CHAPTER - I
Infrastructure has become supremely important for a nation’s economic development, as it provides the basic structural foundation for it. And it is far more so in the case of developing countries of the world as their economic development, which had been neglected for long, for various reasons, depends very much upon their raising an effective and efficient infrastructure which can respond to demand and provide the required services promptly and efficiently. Effective service is the golden measure of infrastructure development\(^1\). Infrastructure services in return enhance the welfare of the people, foster economic growth and productivity, and help to improve the quality of life in general. Therefore it has been said that infrastructure is like the wheels of economic activity\(^2\). Its failure, especially in major areas such as power, reduces productivity and radically affects the quality of life. There is every reason to believe that in the developing countries today investments in infrastructure have been improper despite high costs, and therefore have not been rendering the services expected of it properly.

The economic development of any country irrespective of its size, mainly depends upon the development of the power sector, which in fact is a key indicator of the nation’s overall economic development. Power is central not only to all household activities, but to economic development as well. In fact it is the fuel of economic progress in all sectors, not only agricultural and industrial but all allied areas. Economic progress depends very much upon how successfully and profitably a country manages its power sector. Agriculture, industry and other core areas of economy ultimately depend for
their development and success on the availability of adequate power constantly and uninterruptedly throughout the year. How important is power consumption in the economic development of a country, apart from other factors, may be known by taking into consideration its power consumption. If power consumption by all sectors is seen to increase, then the index of eco-development as a measure of its progress is also found to increase. Usually the correlation between consumption of power and the growth of economy is taken as a measure of progress.

The production of electricity is a basic indicator of a country's size and level of development in all spheres. Some countries are exporting electricity on a massive scale and others are importing it on a large scale. In India most of the power consumption is by the agricultural sector, where the rate of revenue is very low. Expanding the supply of electricity to meet the growing demand of ever increasing urbanised Indian economy without incurring unacceptable costs, is a major challenge to it. People's standard of living depends on their use of energy in general and access to electricity in particular. It is a major factor on which the policy-makers have to seriously focus their attention and direct their efforts. Compared with several other countries of the world, India is lagging behind many in terms of production as well as per capita consumption of energy.

Power Scenario – Global Context

India has low energy consumption but high-energy intensity. In 1991 the energy consumption per capita (toe/persons) in India was 0.112, while it
was 0.336 in Asia, and 7.67 in U.S.A in the year 1971. During 1996 it shot up to 0.277 in India, 0.733 in Asia, and 7.88 in USA. It clearly shows that the energy per capita consumption in our country doubled between 1971 and 1996 but there was a steady increase of it in USA. It clearly reveals that the energy consumption in India even in 1996 was only 0.277, whereas in Asia it was 0.733, and in USA 7.88. Obviously there is a lot of variation in terms of energy consumption between developing countries and developed countries. In terms of electricity intensity (toe/million US $) it was 462 in India, 385 in Asia and 503 in USA during the year 1971 and it shot up to 597 in India, 406 in Asia and 384 in USA during the year 1996.3

It is clear that while the energy intensity has been increasing year after year in India, it is considerably getting reduced in USA over a period of time. But in the other Asian countries it exhibits a mixed trend. It indicates that though there is a considerable rate of growth in power generation in India over a period of time, its energy requirements have been so enormously increasing that there is no match between power generation and power requirement. It is dire necessity to reduce this disparity as quickly as possible to have overall economic development in the country. Unless adequate power is generated to meet the requirements of all sectors of our economy, economic progress will be invariably slow.

The world per capita use of energy was 1.9 tonnes of coal equivalent, (T.C.E). Developed countries like the USA, U.K and Japan have their respective per capita consumption at a much higher level of 11.1 T.C.E, 5.4
T.C.E and 3.2 T.C.E respectively, while developing countries like China and India have a per capita energy consumption of 0.5 T.C.E and 0.2 T.C.E respectively.\(^4\) A lot of change has been taking place the world over in the consumption of energy. High-income countries consume energy 3 ½ times that of Europe and central Asia. The total energy use by South Asia and Middle East and North Africa is almost the same. The Latin American and Caribbean countries use more energy than South Asia. But the sub-Saharan Africa consumes less power than half of South Asia. The U.S is the biggest consumer of commercial energy. It uses 4 times that of Japan and China, and the erstwhile Russian Federation was a large consumer of commercial energy. But India, Canada and the U.K consume almost the same quantities of energy, which indicate the stage of economic development of each of the countries. It is clearly noticed that rapidly industrialised countries have been increasing their consumption of energy considerably. India has registered a high overage growth of 4.4%\(^5\). The world development report 2000,\(^6\) clearly specifies the world position of power in terms of per capita use. It points out that the use of electrical energy is very high in the developed and some of the Gulf countries. The per capita consumption of power globally was 2053 kWh. The per capita use of the U.S was only one half of that of Norway. Japan, Belgium and Switzerland consumed 7000 kWh per capita each in the year 1997.

Among the developing countries, Kuwait recorded very high power consumption. It was 12900 kWh, more than 6 times of the world average. China’s per capita consumption of 714 of kWh was much higher than India’s
consumption of 363 kWh. Regarding transmission and distribution loss (T & D loss), it is frequently noticed that the T & D losses are minimum in the advanced countries. On the contrary, it is reported that the T & D loss in the developing countries is very high, due to ineffective distribution mechanism. The T & D losses in the developed countries recorded an average of 6.8 % of production, where as the T & D loss in India recorded an average of 18%. The above analysis reveals that there is a huge deviation in production, distribution and T & D loss among the developing countries. The production of energy ultimately depends upon the availability of resources and advancement of technology. But nature has not distributed the resources equitably among the various countries of the world. Many countries are not in a position even to generate energy adequate to their needs. Many of the developing countries do not have the necessary capital, natural resources, manpower, technology etc., for it. It results inevitably in differences in the economic development of the various countries world over.

Power scenario – India

Power has become important and indispensable practically in every sphere of activity. It is used by many categories of consumers. Innumerable gadgets not only domestic ones, are run on electricity. Industrial application of power has no bounds. Different kinds of machinery, which run on power are in use in large, medium and small-scale industries, which have been major consumers of power. To run computers and robots power is required. It is now possible to contact and communicate with whomever one wants to, from any
point of the universe, through telephone, internet, e-mail, e-commerce, video conferencing etc. Distance between places has little significance now, due to the development of modern communication systems. Satellites supporting all these channels of communication are controlled from earth stations, with the help of both conventional and non-conventional power systems. The ever-increasing living standard of people leads to increasing energy consumption for meeting various comforts by means of energy-intensive devices, by electrical appliances, air conditioners and the like. But the production status of energy in India has not been a match to the power requirements of various categories of consumers. The production efforts in the power sector have not been increasing correspondingly and positively for enhancing the consumption levels of people and their standard of living. There is a constant widening of the gap between power generation and demand for power. Though there is a strong correlation between level of income and energy consumption, power development strategies have not been fruitful so far. The stimulus for economic development is to be found in continuous energy production and supply. Energy consumption and National income are interrelated, and require providing a strong link between adequate energy supply and economic growth in developing countries like India. It is also clear that economic development and power sector development are interrelated and inter-dependent. A close link between energy consumption and National income in both cross-sectional and time series data power sector implies that inadequate power generation and supply could inhibit the economic growth of the country.
Issues

Power shortage in our country has had a crippling effect on economic activity in all the core sectors of the nation's economy, notably in agriculture, industry, and other related spheres. The shortage of power supply has lowered industrial and agricultural production, and tardy progress in all the vital sectors has inevitably slowed down economic growth. Further strategies in estimating power demand have not been scientific and effective. As a result, the financial performance of the power sector has been hindered. Further, lack of a futuristic approach in developing the power sector also has caused a setback in this sector. Governments have been adopting only shortsighted approaches as to power generation, from time to time. Therefore power supply to the public has not been constant and stable. Another important factor affecting adversely power production is the uncertainty about factors of production, which seem uncontrollable. The high degree of uncertainty in the resources for power production and the cost of energy would deter investment, which is highly dependent on the inputs of energy. The wide fluctuations and uncertainty in generation and supply of power are discouraging investments in industrial and other related sectors. Total assurance of uninterrupted power supply will certainly encourage industrial development and ultimately stimulate overall economic development, on which depends the economic future of the country. The upshot of the above observations is that evolving a sound energy policy and acting promptly on it is supremely important for the sustainable economic development of the country.
Unfortunately the power situation in our country as a whole and in the states has not been satisfactory. There is an acute power shortage. Power cuts are frequent, power supply is insufficient and irregular and high voltage fluctuations are common. These imbalances in the supply of power have been causing a lot of damage to the domestic, agricultural, and industrial sectors. Frequent fluctuations in power supply have been doing a lot of harm to valuable electrical equipment, electrical motors, electrical appliances, power stations etc. For want of constant power supply, agricultural and industrial productivity is being impeded. Farmers get only a few hours of power, mostly during the night, which makes their task full of hardship. There is ample evidence to show that the agricultural sector has been losing valuable output and productivity because of inadequate and erratic power supply. What is said of the agricultural sector is equally true of the industrial sector too. The domestic sector too is facing severe hardships. Another depressing fact is that even after 50 years of Independence, several villages in the country do not have electricity and only some have partial power supply.

Though Andhra Pradesh has abundant natural resources for power generation, self-sufficiency in it is yet to be realised. Naturally, power consumption of the people in the state is much less than the average per capita consumption in the rest of the country. That there are resources to generate adequate power but yet there is not enough power supply is a paradoxical situation. To be fair to the state and central governments, it must be admitted that they have taken several measures during the various plan periods to meet
the needs and demands of people for power supply. However the requirements of the country are far greater, and demands further increase in generation capacity. The demand for power from industry and irrigation presently is over 8.5 per cent of the total Indian electrical consumption. It has increased substantially during the last decade. Energy deficiency is approximately 11% with a peak shortage of 18.8%¹⁰. According to the 15th electrical power survey conducted by the Central Electricity Authority (C.E.A), the demand is expected to rise at the rate of 7.5% per annum over the next decade.

There is flagrant inefficiency and shortsightedness in all sectors. There is no insistence on accountability. Few feel that they are answerable for the lapses. As a result, costs have remained above revenues, which are constrained by irrational policy and practice of subsidising prices by successive governments¹¹. It is clear that State Electricity Boards in all most all stases have failed to manage the power sector properly. As a consequence both production and distribution of power have suffered badly. The majority of consumers of various categories have been deprived of the power they require. Outwardly, taken by itself, the growth of the power sector in India looks impressive, but it conceals many innate inadequacies of the system and its capacity to build up because of which it is lagging far behind the growing demand. There is a chronic shortage of power¹². A number of forces have been responsible for this plight. Firstly, no plan period could reach the target for installed capacity; the cumulative slippage between target and achievement has remained more than 20%. Secondly, low capacity utilisation has hampered
the performance of the system; thirdly, the performance of the sector for the last 4 decades indicates a velocity of energy sales, with respect to energy generated, of just 0.843. It exhibits high levels of auxiliary consumption and high transmission and distribution losses. In addition to these infirmities there have been finance failures arising from irrational pricing policies, over-manning, politicised subsidies at the cost of efficiency and an overarching professional inefficiency (what economists call “ex – inefficiency”), all of which contribute to and reinforce the whole malady\textsuperscript{13}. The existing status of the power sector in India is dark. In fact it is in the doldrums.

Another serious problem confronted by the power sector of various states is lack of sufficient investment. The enthusiastic power development programmes and targets devised by them could not realise for want of required investment. The resource crunch in channalising sufficient investment into the power sector has made it difficult to meet the power demand. The share of the power sector in the total plan outlay records a declining trend over the several plan periods. Further under-utilisation of power generation capacity has resulted in purchase of power from outside. Which means that the already meagre resources have had to be diverted towards the purchase of power. Consequently, an unbearable burden is imposed on the electricity boards which, to make up the required funds, increase the power charges and thus pass the buck on to consumers. The targeted capacity addition also necessarily exerts heavy pressure on the Government to make further investments. It is all like a vicious circle.
Further, increasing transmission and distribution (T&D) losses have made the power sector a most uneconomical venture. The present reported T&D loss of 22% is much above the International Standards. The T&D loss of China is about 7% and in the other developed countries, the loss is considerably less than in India. This goes to show how inefficient is the functioning of the power sector in our country. According to unofficial reports, the T&D loss in the power sector in our country is much more than the recorded figure. The T&D losses are also another setback to the power sector. These losses have to be kept at as low a level as possible. As energy saved is energy produced and also saving in capacity addition, proper control measures are necessary to curb the T&D losses.

**Poor Financial Health**

All the SEBs of all the states with out exception experience severe financial strain due to various inherent problems. All of them are getting negative returns on their investments, as the average cost of power is less than average revenue, low PLF, High T&D losses and High Accounts Receivables. The causes for all these maladies are presented in the following chart.
### Reasons for Poor Financial Health of SEBs/State Utilities

<table>
<thead>
<tr>
<th>Negative Returns on Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost of Power Average Revenue</td>
</tr>
<tr>
<td>Low PLF</td>
</tr>
<tr>
<td>Skewed Tariff system Subsidising domestic and agricultural consumers at expense of industrial consumers</td>
</tr>
<tr>
<td>Inadequate R&amp;M investments resulting in less than optimal PLF</td>
</tr>
<tr>
<td>Technical losses account for about 15-20% of these losses, commercial losses account for 20-25%</td>
</tr>
<tr>
<td>No Firm policy for disconnection varies widely across states (lower in Tamil Nadu higher in Bihar)</td>
</tr>
</tbody>
</table>

Source: Blue Print for Power Sector Development, Ministry of Power, Government of India, 2001

Apart from these problems, the technical obsolescence and managerial inefficiency are added factors to make the power sector very bleak. Though the power sector is said to be an autonomous body as per the electricity (supply) Act 1948, in fact it is under the tight control of the government, which interferes every now and then. This neutralises its autonomy and makes it virtually a Government department, very much influenced by whichever party is in power. Besides, lack of professional management, and labour productivity, and absence of the competitive spirit are also complicating the problems of the power sector. Pilferage, estimated to be between 7 to 25%, is the worst problem faced by all State Electricity Boards. Distribution losses, though officially estimated to be 22%, are sometimes much higher. The power sector as such is considered a disaster.
sector is on the verge of a severe financial crisis and is unable to attract any public or private investments.\textsuperscript{14}

In view of the problems faced by the power sector, some reforms were initiated. But their implementation was so very slow that there was not much improvement. Therefore attempts were made by the government to speed up the reforms in the power sector and to improve power generation. Meanwhile a number of working committees and commissions were appointed to review the existing power set up and to suggest measures for restructuring the power sector on commercial lines. A bill to facilitate the restructuring of the Power Sector was introduced.

**Power Sector Reforms**

A number of home truths about the embattled power sector in the country surfaced and were placed under spotlight at the fourth energy summit of Confederation of Indian Industry (C.I.I) at Chennai. It was asserted at the summit that "the beginning of the power sector reform should have been at the distribution end" with a view to transforming the State Electricity Boards (SEBS) from bankruptcy to bank ability, and that fuel choices should be made on the basis of long-term viability and national energy security, indigenous resources and costs, and not short-term considerations of bridging the energy gap.\textsuperscript{15}

As electricity is one of the most vital infrastructures for national economic development, and the pace of growth and development of our economy depends very much upon the healthy functioning of production and
distribution system of electricity, the demand for electricity in our country being enormous and ever increasing, the government has to do its best continuously and consistently to improve the supply system of electricity. The growth of our economy and the living standards of the people are ultimately measured by the quantum of electricity consumed. It is an important index of the economic development as various sectors such as agriculture, industry, service, health, transportation, education etc., heavily depend upon it.

Since independence the power sector in India has grown several fold in size and installed capacity. The installed capacity has increased from 1362 MW in 1947 to 94942.14 MW in 2000, recording an increase of 69.707 times. Electricity generation was only 4,073 million units in 1947 and it shot up to 371082 million units in 1999 – 2000 recording a phenomenal growth. Over half a billion villages in the country have been electrified, accounting for 85 per cent of the total number of villages in the country, in sharp contrast to only 3061 villages in 1950. However, power generation despite the growth, it is not sufficient to meet the increasing requirements and increasing consumption.

As per the World Development Indicators, 1998, India is generating about 414.6 billion-kilowatt hour, which is only 11.65 per cent of the total electricity generation of the United States (3558.4 billion-kilowatt-hour). Electricity consumption per 1000 people kWh in India is only 0.3, which is 2.59 per cent of the U.S consumption, and it is also the lowest among the major countries. It is an indication of the low growth of Indian economy. It is
obvious that greater attention is to be bestowed on the development of the power sector in the country to speed up the growth of our economy.

**Trend in Power Generation**

Power generated simultaneously by various types of generation, either by traditional or non-traditional methods at different stations, can be termed as "generation mix". Hydel and thermal are traditional methods, and presently the nuclear method, non-modern and critical method, added to them. Together they have a major share of generation at the national and state levels.

Generation-mix at the all India level with percentage share of each category, year-wise between 1991-92 and 2000-01, is presented in Table 1.1. To appreciate the situation better figures for three decades, from 1950-51 to 1980-81 are also included in the list.

At the national level, the generation mix remained more or less similar, and the variations were marginal. The share of Hydel power, which started at 24%, peaked to 39% and declined to 24% again. It is proposed to maintain at least 25% share for the Hydel sector in the total generation continuously. Thermal power started at 75% and continued to grow almost at the same rate. It may improve its share further, with the entry of I.P.Ps on a big scale. Nuclear generation did not take off in Andhra Pradesh. At the national level it could
not achieve more than 2.67% so far and achievement of the targeted 10% appears a
distant dream.

Power Situation – Important Growth Trends

As electricity was introduced in India in 1899, the year 1999 marked the
centenary of its existence in the country. India’s energy requirements at the
time of Independence in 1947 were very modest and were largely met by coal.

The energy scene was dismal. The per capita consumption of energy was 15
kgoe (kilo gram oil equivalent). The installed capacity (for power generation)
was only, 1,562 MW, coal production merely 30 million tons and crude oil
production was just 0.225 million tons. 80% of the non-commercial energy
fuels consisted of firewood, crop residues and animal waste.

Table 1.2 presents the trends in the production of primary commercial
energy in India, during four and a half decades between 1995-51 and 1995-96.
Table No.1.2

Trends in Production of Primary Commercial Energy
(Figures in million tons of oil equivalent)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>16.17</td>
<td>27.3</td>
<td>35.75</td>
<td>55.82</td>
<td>103.75</td>
<td>132.35</td>
</tr>
<tr>
<td>Lignite</td>
<td>0.00</td>
<td>0.03</td>
<td>1.66</td>
<td>2.5</td>
<td>6.91</td>
<td>10.85</td>
</tr>
<tr>
<td>Crude Oil</td>
<td>0.26</td>
<td>0.45</td>
<td>6.82</td>
<td>10.51</td>
<td>33.03</td>
<td>34.6</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>1.45</td>
<td>2.12</td>
<td>3.88</td>
<td>4.96</td>
<td>6.02</td>
<td>6.66</td>
</tr>
<tr>
<td>Hydel</td>
<td>0.66</td>
<td>2.1</td>
<td>1.24</td>
<td>2.02</td>
<td>15.42</td>
<td>19.1</td>
</tr>
<tr>
<td>Nuclear</td>
<td>0.25</td>
<td>0.25</td>
<td>0.52</td>
<td>0.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16.64</td>
<td>28.44</td>
<td>47.77</td>
<td>74.98</td>
<td>164.59</td>
<td>203.58</td>
</tr>
</tbody>
</table>


The growth rate of 71% upto 1960-61, 68% upto 1970-71, 57% upto 1980-81 in the total production of energy reflects marginal increase only. A revolutionary growth rate of 120% is recorded in the latest decade, due to all-round growth and increased awareness and demand from all sectors of the economy for increased power. The energy demand-supply gap is about 20%. Still, 77,682 villages are without power.

Table 1.3 presents the percentage share of different sectors in overall energy consumption in India, during a period of nearly four decades from 1950-51 to 2000-01.

Table No.1.3

Share of Different Sectors in Energy Consumption
(Figures presented in percentages)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>39.80</td>
<td>40.70</td>
<td>51.60</td>
<td>57.00</td>
<td>50.40</td>
<td>44.36</td>
</tr>
<tr>
<td>Transport</td>
<td>46.20</td>
<td>44.90</td>
<td>29.40</td>
<td>23.50</td>
<td>24.40</td>
<td>20.23</td>
</tr>
<tr>
<td>Household</td>
<td>9.90</td>
<td>10.60</td>
<td>14.30</td>
<td>12.50</td>
<td>13.90</td>
<td>15.14</td>
</tr>
<tr>
<td>Agriculture</td>
<td>1.70</td>
<td>1.80</td>
<td>3.80</td>
<td>6.00</td>
<td>9.00</td>
<td>10.62</td>
</tr>
<tr>
<td>Others</td>
<td>2.40</td>
<td>2.00</td>
<td>0.90</td>
<td>1.00</td>
<td>2.30</td>
<td>9.65</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: CMIE September 1996, published in "India at 50" by Indian Express.
Industry, transport and household sectors consumed significantly power in the 1950s. The consumption by industry swelled owing to the growth of energy intensive industries up to the 80s. The oil crisis of the 1970s brought to light the enormous wastage power in industry. Better energy management brought down the rate of power consumption. The transport sector, which recorded high rates of consumption gradually, brought the rate down minimally, owing to the growth of rail and road transport network. With electrification throughout the country, households began to use more power, even though 70% of the cooking has been through non-commercial forms of energy.

By June, 1999, the installed capacity for power generation was 92,765 MW, coal and lignite production increased to 143.20 mtoe, crude oil to 34.60 mtoe, natural gas to 19.10 mtoe, hydel energy to 6.02 mtoe, and unclear power to 0.66 mtoe.

But these are not sufficient to meet the needs of all the sectors of the economy. By 1995-96, coal and lignite provided 70% of energy, whereas oil and gas provided 26% of energy. The balance of energy was produced by nuclear, non-conventional and other sources put together.

**Trends in Electricity Consumption**

**Per Capita Consumption**

The level of development of a country or state is measured by the per capita utilization of power in KWH. (Kilo Watt Hours, popularly known as Units). Higher level of per capita consumption of power not only indicates
higher growth rate but also higher production and consequently, prosperity. India with a per capita consumption of 300 ranks ninth among the zones in the capita consumption. The zones above India with per capita consumption of power (mentioned within brackets) are, North America (12,800), Western Europe (5,400), Eastern Europe (4,200), Latin America (1,500), Far East (1,400), South-East Asia and Pacific (1,200), Africa (500), Middle East and South Asia (500).

Per capita consumption of developed and developing countries in units/KWH is presented in Table 1.4 given below.

Table No. 1.4
Per Capital Consumption of Power in Different Countries

<table>
<thead>
<tr>
<th>Developed Countries</th>
<th>K.W.H</th>
<th>Developing Countries</th>
<th>K.W.H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>17,347</td>
<td>Brazil</td>
<td>1,783</td>
</tr>
<tr>
<td>Sweden</td>
<td>16,531</td>
<td>South Korea</td>
<td>1,649</td>
</tr>
<tr>
<td>United States</td>
<td>12,308</td>
<td>Mexico</td>
<td>1,486</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>10,880</td>
<td>Egypt</td>
<td>787</td>
</tr>
<tr>
<td>Australia</td>
<td>9,284</td>
<td>China</td>
<td>719</td>
</tr>
<tr>
<td>Japan</td>
<td>7,281</td>
<td>Algeria</td>
<td>680</td>
</tr>
<tr>
<td>France</td>
<td>7,126</td>
<td>Pakistan</td>
<td>416</td>
</tr>
<tr>
<td>Germany</td>
<td>6,513</td>
<td>India</td>
<td>283</td>
</tr>
<tr>
<td>England</td>
<td>5,843</td>
<td>Kenya</td>
<td>139</td>
</tr>
</tbody>
</table>


It can be observed from the Table that developed countries have a per capita consumption of above 5,000 KWH. Just as India is way behind the developed countries in in per capita income, in per capita consumption of electricity also she is behind them.

Per Capita consumption of power in the different States of India is presented in Table No. 1.5
Table No. 1.5
Per Capita Consumption of Power in Different States as on 31-3-1999
(Units KWh)

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>Per Capita Consumption Units (KHz)</th>
<th>Rank</th>
<th>State</th>
<th>Per Capita Consumption Units (KHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Daman &amp; Diu</td>
<td>3599</td>
<td>18</td>
<td>Kerala</td>
<td>305</td>
</tr>
<tr>
<td>02</td>
<td>Dadra &amp; Nagarhaveli</td>
<td>3566</td>
<td>19</td>
<td>Jammu &amp; Kashmir</td>
<td>292</td>
</tr>
<tr>
<td>03</td>
<td>Pondicherry</td>
<td>1010</td>
<td>20</td>
<td>Lakshadweep</td>
<td>231</td>
</tr>
<tr>
<td>04</td>
<td>Punjab</td>
<td>851</td>
<td>21</td>
<td>Andaman &amp; Nicobar</td>
<td>218</td>
</tr>
<tr>
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<td>Delhi</td>
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<td>Tripura</td>
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<td>30</td>
<td>Arunachal Pradesh</td>
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<td>14</td>
<td>Karnataka</td>
<td>3649</td>
<td>31</td>
<td>Nagaland</td>
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<td>15</td>
<td>Himachal Pradesh</td>
<td>334</td>
<td>32</td>
<td>Manipur</td>
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<td>16</td>
<td>Rajasthan</td>
<td>329</td>
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<td></td>
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<td>17</td>
<td>Orissa</td>
<td>313</td>
<td></td>
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<td>360</td>
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</table>


In per capita consumption, Andhra Pradesh has taken the 12th place in the country. This level is just above the national average of 338 units. It goes without saying that there is need to improve the per capita consumption further to achieve a better pace of progress in the state.

Trends in the pattern of electricity consumption by important categories of the economy are presented in Table 1.6, which follows

Table No.1.6
Pattern of Electricity Consumption – All India
(Figures presented in percentages)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Domestic</td>
<td>12.60</td>
<td>10.70</td>
<td>8.80</td>
<td>11.20</td>
<td>16.80</td>
<td>20.14</td>
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<tr>
<td>2</td>
<td>Commercial</td>
<td>1.75</td>
<td>6.10</td>
<td>5.90</td>
<td>5.70</td>
<td>5.90</td>
<td>5.63</td>
</tr>
<tr>
<td>3</td>
<td>Industry</td>
<td>62.60</td>
<td>69.40</td>
<td>87.60</td>
<td>58.40</td>
<td>44.20</td>
<td>29.33</td>
</tr>
<tr>
<td>4</td>
<td>Agriculture</td>
<td>3.90</td>
<td>6.00</td>
<td>10.20</td>
<td>17.60</td>
<td>26.40</td>
<td>30.62</td>
</tr>
<tr>
<td>5</td>
<td>Others</td>
<td>19.15</td>
<td>7.80</td>
<td>7.50</td>
<td>7.10</td>
<td>6.70</td>
<td>14.88</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

From the Table 1.6 it can be observed that in 1950-51 industry was single largest sector in the consumption of electricity (62.60% of total power). By 1998-99, however its share came down to 33.65% (-46.47), and further to 29.33% in 2000-01 due to its shift to captive generation and application of power-saving equipment and techniques.

On the other hand, agriculture increased its share from just 3.90% in 1950-51 to 30.62 in 2000-01. Domestic consumers increased their share from 12.60% in 1950-51 to 20.14 in 2000-01. Interestingly, these two categories of consumers who pay the least tariff, have a higher rate of consumption of power in the country and together they have improved their share from 16.50% to 50.76% of total consumption. The enhanced activity of the commercial sector has resulted in increased consumption in spite of the higher tariff. But the main source of worry of the State Electricity Boards is the steep fall in industry’s consumption. For, industry is their most valued customer and responsible for their viability. The other’s category also shows a negative growth trend in the last five decades.

Table No.1.7.
Pattern of Electricity Consumption – Andhra Pradesh
(Figures presented in percentages)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Domestic</td>
<td>8.17</td>
<td>10.70</td>
<td>12.79</td>
<td>22.49</td>
</tr>
<tr>
<td>2.</td>
<td>Commercial</td>
<td>5.83</td>
<td>4.23</td>
<td>3.16</td>
<td>4.53</td>
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<tr>
<td>3.</td>
<td>Industry</td>
<td>65.44</td>
<td>63.07</td>
<td>39.03</td>
<td>21.91</td>
</tr>
<tr>
<td>4.</td>
<td>Agriculture</td>
<td>18.44</td>
<td>18.44</td>
<td>38.62</td>
<td>40.86</td>
</tr>
<tr>
<td>5.</td>
<td>Others</td>
<td>2.12</td>
<td>3.56</td>
<td>6.40</td>
<td>10.01</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The pattern of electricity consumption in the state of Andhra Pradesh is presented in Table No. 1.7 given above. It gives a clear picture of the consumption pattern of power among various categories of consumers in the state. During the year 1970-71 the lion’s share of power was consumed by the industry, accounting for 65.44 per cent followed by the agricultural sector (18.44 per cent), Domestic (8.17 per cent), commercial (5.83 per cent) and the others (2.12 per cent). During these 30 years of existence of the power sector, there is a lot of change in the pattern of power consumption. During the year 2000-01 the lion’s share went to the agricultural sector accounting for 40.86 per cent, followed by domestic 22.49 per cent, industry 21.91 per cent etc.

Though the major share of power was consumed by the agriculture sector, it brought little revenue as power supplied to it was subsidised. Arrears are pending from the consumers, despite the concession shown.

Flow of Supply System

Just as water is distributed by local bodies from water tanks and reservoirs to consumers through pipelines, and taps, electricity is distributed to consumers through High Tension and Low Tension power lines. But there are risks in power supply. While water can be stored and supplied at one’s convenience power generated has to be consumed simultaneously and there can be no storage of power. Distance between the generation station and distribution point should not be more than 600kms to minimise transmission losses. Hence, power plants have to be located at different geographical areas, and near to load centres.
Causes For Power Cuts

If the power generated is less than the demand at any point of time, the distribution system gets weakened and works at less than the stipulated frequency, i.e., 50 Hertz (1 Hertz = 1 cycle per second). Then the voltage drops from the usual 230 volts per phase, to about 190 or even 180 volts at consumer points. Even though power is transmitted on a network of EHT (132 KV* to 220 KV) and HT (33 KV to 11 KV) lines and sub-stations, the Andhra Pradesh Grid is operating only at about 48 to 48.5 Hertz instead of the permitted 50 Hertz. If the demand rises further, and the frequency falls below 48 cycles, then there is no option left except to cut the supply of power to some pockets by rotation to maintain the frequency of operation at least around 48 Hertz. Power cut, technically termed as load shedding or load-relief, is resorted to during peak hours, normally between 5.00 am and 8.00 am and from 6.00 pm to 9.00 pm, when all categories of consumers, except some industries and agriculture, use more power. The peak hours vary with the change of seasons. During dry seasons, consumers especially from agriculture, draw excessive power (nearly 40% of energy). Power-cuts (Load-shedding) are inevitable when the available power (power generated + imported/purchased) is less than the demand. The available power is rationed essentially to agriculture and domestic categories, which are subsidised heavily.

Everyone, administrators, the Governments and consumers of all categories, clamours for the efficient functioning of State Electricity Boards (S.E.Bs). But none is prepared to pay the right price for it. No organisation
can sustain losses for long. The funds needed for increased generation of energy, are not available. Financial institutions, like Power Finance Corporation (P.F.C.), and Rural Electrification Corporation (R.E.C.), insist on a minimum rate of 3% return on investment, for their financial support. With heavy subsidies to some categories and cross-subsidies from other categories not quite matching and no tangible help from the State Government, there is little hope of return of the S.E.Bs, even to the break-even point.

Implications of Power Cuts

Power breakdown brings life to a grinding halt. Trains come to a standstill. Industrial production gets disrupted. Inconvenience of many sorts follows a power breakdown, making life miserable. All these are common experience. Power shutdown or breakdown is rarely heard of in Western countries, as they are able provide for reserve capacity over and above the maximum loads of the system. In India it is common because of inadequate generation, though every developmental activity aimed at the society, urban or rural, industry or agriculture, needs electricity and vociferously makes a demand for it.

Conservation Mechanism

Conservation of energy by consumers can reduce appreciably the impact of shortage of power. Government of India has established an organisation, called Petroleum Conservation and Research Association of India (P.C.R.A), which is intended to promote preservation of energy in all sectors. In the power sector, power conserved can be better and profitably used by needy consumers.
There is wastage of power on many counts often due to carelessness, callousness and indifference. Consumers of all categories can contribute to power conservation by using Compact Fluorescent Tubes (C.F.L.s) of 6 Watts, 11 Watts and 18 Watts in place of filament lamps, tube lights etc. Power for lights, fans, TVs, machinery etc, can be switched off, when they are not necessary and when there is no user in the place, thereby reducing the load on transformers significantly.

Disappointing Scenario

Power, the most important sector in infrastructure, has been lagging behind due to needless complicated official formalities and inaction. Delay and failure to take decisions at the appropriate time, has proved costly in meeting the needs of power and in planning for the future. All categories of consumers are affected by the delay, and retrieving the lost ground is very difficult. Project clearance in the power sector has been facing this situation for long.

India is lagging behind, not only the advanced countries, but some developing countries too, in many areas, notably literacy, gross domestic product, per capita income, productivity in industry and agriculture, and per capita consumption of power. According to the report in India Today weekly, "60% of families in India do not have electricity at home, 22% of the power generated does not reach the consumers, 150 million households do not have electricity". The S.E.Bs in the country are already facing difficulties in meeting the energy needs fully. Further investment for additional generation, transmission and distribution, in the present context seems not possible.
It would be both unfair and incorrect to say that the governments have not been aware of these facts and are not doing anything set things right regarding power. Government of India has been making hectic efforts to improve the electricity sector by providing policy and financial support. As a result there has been an impressive increase in the installed capacity and generation of power. However, the increased level of production of electricity has not matched the increasing demand from the exploding population. Moreover, the demand for electricity has greatly increased in proportion to rapid industrialisation, proliferation of electrical appliances, increased rural electrification, etc. In view of the growing need for electricity for sustained economic development, proper planning for power development is imperative. It needs to channelise financial resources on a long-term basis, which yield results only in the long run. At present there is a wide gap of 11.7 per cent between the demand and supply of power in our country. Realising the need for regularising the existing power generation and distribution system to ensure adequate, qualitative and competitively priced power supply, the Government of India is determined to generate an additional 40,000 MW of power.

**Grid Integration**

A huge grid system and modernised distribution of power system is envisaged at an estimated cost of Rs.2, 80,000 Crores. The eastern region of the country has energy surplus. Yet owing to lack of transmission facilities, the surplus energy cannot be exported to power deficit regions. For this very reason, even within the eastern region, certain areas suffer from severe power
cuts and shortages. The National Thermal Power Corporation has been backing down its generation and even stopped generation on account of low demand for power in the eastern and northern regions. During October 1997, it reported a loss of 1020 MW of generation. During the first seven months of 1997-98, the company had to back down generation totalling 4.29 billion Kwh. If all units are allowed to operate as per schedule, the region may witness surplus supply ranging from 1500 MW to 2000 MW during off-peak periods. Andhra Pradesh, on the other hand, continues to suffer power shortages. There is a 20 percent cut for high-tension industries and a daily two-hour cut for domestic users. A transmission link between the eastern region and Andhra Pradesh would certainly ease the situation in the state. Studies reveal that the development of inter-regional links could reduce the requirement for new generation capacity by 7000 MW by the end of the Tenth Plan.17

The problems are expected to exacerbate in the near future. If generating capacity is increased to meet the rising demand, the strain on the existing transmission networks becomes unbearable, unless corresponding investments are also made in the T&D. To evacuate the targeted additional 42,000 MW power in the Ninth Plan, an investment requirement of Rs.1260 billion is estimated for the T&D system. Recently, the Parliament passed the transmission bill permitting private sector participation in transmission. The bill allows private firms to invest in facilities for transmission and to operate and maintain them. The Central Electricity Regulatory Commission (CERC) and the State Electricity Regulatory Commissions (SERCs) have been
empowered to grant licences for inter-and intra-state transmission respectively. The government will continue to retain control over power transmission through central grids or the SEBs. The need for additional resources for system upgradation would need private sector participation in distribution. Significantly, the need for reforms seems to emanate from these concerns, though it is recognised that to attract private capital in the industry, structural reforms in the industry would be required. This issue is hence central in the Indian debate on power reforms.

Statement of the problem

Andhra Pradesh, like the other states, has been facing acute power shortage, frequent power failures and wide fluctuation in power supply. As a consequence great damage is being caused to industrial, agricultural, domestic and other related sectors in the state. Power generation in the state is not at all in proportion to the demand. Consumption of power in the agricultural sector in the state enormously increased, from 2569 (MU) in 1985-86 to 11,968 (MU) in 1997-98, recording an increase of 50.81 per cent of the total power consumption. However, the industrial consumption of power in the state recorded only a marginal increase from 5485 (MU) in 1985-86 to 6099 (MU) in 1997-98. Between the agricultural and industrial sectors of the state, the farmer's consumption of power reveals that the percentage in terms of percentage doubled over a period of 10 years, showing an increase from 23.60 per cent in 1985-86 to 50.87 per cent in 1997-98, whereas the percentage of industrial consumption declined by 50 per cent, i.e. from 50.50 per cent in 1985.
Greatly subsidising supply of power to the agricultural sector, by the state government has resulted in the high level of power consumption in that sector. Consequently the financial burden on the State Electricity Board as such gradually declined during the decade between 1985-86 and 1997-98, while the power consumption in the agriculture sector grew considerably.

However, the Andhra Pradesh State Electricity Board (APSEB) sustained losses continuously due to the gap between its revenue and expenditure. While the expenditure for power generation enormously increased due to the abnormal hike in the price of various inputs of power generation, the revenues did not increase commensurately because of the huge subsidised supply of power to the agricultural sector. During the year 1997-98 the financial position of the State Electricity Board further deteriorated resulting in a loss about Rs.280 Crores due to the failure of the monsoons and the consequent loss of about 3,00,000 MU of low cost energy from hydro-electric sources. The continuous revenue deficit over a period of time had serious financial implications for the Board, which was forced to borrow funds at high cost to make up the deficit, thereby landing itself in an inextricable debt-trap. The debt-service position of the Board also worsened year after year resulting in the loss of its creditworthiness to raise additional funds to meet its financial requirements. Impudent financial management and inefficient distribution system have been attributed the Board’s poor financial performance. In a recent survey, it was revealed that theft of power by all
categories of consumers in the state had been increasing year after year, causing a loss of Rs.480 Crores to the Board. The loss during transmission and distribution of power was estimated at 22 per cent. The commercial loss due to pilferage was estimated at 11.43 per cent. Together they further damaged the financial position of the APSEB.

This unfortunate situation could be remedied only when all mal-practices were eliminated and the distribution of power was properly managed through a carefully devised mechanism for containing technical loss, commercial loss, financial leakage, etc. It required financial restructuring of the Electricity Board by giving due weight to the cost and return of power supply without diluting the interests of the common man. As long as the subsidising system continued, it would inevitably impose an unwarranted burden on the State Electricity Board. Of course, political and other exigencies sometimes might require subsidising power supply. But the burden should be bearable. Unfortunately the APSEB had crossed this line long ago and it was under tremendous financial strain. Hence there was an urgent need to take all possible measures to improve its financial performance, which was in a deplorable condition and had a deleterious impact on the economic health of the State. Seized of the gravity of the power situation in the nation as well as the states, the Central government, which had been urging the states for quite some time to effect reforms in their respective power sectors, enacted in 1998 the Electricity Regulatory Commission Act (CERC). This Act was intended to strengthen the base of power generation and distribution to overcome the many
hurdles faced by the State Electricity Boards. Andhra Pradesh, is conformity
with the national policy, was one of the first states along with Haryana and
Orissa, to initiate reforms in the SEB in February, 1999, and bifurcate the
APSEB into two autonomous bodies, APGENCO and APTRANSCO. The
next chapter of the present study gives a more detailed account of the reforms
initiated by the state government.

An in-depth study of the financial predicament of the APSEB was
required to evaluate the various issues in the power sector relating to the
financial resources and their utilisation, cost of power generation, sale of
power, the areas where losses were incurred, the various loopholes in the
distribution mechanism, collection policies, etc., of the Board. All these had to
be scrupulously and systematically investigated into. In fact there has been so
far no significant study in the area of operational and financial management of
the APSEB. Such a study is very essential to identify the factors contributing
to the financial deterioration of the Board. The present study of the
Performance of APSEB is intended to be a modest attempt in this direction.

At this point one could initially ask what relevance a study of the APSEB such
as the present are would have, beyond having an historical interest since the
Board does not exist, and is very much a thing of the past. Would it serve any
purpose at all except gratifying academic curiosity? Some explanation in
justification of the study is called for. When the present study was undertaken,
the APSEB was very much in existence and functioning, though it was
struggling hard to survive and serve. Its fortune, as pointed out already,
affected the consumers and the economy in general. The problems it encountered were many and all tangled up so that a systematic and analytical of its functioning especially with reference to its finances was warranted true, the set up was changed since then and the Board is replaced by the APGENCO and APTRANSCO, and their wings. However, what should be particularly noted is that the challenging problems issues the Board encountered, which are huge, complicated and complex, still persist and more or less of the same magnitude. Financial strains continue to harass the restructured bodies. The newly constituted corporations have yet to make an impact on the power sector, if one may judge by the relentless debates in the state Assembly and the never-ending complaints of all varieties of consumers of power. Therefore many of the conclusions that may be drawn from a detailed study of the APSEB and its finances may be applicable to the changed situation. Similarly some of the suggestions for improving the financial position of the Board could be found worth serious consideration by the new set up. Time is not yet ripe to assess the financial performance of the two corporations. It would take a few more years before tangible results would emerge. Therefore it is hoped that the present study in depth of the APSEB would not be irrelevant or be a mere academic exercise.

In general it may be said that the state of affairs in the APSEB may not be essentially different from the state of affairs in the Electricity Boards of the other States of India, though there may be local variations and peculiarities. The problems faced by them are huge complicated and complex. The fact is
that the overall performances of many of these boards and their services in general to the consumers have been far from satisfactory. There is not likely to be much of a difference of opinions in this respect. It is a well known fact that different categories of the consumers of electricity in most states have been facing frequent power cuts, low voltage, frequent breakdown of power transformers, lack of prompt service from the line staff etc. These problems have been causing great damage to farmers, industrialists, businessmen and the public in general. Enough has already been said about the hardships that all of them experience. Inconvenience of some kind or other is experienced by every section of the society. The damage caused is both psychological and material. Unless the Electricity Boards and their successors became viable and functioned on profit earning lines, and rendered service to all concerned, they would not have justified their existence, and failed in their objectives and purposes.

As Andhra Pradesh is vast and the problems of power are more or less uniformly shared by all the districts in the state, the Tirupati Circle (Chittoor District) was chosen as the area of study for the present inquiry into the working of the APSEB. The choice of this circle was guided by the following considerations:

(a) The circle is fairly representative of the different parts of the state regarding the functioning and performance of the APSEB, and the problems faced by consumers of different categories.
(b) It is within the reach of the investigator to collect the data required, to identify the problems confronting the APSEB and the consumers of various categories, examine the measures taken so far to solve them, and to consider what further steps have to be taken to make the Board efficient.

Objectives

The study purports to assess the performance of the APSEB. As a part of this inquiry, it furnishes a detailed analysis of the various problems confronting the APSEB as well as the public. It also elicits the consumers' opinion about the functioning of the APSEB in its endeavour to supply sufficient electricity uninterruptedly. To be more specific, the prime objectives of the investigation are:

1. To study the Power Sector Development, Reforms and the overall functioning of the SEBs in the country;
2. To assess its distribution efficiency and the measures taken to curb the leakages in the distribution system;
3. To examine the Financial Performance of the APSEB;
4. To diagnose the problems experienced by various types of Consumers and to elicit their opinion of the functioning of the APSEB in the Tirupati Circle, the study area;
5. To identify the various factors that have contributed to the poor financial performance of the A.P. State Electricity Board, and in the
Tirupati Circle and to suggest feasible ways and means to tone up the performance of the State Electricity Board and revitalise it to improve its overall functioning. Some suggestions offered, it is hoped, would hold good even in the restructured set up, since the problems and difficulties of the APSEB have been carried over by the corporation, which have replaced the Board.

Methodology

The present study surveys the plight of the APSEB in terms of profitability and services, the causes for its poor financial performance, loopholes in the distribution system, collection policies, and the opinion of the consumers on the efficiency of the APSEB in rendering service to them. For this purpose it makes use of both primary and secondary data. The study adopts a three-way approach. Firstly, it focuses on the overall functioning of APSEB, Secondly, it focuses on its performance in the Tirupati Circle of Chittoor District. Thirdly, it focuses on the various categories of consumers of electricity in the Circle to get factual data about the over-all performance of the APSEB. Further the study makes use of the various reports of the Ministry of Power, Planning Commission and APSEB.

Sample frame

The Tirupati circle of APSEB, which covers the entire Chittoor district; comprises four Electricity Divisional Offices, located at Tirupati, Chittoor, Madanapalli and Puttur. The Tirupati division consists of three Electricity revenue offices, one each at Tirupati, Srikalahasti and Pakala. The Chittoor
division consists of three electricity revenue offices, one each at Chittoor, Palamaner and Punganur. The Madanapalli division consists of three electricity revenue offices one each located at Madanapalli, Piler and Vayalpad, and the Puttur division consists of two electricity revenue offices located at Puttur and Nagari.

The four electricity revenue divisions and their respective electricity revenue office areas are studied in the light of the objectives of the present study stated earlier. A detailed study of the various issues of electricity consumers even in a district is a herculean task for an individual. Therefore, to keep the inquiry within manageable but yet reliable limits, the method of stratified random sampling is adopted and a sample of 120 consumers from each electricity division has been selected. The sample of respondents comprises 30 consumers from each of the agricultural, domestic, industrial and business categories. In order to ensure equal representation to all the geographical regions of the Chittoor district, adequate care has been taken to distribute the sample consumers proportionately among all the areas in the circle. Thus, the study covers four electricity divisions, 11 electricity revenue offices and 480 consumers in the Tirupati circle. The details of the study are presented in the following diagram.
Sources of Data

The primary data for this study has been collected through pre-tested schedules prepared separately for the electricity divisions, electricity revenue offices and consumers of various categories. The secondary data has been collected from the relevant publications of Government of India, State Government, Ministry of Power, Planning Commission, and Andhra Pradesh State Electricity Board. Further published and unpublished records and reports of various institutions relating to power supply and distribution have also been collected. In addition to these, structured and unstructured interviews have also been conducted with experts in the subject as well as persons who are connected in one way or other with the affairs of the State Electricity Board.
Tools of analysis

To analyse the collected data, various financial tools and techniques such as percentages, growth rates and financial ratios are used. Appropriate statistical tools like mean, standard deviation, co-efficient of variation, correlation coefficient, regression analysis and trend analysis are also used whenever necessary in analysing the quantitative data in order to arrive at logical conclusions and interpret the data significantly.

Significance of the Study

Power generation in Andhra Pradesh, compared with the other states, is still in its infancy, and the state being very vast, it is yet to increase its production in order to brighten people’s lives as well as aid the economic development of the state. The existing situation is not encouraging. The economic development of the State greatly depends upon the successful functioning of the State Electricity Board and the power sector in generation and distribution of power. But the functioning of the State Electricity Board for the development of the State has not been satisfactory and is far behind the expectations of the various sectors of the economy. Therefore it is necessary not only to improve the operational efficiency of the Electricity board in terms of power generation and distribution but also managing the funds more efficiently and purposefully than at present, in order to maintain sound liquidity and profitability.

In view of the pivotal role of power generation and distribution in economic development, there is an urgent need to thoroughly analyse the entire
operation of the State Electricity Board to make it effective. Prudent financial management alone can strengthen its financial base. To achieve this the executives of the Board should improve their efficiency in managing its operations. The Board has to be made a viable organisation so that it can supply the power required at qualitative and competitive price, to all the sections of society that need it. Its operations have to be multiplied to meet the ever-increasing demand for power from all sections. At present the demand for power is far greater than the supply. To match the demand for power with adequate supply, a lot has to be done in the power sector by way of investing on the latest technology in the generation and distribution of power. In this process one should not only be aware of the investment avenues open but also of the latest technology that is suitable to our conditions. Only then quick development of electricity would be possible. Further a close watch has to be kept on the management of the operations of the Electricity Board. And hence the present critical study of the different aspects of the AP State Electricity Board, with particular reference to the Tirupati circle is without doubt significant.

Limitations of the Study

The present study of the A.P. State Electricity Board was undertaken during 1994-1998, to cover a period of ten years of its functions (from 1989-90 to 1998-99). The study therefore ends with the year 1998-99. However since then, the set up in the power structure in the state has changed. The Government of Andhra Pradesh has restructured the APSEB in February 1999.
This fact imposes invariably a limitation on the present study. And the data for analysis has had to be limited to the APSEB. However an attempt is made to incorporate wherever possible subsequent data relevant to the argument of the present study. Among the suggestions offered at the end of the inquiry, some at least are worth considering, even under the reformed set up of the power sector. Further, the study concentrates mainly on the overall performance of the APSEB, and does not address itself to the questions of cost-return and generation efficiency. Despite these limitations, the study it is hoped, would still be considered worthwhile as it dwells on other, equally important aspects of the power situation in the state.

Plan of the Thesis

The entire thesis is organised in seven chapters.

Chapter I This introductory chapter is concerned with a brief account of the need, and importance of the power sector in India and in Andhra Pradesh and the issues and problems it encounters. It also states the problems of inquiry and explains briefly the methodology adopted in it.

Chapter II Deals with the Power Sector Development and Restructuring in India and Andhra Pradesh.

Chapter III Covers Andhra Pradesh State Electricity Board and gives Brief Account of it.

Chapter IV Examines the Distribution Efficiency of the APSEB.

Chapter V Gives an account of the Financial Performance of the APSEB.
Chapter VI Covers the various Problems perceived by the Consumers in the Tirupati Circle.

Chapter VII Contains a summary of the argument presented in the proceeding chapters and the conclusions drawn. It also offers a few workable suggestions to improve the functional efficiency of the State Electricity Board, which may be found useful even under the restructured set up.
References:

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