industrial consumption, which was 18.5% of the total consumption during 1994-95, has come down to 8.4% of the total consumption during 1999-00. There is an increase of 33% in the total energy consumption in the state from 1994-95 to 1999-00 but there is a decrease of about 39% in the HT industrial consumption during the same period.
The following table indicates increase in the total energy consumption and reduction of HT industrial consumption for six years period.
Steep increase in the agriculture loads / energy consumption, which was only 8% of the total consumption during the early 80's to nearly 24% of the total consumption during end of the 20th Century, which is mainly cross subsidized. The average realization of agricultural sector is only Rs. 0.31 per Kwhr against the

Table – 7

Sl. No.	Year	Total Consumption mu	% Increase	HT industrial consumption mu	% Increase
1	1994-95	19741		3659	
2	1995-96	19769	0.1	3386	-7.5
3	1996-97	18771	-5.0	2630	-22.3
4	1997-98	21753	15.9	2397	-8.9
5	1998-99	22882	5.2	2336	-2.5
6	1999-00	26277	14.8	2217	-5.1
7	Total		31.0		-39.0
8	Average increase		6.2		-7.8

average delivered cost of Rs. 335 per Kwhr during the year 2000-01.
Increase in T&D system losses, which was about 18.5% during early 90's to about 30% during 1999-00. The reason for steep increase in system losses due to inadequate capital investment for developing and strengthening T & D network commensurate with growing load demands during ten years period from 1990 to the year 2000.

MEASURES INTIATED:
KPTCL has already initiated following several measures for improving the finances Measures initiated to increase industrial consumption.
The rural loads have been isolated from industrial feeders where industrial loads are more than 75% to prevent scheduled and unscheduled load sheddings and single phasing during peak hours by operation of roaster isolators.
Improving and strengthening T&D network in industrial estates like Peenya & Keonics City, where reliability of the power supply has been improved.
Allocating additional energy to the industries over and above their average monthly; consumption at a concessional rate of Rs. 3.2 per KWhr.
Powers have been decentralized and procedures have been simplified for arranging power supply to the industries quickly.
Schemes have been prepared for strengthening T & D network to improve the quality of the power supply and many schemes are being implemented.
Reactive compensation to an extent of 1090 MVAR is being provided in the system for improving the voltage conditions.
All restrictions like power cuts, use of power during peak hours for production purposes on industries have been completely relaxed.
High precision meters have been provided to about 4 to 5 lakhs installations in urban areas.
The street light installations are being metered in Bangalore City.
Computerized billing has already been introduced in Bangalore City and 100% billing is being done.
Close monitoring of revenue collections, mass disconnection drive of defaulting installations regularly through out the state has yielded good results and the average monthly collections exceeded the targeted levels of Rs. 300 crores.
These measures have already yielded fruitful results. The decline in the HT industrial consumption, which was at the average rate of 7.8% per year from 1994-95 to 1999-00 has been arrested and the consumption has increased by 7.1% during the first half of 2000-01 compared to same period during 1999-00 (The HT industry consumption from April 1999 to September 1999 was 1090.35 mu. The same is 1168.64 mu between April 2000 and September 2000).
Electronic trivector meters are being provided at all points in he transmission network for effective energy audit in the transmission system.

FUTURE SCENARIO:
The projected demand and energy requirement for the year 2009-10 is 9100 MWs and 46,000 mu considering the reduction in T & D losses. It is required to add generating capacity to an extent of about 4300 MWs during next ten years to meet the load demands.
All the proposed new generating units are thermal plants only except 240 MWs of SVPTR and 297 MWs of Alamatti dam powerhouse. Huge capital investment is required for these new plants and high recurring expenditure in the form of fuel costs is also involved. The power purchase rates for these of the proposed plants will be extremely; high and hence the average power purchase cost also goes up steeply and there will be heavy financial burden which has to be compensated either by revision of tariff or subsidy from GOK. Average cost per unit of power from each source for the year 2000-01 is indicated below:

Hydel	Rs. 0.37
KPC thermal	Rs. 2.19
CGS	Rs. 1.89
Cogeneration	Rs. 2.95
IPPs	Rs. 2.57

MEASURES SUGGESTED:
The following measures are suggested for further improving the finances and reducing the revenue gap.
The HT industrial consumption to be increased and the industries to be persuaded to switch over from captive power plants to grid supply.
The following measures are to be taken.

- The T & D network in all the industrial estates in particular & in the state as a whole shall be strengthened to provide quality power supply.
- The express feeders shall be provided to all the industries by bifurcating rural loads to prevent unscheduled and scheduled load sheddings and single phasing during peak hours.
- Sufficient reactive compensation shall be provided to improve the voltage conditions.
- Rationalize the tariff structure to have a lower tariff on higher slabs of consumption, which was in practice earlier to 80's reversing the present tariff structure.
- Separate cell should be formed for redressal of grievances of the industrial consumers.
- Regulating the IP set consumption
- Deep bore wells have been drilled to extent of 500 to 600 ft. below the ground level, which increased the power consumption for lifting water. Hence all the IP set installations shall be metered and tariff to be rationalized to create awareness among the agriculture consumers regarding high cost of energy used by them for unproductive yields.
- The sample study indicates that the average efficiency of IP sets is very poor to an extent of less than 20%. There is a scope to increase the efficiency to 40% by using HDPE pipes for delivery pipes of the bore wells and providing friction foot valve and HDPE pipes for suction and delivery pipes in case of open wells.
- The distribution losses can be considerably reduced by providing adequate capacity shunts capacitors at all the IP set installations.
- Computerization of billing & collection
- The computerized program for billing & collection which has already been contemplated for the complete state by KPTCL and implemented only in Bangalore City at present shall be extended throughout the state at the earliest to ensure 100% billing and collection.
- Reduction of commercial losses
- Drastic measures shall be taken to reduce theft and pilferage.
- Hasten up the process of providing high precision energy meters for all the installations, which has already been initiated by KPTCL and provided about 4 to 5 lakhs such meters.
- Prevent misuse of energy by BJ & KJ installations by converting them to LT1 installations if the connected load is more than one bulb point and charge regular tariff.

All street light installations in the state shall be metered.

Energy audit right from generating station bus bars up to consumer installations shall be conducted regularly by providing 100% metering.

The tariff rates are to be rationalized gradually over the projected period of ten years to reduce the cross subsidization and to cover the power supply cost.