CHAPTER VII

SUMMARY OF FINDINGS AND SUGGESTIONS
The present study makes a modest attempt to know the performance of power sector, problems of electricity consumers and suggest some suitable measures.

The important objectives of this study are (1) To analyze the progress and problems of power sector in India and Andhra Pradesh, (2) To know various reforms introduced for the development of power sector; (3) To assess the performance of A.P.S.P.D.C.L., (4) To highlight the problems of rural electricity consumers, (5) To suggest measures for improving the performance of power sector based on the findings of the study.

The important hypotheses of this study are: (1) The progress of power sector in Andhra Pradesh is not up to the mark, (2) The reforms introduced from time to time did not help to improve the performance of power sector, (3) The performance of A.P.S.P.D.C.L is not satisfactory, (4) The rural consumers of electricity are facing many problems.

The statistical tools like percentages, averages and growth rates are calculated to assess the development in generation, transmission and distribution. Graphs and diagrams are also presented to make the analysis effective.

The survey is confined to Proddatur Division of Kadapa district. The secondary data collected for our study covers a period from 2000-2001 to the available latest data. While the data collected from the consumers of rural domestic, non-domestic and agriculture related to the year 2009-10 and earlier years. The study has not covered all consumers of power sector. The study covers only the economic aspects of power sector.

The study has been divided into seven chapters.
The first chapter introduces the subject of the study and also presents objectives, methodology and review of literature. The origin and progress of power sector in India is discussed in chapter two. Third chapter presents different power sector reforms introduced from time to time. The chapter four is devoted to analyse the growth and problems of power sector in Andhra Pradesh. Performance of A.S.P.D.C.L. is analyzed in chapter Five. The sixth chapter discusses the problems of rural electricity consumers. The Last chapter presents the summary of findings and suggestions.

This study is based on both primary and secondary data. The secondary data relating to different aspects of power sector has been collected from various sources. In order to know the problems of electricity consumers, a field survey was conducted in 2010-11 with the help of (pre tested) schedules. A multi-stage random sampling method is adopted here. The study is confined to Kadapa district one of the six districts covered by A.P.S.P.D.C.L. According to the data given by the Electricity department the district has been divided into six divisions. Altogether 8 sections have been selected. Each section covers one mandal and it is under the control of the Assistant Divisional Engineer. In the third stage 35 consumers covering domestic/non- domestic and agriculture are selected. Thus the study has chosen 280 consumers from the eight sections for the purpose of collecting primary data. The officials concerned are also contacted to know the different aspects relating to electric power.

Power development in India commenced with the commissioning of electricity supply in Darjeeling during the year 1897 followed by the commissioning of hydro power station at Sivasamudram in Karnataka in 1902. In the pre-independence era, power supply was mainly in the private sector that too restricted to the urban areas. After independence a significant step was taken in bringing about a systematic growth of power supply industry all over the country with the formation of State Electricity Boards (SEBs).
In India the power generation increased from 6.6 to 842.5 billion kilo watts during the period 1950-51 to 2008-09. The power generation installed capacity improved from 2302 Mega Watts to 169748.86 Mega Watts during the period from 1950-51 to the end of January 2010. The length of transmission and distribution lines increased from 29721 to 7278946 CKM during the period 1950-51 to 2008-09. The number of electrified villages rose from 3061 to 488439 during the same period. So India made spectacular progress in the power sector after independence.

The important sources of electricity generation are thermal, hydro, nuclear, oil, gas and wind etc. The installed capacity of utility and non-utility rose from 2890 MW in 1950-51 to 187900 MW in 2009-10. In terms of growth rate it was very high at 144.49 per cent in 1970-71. Between 2001-02 and 2009-10 the growth rate in the installed capacity of utility and non-utility was very low and it ranged from 3.1 per cent in 2002-03 to 8.65 per cent in 2007-08.

Of the total installed capacity of utility in 1950-51 the installed capacity of hydro electricity accounted for 24.28 per cent and that of thermal for 75.72 per cent. In 2009-10 also the installed capacity of thermal power was high. However the installed capacity of thermal power declined by more than 10 per cent in 2009-10. It was due to the introduction of new resources like nuclear, oil, gas, wind etc. The share of nuclear in the total installed capacity was only 2.82 per cent and that of oil, gas, wind etc was 9.66 per cent in 2009-10.

The generation of total utility increased from 5.10 billion units in 1950-51 to 796 billion units in 2009-10. It is observed that the growth rate of power generation (total utility) was very high in 1960-60. After 2001-02 growth rate of power generation (total utility) declined to 3.42 per cent in 2008-09. Because, the government encouraged private
electricity generation. The growth of power generation was very high in 1960-61 and 1970-71. It ranged from 204.55 to 204.53 per cent. After that the growth rate declined.

In 1950-51 the share of hydro power in total generation was 24.3 per cent and that of thermal was 75.2 per cent. But in 2009-10 the share of hydro was only 13.3 per cent and that of thermal was very high at 84.26 per cent. The generation of nuclear power was started in 1970-71. Its share in total generation ranged from 2.55 per cent in 2001-02 to 1.97 per cent in 2008-09. It implies that there is no significant change in the contribution of nuclear power.

Region wise statistics reveal that western region with 31.06 percent of the total installed capacity of India (147965.42 MW) stands first followed by northern region with 26.17 per cent, southern region with 25.91 per cent and north-eastern region with 20.89 per cent.

Among the states of western region, Maharastra has high installed capacity of 15284.06 MW (33.25 per cent) followed by Gujarath 9273.20 MW (20.17 per cent). It is observed that in all the states the important power generating sources are thermal and hydro. The percentage of thermal in state’s total installed capacity was high in Delhi (100 per cent). While the percentage of hydro was very high in Himachal Pradesh (80.80 per cent).

As on 31.03.2009, of the total installed generating capacity of India (147965.42 MW) the share of hydro was 24.92 per cent, of thermal 63.34 per cent and that of nuclear was only 2.78 per cent.

Plant load factor is an important indicator of operational efficiency of thermal power plants. It is evident that the percentage of PLF is relatively high in private sector as it ranged from 73.1 per cent in 2000-01 to 91.0 per cent in 2008-09. The percentage of PLF
is also high in central sector where the PLF ranged from 74.3 per cent in 2000-01 to 86.7 per cent in 2008-09.

The targets and achievements of capacity addition reveal that in every Five Year Plan there was a shortfall in achievement. The achievement ranged from 96.20 per cent in the Seventh Five Year Plan (1985-90) to 47.50 per cent in the Ninth Five Year Plan (1997-02). While the shortfall varied from 3.80 per cent in the Seventh Five Year Plan to 52.50 per cent in the Ninth Five Year Plan. The important reason for this short fall was the withdrawal of budgetary support by central government for power projects in the mistaken expectation that the Independent Power Producers would come up with necessary investments.

In India the power consumption rapidly increased from just 5.10 B.U in 1950-50 to 741.17 B.U in 2008-09 registering 145 fold increase. Sector wise statistics reveal that the consumption of domestic sector doubled from 12.60 per cent in 1950-51 to 24.64 per cent in 2008-09. But there is no significant increase in commercial consumption at it ranged between 6.10 per cent in 1960-60 and 10.15 per cent in 2008-09. While the share of industrial sector in total power consumption declined from 62.60 per cent in 1950-51 to 39.38 per cent in 2008-09. Because, the industrial units shifting to other sources of fuel.

The power consumption by agriculture sector significantly increased from 3.90 per cent in 1950-50 to 29.69 per cent in 2001-02. The increase in power consumption by agriculture sector is mainly due to energization of pump sets which lift water for irrigating fields and ultimately for increasing agriculture production.

The per capita consumption increased from 360 Kilo Watts/Hour in 1998-99 to 733.54 kWh in 2008-09. D&N Haveli got first rank in 2004-05 with the per capita
consumption of 8479 kWh and 11094 kWh in 2008-09. Bihar state stood last with the per capita consumption of 75 kWh in 2004-05 and 107 kWh in 2008-09.

In India the total power generation increased from 499500 billion units to 723800 B.U in 2008-09. Despite this tremendous growth, India has always faced chronic power shortage.

The power requirement showed increasing trend from 507216 M.U in 2000-01 to 777039 M.U in 2008-09 while that of availability from 467400 M.U to 691038 M.U during the same period. In terms of percentage the shortage of power ranged from 7.1 percent in 2003-04 to 11.1 per cent in 2008-09. The shortage of power is high in Jammu & Kashmir (-24.1 per cent). Among the regions Western region has -13.7 per cent power shortage followed by Northern region -11.6 per cent. It is impressive to note that power shortages is low in Delhi (-0.8 per cent), Orissa (-2.1 per cent), Rajasthan (-2.4 per cent), Kerala (-2.4 per cent) and Himachal Pradesh (-3.5 per cent).

The outlay of power sector as per cent to outlay of all sectors in India ranged from 20.1 in 6th plan to 7.4 in 10th Plan. The expenditure on power sector significantly increased from Rs 260.0 crore in First Plan (1951-56) to Rs 187234.60 crore in 10th Plan (2002-07) registering a 720 fold increase. It is noticed that a huge amount was spent on power sector between 7th Five Year Plan and 10th Five Year Plan (The amount spent ranged from Rs 37895.3 crore to Rs 187234.6 crore). On the whole the percentage of expenditure on power sector started declining from in 9th Plan.

All India statistics reveal that T&D losses declined from 32.54 per cent in 2002-03 to 25.47 per cent in 2008-09. In 2008-09 Himachal Pradesh stood first in the country with the lowest T&D losses (15.51 per cent), followed by West Bengal (16.79 per cent), Karnataka (17.03 per cent), Tamil Nadu (18.47 per cent) and Andhra Pradesh (18.63 per cent).
In 2008-09 the highest percentage of T&D losses was recorded in Jammu & Kashmir (58.02 per cent) followed by Bihar (46.37 per cent), Orissa (42.65 per cent), Madhya Pradesh (38.46 per cent) and Assam (37.59 per cent).

Reasons for T&D losses are: (1) Inadequate capital outlay and technology, (2) Weakness in T&D lines and high length power carried lines, and cross sections, (3) Lack of working meters, energy auditing and billing, (4) Non-metering of agricultural loads, (5) Faulty metering at consumers' premises where there is consumption but not metering, (6) Average billing practices which are not yet fully eradicated.

In 1949 there were only 1500 electrified villages in India. Later on electrified villages increased from 3061 in 1951 to 500920 in 2009-10. In other words the percentage of electrified villages to total villages rose from just 0.54 per cent in 1950-51 to 86.65 per cent in 2001-02. The increase in the number electrified villages is due to Rural Electrification Corporation and Green Revaluation. Rural electrification programmes like Kuteer Joythi programme (1988-89), Pradhanamantri Gramodaya Yojana (2000-01), Accelerated Rural Electrification programme (2002-03) and Rajiv Gandhi Grameen Vidyutikaran Yojana (2005).

In the country as a whole the number of electrified villages increased from 579662 in 2000-01 to 593732 in 2010. The percentage of electrified villages was recorded at 84.4 per cent by 2010. Thus the foregoing analysis reveals that there are still many states in the country which have to achieve 100 per cent electrification.

The number of energized pump sets rose from 0.2 lakh in 1951 to 161.65 lakh in 2009 due to introduction of High Yielding Varieties Programme in 1966 (it is popularly known as green revaluation). So the energized pump sets increased rapidly after 1969.
The Andhra Pradesh Power Sector was divided into two parts namely Andhra and Telangana regions before the formation of A.P. Andhra area administration was under the control of Madras state. So the Madras state supplied power to Andhra area through Madras State Electricity Department which was established in 1926-27. Andhra state was separated from Madras state on 1st October, 1953 and formed Andhra State Electricity Department.

Telangana area administration was under the control of Nizam Govt. and the electricity power generation was started at Hyderabad in 1909 for supplying electricity to the King’s palace. Hyderabad Electricity Department was established in 1912. The Hyderabad Electricity Act came into being in 1938-39. After formation of Hyderabad the first hydro electric project was built at Nizamsagar on January 27th, 1955 with a project cost of Rs 225 lakh.

Andhra Pradesh State power sector development was started after the formation of APSEB. It was constituted on 1st April 1959 as per the orders of Government of A.P. in GO. Ms No.722 PW on 30.3.1959. As envisaged by the Electricity (Supply) Act, 1948, APSEB had a monopoly in the power sector under the overall guidance of the State Government.

APSEB was responsible for all three functions of the power sector, namely generation, transmission, and distribution of power in the state. APSEB functioned through four operation circles. Since its formation and up to its unbundling into corporatised entities in the year 1999, APSEB contributed greatly to the economic development of the state. On many technical aspects, APSEB enjoyed a good reputation amongst the other utilities in India-some of the features continue even now. Despite the significant growth witnessed in power generation in Andhra Pradesh, the gap between
demand and supply was increasing due to substantial increase in agricultural and domestic consumption in the state.

Andhra Pradesh state power sector achieved a good progress after reforms, because the Govt. of A.P. gave the importance to the control of fluctuation in power sector and took the financial support from World Bank, Central government and other foreign financial institutions assistance (DFID). Total power generation installed capacity increased by 83.27 times between 2000-01 and 2009-10. The installed capacity of different projects as a whole substantially increased from 213 Mega Watts in 1960-61 to 14625.25 MW (nearly 69 times increase) in 2009-10.

In Andhra Pradesh the major resources of power are hydel and thermal. The installed capacity of hydel increased from 124 MW (58.2 per cent) in 1960-61 to 3703.36 MW (25.32 per cent) in 2009-10. Similarly the installed capacity of thermal also increased from 89 MW (41.8 per cent) to 4382.50 MW (29.96 per cent) during the same period.

It is also evident that the share of central power increased significantly from 162 MW (4.9 per cent) in 1984-85 to 3048.54 MW (20.9 per cent) in 2009-10. Due to these two factors viz. entry of private sector and central power the share of APGENCO in total capacity declined considerably. The sources of state sector include hydel, thermal, gas and wind. In absolute terms the power generated by state sector increased from 784 million units in 1960-61 to 29551.64 M.U. in 2009-10.

Of the total power generated by state sector, the hydel power accounted for as high as 77.8 per cent and thermal power for 22.2 per cent in 1960-61. By 2000-01 the share of hydel power of state sector declined tremendously and recorded at only 15.9 per cent and further it declined to 7.30 per cent in 2009-10. The share of thermal power in
total generation increased from 22.2 per cent in 1960-61 to 48 per cent in 2002-03 and afterwards it showed declining trend and reached to 32.30 per cent in 2009-10.

The power generated by private sector ranged from 4946 million units (10.8 per cent) to 16025.76 MU (21.48 per cent) in 2009-10. It is observed that the central sector became an important source of power as its share increased from 834 MU (6.2 per cent) in 1984-85 to 22851.20 MU (30.63 per cent) in 2009-10.

It is evident that there is a rapid increase in the consumption of electricity for domestic purpose from 10.80 per cent in 1960-61 to 22.90 per cent of total consumption in 2001-02. On the other hand the consumption by industries tremendously declined from 72.80 per cent in 1960-61 to 33.20 per cent in 2009-10. The power consumption by all sectors significantly increased from 45678.73 million units in 2000-01 to 74611.86 million units (63.34 per cent increase) in 2009-10. While the per capita consumption (utility) of all categories increased from 510 KWH to 929 KWH (82.15 per cent increase) during the same period.

Of all the districts, Medak district recorded highest per capita consumption in 2001-02 (103.82 kWh) and in 2008-09 (1292 kWh) followed by Ranga Reddy (990.85 kWh, 1285 kWh) and Nalgonda (766 kWh, 1126 kWh). Srikakulam district recorded lowest per capita consumption (117.35 kWh, 295 kWh).

It is observed that there is no surplus power in Andhra Pradesh. The shortage of power varied from 355 MU (0.7 per cent) in 2004-05 to 5231 MU (6.6 per cent) in 2009-10 resulting in frequent power cuts. The highest peak deficit was recorded at 1712 MW (19.9 per cent) in 2001-02, followed by 2002-03 with 1633 MW (19.2 per cent), 2006-07 with 1567 MW (15.4 per cent).
There is no regularity in plan outlays and expenditure which contributed to shortage in power supply and transmission and distribution system failures. The APSEB incurred expenditure mainly on transmission distribution and others. The expenditure on transmission increased from Rs. 8.52 crore in the third plan (1961-66) to Rs. 906.91 crore in 2009-10 of the 11th plan. While the expenditure on distribution rose from Rs. 21.18 crore to 1942.43 crore during the same period.

The Board’s expenditure was high (39.10%) in the 1st plan and in the 8th plan (24.01%). Especially in 11th plan, the share of Board’s expenditure in the total plan expenditure tremendously declined nearly to 3 per cent.

Revenue includes the revenue from sale of power, subsidy, and receipts of miscellaneous. Expenditure includes the expenditure on purchase of power, establishment i.e. general office expenses and other expenses.

The major part of the expenditure is incurred on purchase of power which ranged from 34.14 per cent in 1983-84 (including power generation cost) to 79.66 per cent in 2009-10 (only purchase cost). In 2009-10 the expenditure on purchase of power accounted for 79.66 per cent, on establishment for 6.60 per cent, on depreciation for 5.0 per cent and on others for 8.74 per cent. The deficit (loss) increased from Rs.4.52 crore in 1983.84 to Rs.7874.15 crore in 2008-09. In 2009-10 the deficit amount declined to Rs.6573.27 crore. If revenue is taken (including subsidy) there is surplus (profit) in majority of the years except in 2001-02 and 2003-04. The surplus (profit) ranged from Rs.9.65 crore in 1983-84 to Rs.655.32 crore in 2005-06.

It is observed there is difference between the purchase cost (paise/kWh) from the APGENCO and others. Similarly there is difference in the revenue from overall low tension and high tension. Overall power purchase cost increased from 151.18 paise/kWh
in 1999-2000 to 180.81 paise/kWh in 2003-04. APGENCO power purchase cost also rose from 133.36 paise/kWh to 171 paise/kWh during the same period.

There is a significant difference in the purchase cost of power from APGENCO and other sources. The cost of power purchased from other sources (private, Central sector and other States) is higher than that of APGENCO in all years. The difference varied from 81 paise/kWh in 2006-07 to 153 paise/kWh in 2008-09.

The number of electricity consumers in A.P. tremendously increased from 1482888 in 1974-75 to 21827399 (13.73 times) in 2009-10. Of all the consumers the domestic consumers accounted for 78.22 per cent and agricultural consumers for 12.69 per cent in 2009-10. While the increase in the number of non-domestic consumers and industrial consumers is very low at 5.44 per cent and 5.45 per cent respectively. The total sale of power increased from 2186 million units in 1970-71 to 59607 MU in 2009-10. Among all categories in 2009-10 from I to VIII the energy sold was high to agriculture (category V) in all the years. The energy sold to agriculture rose from 394 MU (43.92%) in 1970-71 to 17729 MU (45.69 %) in 2009-10. The sale of domestic energy (category I) rose from 179 MU in 1970-71 to 13102 MU in 2009-10 and as a percent to L.T total it increased from 19.96 to 33.76 during the same period.

Total revenue from sale of power increased from Rs.5569.06 crore in 2000-01 to Rs.15520.95 crore in 2009-10. It is observed that the L.T domestic revenue from sale of power in total L.T revenue is high as it increased from Rs.1278.43 crore (22.95%) in 2000-01 to Rs. 3425.79 crore (22.07%) in 2009-10. It is significant to note that the revenue from agriculture declined from Rs.235.60 crore (4.21%) in 2000-01 to Rs. 19.26 crore (0.12%) in 2009-10.
The total arrears increased from Rs. 32.34 crore in 1981-82 to Rs. 2245.95 crore in 2009-10. The data also reveals that the arrears of low tension consumers are higher than that of high tension consumers except in 1990-91. It is observed that the consumers of L.T are responsible for 56.58 per cent and that of H.T for 43.42 per cent of total dues in 2009-10.

The theft cases registered ranged from 18505 in 2000-01 to 125913 in 2007-08. From 2000-01 to 2009-10 a total of 1000840 cases were registered by APTS. Of them 805129 (80.44 per cent) cases were compounded. In addition to these, a total of 12016 persons were arrested during the same period. A total amount of Rs. 28981.00 lakh was initially assessed for all the cases registered. All these statistics reveal that there is still nearly 30 per cent of the initial assessed amount that should be collected from the electric consumers against whom the power theft cases are booked.

In A.P. the total number of sub-stations increased from 71 by the end of the Second plan to 4096 by the end of 2009-10 (the third annual plan of the Eleventh five year plan) registering a 57 fold increase. These sub-stations are plying an important role in power distribution.

Andhra Pradesh state transmission and distribution system functions are divided into two parts after unbundling of APSEB. The transmission business was transferred from APSEB to APTRANSCO (one of the unbundled corporations). APTRANSCO will buy power from APGENCO and other central and private power producers, for further supply to the distribution companies.

The total T&D lines increased from 28538 ckm / km in the Second plan to 864064 ckm / km in 2009-10 (third year of 11\textsuperscript{th} plan). Low tension lines occupied significant place in total length of the lines. The transmission lines of 66 kV and 132 kV declined
from one plan to another plan. Because APSEB made a policy to reduce electricity transmit length for controlling transmission losses. So the electricity department adopted 132 kV to 33 kV lines for transmission. For the first time the 400 kV lines were arranged in 9th plan.

The number of energized pump – sets increased from 1939573 in 2000-01 to 2769275 in 2009-10. On an average 55385 agriculture pump sets were energised every year. The process of energization of pump sets is still going on for providing irrigation facility to agriculture.

District wise agriculture pump sets energised in A.P increased from 2197026 in 2001 to 2769275 in 2010. In 2010, the highest number of agriculture pump sets were energised in Karimnagar district (28605) in the state. The lowest number of agricultural pump sets was energised in Ranga Reddy district in the state. Among the DISCOMs the APSPDCL registered the highest growth in the number of pump sets energised during 2001-2010. Electricity Consumption by Agriculture Sector increased from 10282.62 million units in 1999-2000 to 18460.28 MU in 2009-10.

The important reasons for low revenue from agriculture sector are: (1) Irrational and un remunerative tariff structure, (2) State government’s interference in tariff setting and desire to provide power at concessional rates especially to agriculture sector, (3) H.T Agriculture consumers’ dissatisfaction resulting in unwillingness to pay even highly subsidized charges (4) Irregular supply of electricity to agriculture, (5) Theft of electricity, (6) Supply of electricity to agriculture without meters and the disagreement on the exact amount of subsidy.

Andhra Pradesh state achieved 100 per cent rural electrification, even before reforms. A.P is one of the 12 states which achieved 100 percent electrification. In A.P.
the number of electrified towns and villages increased from 197 in pre plan period to 26823 by the end of the third annual plan of the Eleventh five year plan. Number of electrified hamlets also increased from 66 to 31838 during the same period.

In A.P the number of electrified general hamlets is 31838 (98.16 per cent), out of existing 32434, the number of electrified tribal hamlets is 13788 (94.61 per cent), out of existing 14573, the number of electrified dalitwadas is 56239 (97.90 per cent), out of existing 57446, the number of weaker section colonies is 31927 (94.68 per cent), out of existing 33720.

DISCOM wise data reveals that 100 percent general hamlets electrification was achieved by APNPDPCL, followed by APSPDCL (99.13%), APEPDCL (98.1%) APCPDCL (94.43%).

Tariff order was issued by APERC. The fixation of tariff for bulk and retail supply of power was an important function of the commission. But the fixation of tariff basically depends on aggregate revenue requirement, revenue gap, operation and maintenance cost, transmission & distribution losses and capital cost.

The APERC issued the first tariff order in 1999. This tariff order determined six slabs for domestic category. As the consumption units increase the rate also change according to table. The commission reduced slabs from six in 1999 to four in 2002 and issued another tariff order. The commission had also introduced telescopic slab system for L.T non-domestic category. Non-domestic includes shops, offices, commercial establishments, entertainment centers, studio etc.

According to APERC first tariff order (1999) there were two slabs. One is 0-200 units per month with the tariff of 425 paise/unit and another one was above 200 units/moth with the tariff of 495 paise /unit. According to 2002 tariff order the first slab
was 0-50 units/month with the tariff of 395 paise/unit and the other one was above 50 units/month with the tariff of 700 paise / units.

As per 2004 tariff order, for the first slab of 0-50 units/month the tariff was 395 paise/unit. For next slab i.e. above 50 units/month the tariff rate was decreased to 625 paise/unit. Again these tariff rates declined to 385 paise/unit for the first slab and to 620 paise/unit for second slab. According to 2010 tariff order the number of slabs and tariff rates were changed. The slabs are 0-50 units/month (it is continued), with the tariff of 385 paise/unit, 51-100 units/month with the tariff of 625 paise/month and above 100 units/month with the tariff of 650 paise/unit. Basically agriculture tariff was very low because state government provided incentives for food grains development. Hence it is clear that the tariff rates are increased significantly for second and third slabs as per 2010 tariff order.

Andhra Pradesh Southern Power Distribution Company Limited (A.P.S.P.D.C.L) was formed on April 1, 2000, under A.P.Reforms Act (1st phase). The corporate office headquarters are at Tirupati. The main function of A.P.S.P.D.C.L is “to carryout the power distribution business, retail supply business in its respective area”.

A.P.S.P.D.C.L serves six districts namely Krishna, Guntur, Prakashm, Nellore, Chittoor and Kadapa. A.P.S.P.D.C.L achieved a good progress during the period from 2001-02 to 2009-10. So the distribution company earned profits which increased from Rs. 2.16 crore in 2003-04 to Rs 54.16 crore in 2007-08.

The number of consumers of A.P.S.P.D.C.L rose from 4066524 to 6021853 registering a growth of 48.08 per cent. The total sales increased from 6902.48 MU in 2001-02 to 13697.28 MU in 2009-10 and registered a growth of 98.44- per cent. Of the total sales of 13697.28 MU in 2009-10, total metered sales accounted for 69.94 per cent.
and the agriculture sales accounted for 31.06 per cent. It is quite impressive to note that the percentage of revenue collection over demand is greater than 100 per cent between 2006-07 and 2009-10 (101.20 per cent to 104.50 per cent).

The total revenue collected increased from Rs. 1543.70 crore to Rs. 3364.00 crore during the same period registering 117.92 per cent growth. Aggregate Technical and Commercial losses were recorded at 22.01 per cent in 2001-02. But in 2009-10 the percentage of AT&C Losses declined to 11.36 per cent. Thus the performance of A.P.S.P.D.C.L improved over a period of time.

The total number of services increased from 3194396 in 2000-01 to 6023876 in 2009-10 registering a growth of 88.58 per cent. At the same time the sale of energy also increased from 6345.69 million units to 13697.28 MU and it recorded a growth of 159.71 per cent.

The sale of energy (low tension) has grown from 4912.92 MU to 9968.21 MU during the same period registering a growth of 88.57 percent. Of L.T total the highest number of services were given to domestic sector. These connections increased from 2435056 (76.25 %) in 2000-01 to 4869699 (80.84%) in 2009-10 and the sale of energy also increased from 1664.13 MU (33.87%) to 3605.65 MU (36.17%) during the same period.

Circle wise the percentage of increase in sale of energy is high at 145.42 per cent in Kadapa circle followed by Prakasam circle 115.04 per cent. The highest sale of energy was recorded in Chittor circle in 2000-01 (1130.00 MU) and in 2000-01 2170.45 MU in 2009-10.
The total consumption of electricity increased from 5867.86 million units in 2000-01 to 13697.28 in 2009-10. The highest percentage of electricity was consumed in low tension category compared to that of high tension category.

Of all categories the L.T Agriculture consumption is high compared to other categories consumption as it accounted for more than 40 per cent in every year (ranged from 42.97 per cent in 2000-01 to 49 per cent in 2004-05). After 2004-05 L.T agriculture consumption declined. The next category which consumes more electricity is domestic. Electricity consumption by industrial sector declined as its percentage has come down from 10.0 in 2001-02 to 7.43 in 2009-10.

The net profit increased from 2.61 crore in 2003-04 to 54.16 crore in 2007-08. Later on the profits declined to 10.98 crore in 2008-09 and further to 3.98 crore in 2009-10. The sale of power is the main source of revenue. The purchase of power is the largest component in the total expenditure. The average revenue realized is greater than Rs.2.00 per unit in every year. Under high tension category the average revenue ranged between Rs. 3.65 and Rs.3.87. The average revenue under low tension is low due to supply of free power and fixation of low tariff rates to agriculture sector, cottage industries and domestic purpose.

The highest amount of arrears i.e. Rs. 503.07 crore was observed in 2004. But the same tremendously fell down because; A.P state government waived the agricultural electricity consumers dues in 2005. The arrears again increased to Rs. 398.90 crore in 2010. It is observed that the percentage of L.T Domestic arrears in total L.T. arrears is high as it ranged from 21.79 per cent in 2004 to 77.05 per cent in 2005. The H.T total arrears increased from Rs. 86.89 crore (25.10%) to Rs. 136.16 crore (34.13%) in 2010.
The total amount of arrears increased from Rs. 34613.47 lakh in 2003 to 39892.71 lakh in 2009-10 registering a growth of 15.25 per cent. It is noticed that the amount of arrears increased in Krishna, Guntur, Prakasam and Kadapa circles. While in Chittor, Nellore circles the arrears amount declined.

The number of services increased from 436507 in 2000-01 to 595807 in 2008-09. While the agricultural electricity consumption rose from 2283.25 million units in 2000-01 to 4167.82 MU in 2009-10. The average revenue realized from agriculture sector declined from 0.92 paise per unit in 2002-03 to 0.01 paise per unit in 2009-10. But the average revenue realized from other than agriculture activities (over all) was high and ranged from Rs. 2.10 to 2.30 during the same period.

33 kV Sub-Stations reduce the energy losses, control the tailend voltages and supply quality of power. The number of Sub- Stations increased from 455 in 2000 to 1045 in 2009-10. After 1999-00 the large number of Sub- Stations were installed in Chittoor circle (228), followed by Kadapa (191), Nellore (163), Prakasham (158), Guntur (155) and Krishna (150).

The total length of lines increased from 155860.00 kilo meters in 2000 to 244452.62 K.M (1.57 times) in 2010. The distribution company gave much importance to improve the 11 kV system from 2002-03 onwards. The 11 kV system was enhanced from 43350.00 K.M to 91863.75 K.M. The 33 kV line net work rose from 8110.00 K.M to 11506 K.M during the same period.

Circle wise, the highest growth in length of lines was recorded in Kadapa circle 6937.52 per cent followed by Prakasam (2224.16 per cent), Nellore (1919.48 per cent) and Chittoor (1643.32 per cent). The lowest growth was recorded in Guntur circle (17.94 per cent). While in 2010 the same percentage of Guntur circle declined to 14.03 per cent.
(least of all circles). The Chittoor circle recorded the highest percentage in 2010 (18.87 per cent).

The number of existing transformers increased from 51571 in 2000-01 to 249601 in 2009-10 registering a growth of 383.99 percent. The highest number of existing transformers were established (34264) in 2003-04. While the highest number of DTRs failures were observed in 2008-09.

Of all circles, the Kadapa circle registered high growth i.e. 1630.72 percent in the number of DTRs between 2002 & 2010. Of the total DTRs of six circles, large number (29.61 % in 2009-10) are established in Chittor circle followed by Kadapa (28.94%).

The power thefts spiraled in recent years. The number of registered theft cases increased from 5064 in 2000-01 to 51837 in 2005-06. After 2005-06 the registered total number of cases were declined from 31110 in 2006-07 to 18967 in 2008-09. The assessed amount increased from Rs. 4.72 crore in 2001-02 to Rs. 8.89 crore in 2005-06. Later on it declined to Rs. 2.81 crore in 2008-09. Assessment amount collected rose from Rs. 2.70 crore in 2000-01 to Rs. 3.01 crore in 2005-06. Later on it declined from Rs. 1.93 crore in 2006-07 to Rs. 1.81 crore in 2008-09. The number of cases compound increased from 3823 in 2000-01 to 35084 in 2007-08. The number of persons arrested decreased from 877 in 2000-01 to 4 in 2008-09.

A primary survey was carried out in Proddatur division in Kadapa circle during 2009-10 to know the benefits and problems of electricity consumers in rural areas. This survey covered around 280 electricity consumers in 8 sections. Each section covered 35 electricity consumers (with connection). In each section 25 domestic/non-domestic and 10 agriculture consumers were selected randomly. It is noticed that out of 280 respondents 59 electric consumers (21.07 per cent) are illiterates, 55 (19.64 per cent) are having
education up to primary level, 107 (38.21 per cent) studied up to high school level and the remaining 59 (21.07 per cent) are degree holders. Thus it reveals that majority of the electric consumers in the study are educated.

The category wise distribution reveals that out of 280 respondents, 153 (154.64 per cent) are OCs, 95 (33.93 per cent) are B.Cs, 31 (11.07 per cent) are S.Cs and the remaining 1 (0.36 per cent) is S.T. There are 1400 members in all selected households. Of them 711 (50.79 per cent) are male and 689 (49.21 per cent) are female.

As high as 90.36 per cent of the houses of selected electric consumers are pucca, 6.43 per cent are tailed, only 1.07 per cent are thatched. Only 6 (2.14 per cent) of the respondents are living in rented (pucca) houses.

All the 200 respondents of domestic and non-domestic are using 288 bulbs, 373 fluorescent lamps, 386 fans, 179 television sets, 26 coolers, 40 refrigerators, 12 other items. On an average there are 2 fluorescent lamps, one bulb, 2 fans and one television set in each house. Only 26 (13.0 per cent) houses equipped with coolers, 40 (20.0 per cent) houses with refrigerators.

Out of 200 respondents, 140 are using Non –ISI bulbs. Only one respondent of Rajupalem section is using ISI bulb. The remaining 59 respondents are not using bulbs. A total of 155 respondents are using fluorescent lamps. Of these 59 (38.06 %) are ISI fluorescent lamps. Of 179 respondents, 174 (97.21 %) have bought television sets of ISI mark. Only 5 (2.7 %) respondents have bought television sets of Non- ISI mark. Out of 200 respondents, 188 are using fans. But only 37 (18.5%) respondents are using ISI fans.

Out of 26 respondents using coolers 16 (61.54%) respondents bought Non-ISI coolers. Out of 200 selected respondents, only 40 (20 %) are using ISI refrigerators. So,
most of the respondents are using Non-ISI items except in the case of television sets and refrigerators.

Out of 200 respondents 102 (51.0 per cent) fall in the consumption class of 0-50 units, 80 (40.0 per cent) respondents are in the consumption class of 51-100 units, 14 (7.0 per cent) respondents are in the consumption class of 101-150 units, 3 (1.5 per cent) respondents fall in the consumption of 151-200 units and only one respondent (0.05 per cent) is in the consumption class of 201-250 units.

Out of 200 respondents 130 (65.0 per cent) fall in the bill payment class of 0-100 rupees, 46 (23.0 per cent) are in the bill payment class of 101-200 rupees, 15 (7.5 per cent) are in the bill payment class of 201-300 rupees, 6 (3 per cent) fall in the bill payment class of 301-400 rupees and only 3 respondents (1.5 per cent) are in the bill payment class of Rs. 501 and above.

The main source of income of 200 selected electric consumers is agriculture. About 62 (31%) respondents fall in the income class of Rs. 10001-20000, 44 (22%) respondents are in the income class of Rs. 20001-30000 and another 29 (14.5%) are in the income class of Rs.30001-40000. There are some respondents 4 (2%) whose annual income is roughly Rs. 1,00,000, 5 (2.5%) respondents with annual income of more than Rs.1,00,000.

Out of 200 respondents 10 (5%) expressed that the supply of electricity before 2005 was better, 147 (73.5%) expressed that the supply was satisfactory and 43 (21.5%) said that the electricity supply was poor.

In summer (March-May) power was supplied for more than 17 hours a day according to 43 (21.5%) respondents and the power was supplied for less than 17 hours a
day as expressed by 157 (78.5%) respondents. Hence majority of the respondents opined that power was supplied for less than 17 hours a day in all seasons.

Out of 200 respondents, 24 (12 %) expressed the problems of meter (non-functioning of meter, over reading etc.). Of 24 non-functioning meters 8 are immediately repaired and 16 are not repaired timely and there was delay in repairing them. Almost all the respondents told that there was power breakdown due to small defects in distribution and transmission lines and sub-stations. This problem was immediately attended and solved by the department. As high as 170 (60.71%) respondents told that the fuse problem in distribution transformers was solved by the consumers themselves. But majority of the respondents 136 (70.10%) complained that there was delay in rectifying the defects in distribution lines. Besides these, there are other problems like delay in meter installation for those consumers we have applied for fresh connection and mistake in electricity consumption bills (over reading etc.).

About 188 (94%) respondents have paid the bills regularly during 2009-10. Only 7 (3.5%) are irregular in the payment of bills. Another 2 (1%) respondents paid the electricity bills with fine, 3 (1.5%) respondents paid the electricity bills after disconnection.

Out of 200 respondents 157 (78.5%) followed the first power saving method (Using fluorescent lamps). While all the respondents followed the second (Trying to avoid lights during the day time), third (Switching off all items in non-living rooms) and forth (Switching off all items while going out) methods to reduce consumption. It implies that almost the respondents are aware of the energy saving methods and they all followed them in order to reduce the electricity bill.
Out of 200 respondents, 174 expressed their opinion on power. Of 174 respondents 60 (30 %) have informed that new distribution lines were installed in almost all sections except in Rajupalem, 89 (44.5 %) respondents told that distribution transformers were arranged, and other 25 (12.5 %) respondents said that sub-stations were established to improve power supply of Proddatur south section.

Out of 200 respondents 30 (15.0 %) opined that the improvement in the power supply was poor, about 105 (52.5 %) respondents expressed that the improvement in the supply was good after completing power development works in the area.

It is observed that all the 80 respondents have 100 electricity connections. Of them, 61 are free power connections with out meter. All the respondents own 722.6 acres. Of this the area of irrigated land is 288.8 acres (39.97 %) and that of dry land is 433.8 acres (60.07 %). There is no increase in the irrigated area after free power supply. But the free power certainly reduced the cost of production as farmers are made free from the payment of electricity bill.

It is observed that the entire irrigated land is utilized for growing crops in kharif season. In rabi also 94.36 per cent of irrigated land was utilized for growing crops. There is no significant change in cropping pattern.

None of the respondents used the Non – ISI pump sets in the study area. On the other hand, about 42 respondents are using the 7 ½ horse power pump sets where as 38 respondents are using the 5 horse power pump sets to extract the ground water in the study area. Hence the respondents are very particular about the quality of pump sets.

The power supply to agriculture was bettor according to 27 (33.75 %) respondents, about 43 (53.75 %) respondents expressed that power supply was satisfactory and according to 10 (12.5 %) respondents power supply to agriculture was
poor. All the 80 respondents expressed that there were frequent power cuts, 26.25% of the respondents expressed that the supply of power to agriculture was better, 62.5% expressed satisfactory and 11.25% observed poor supply to agriculture and all the respondents expressed the problems of power cuts.

All respondents (80) expressed that power was not supplied for seven hours per day in summer season (March to May). In rainy season (June to September) about 35 (43.75%) respondents expressed that power was supplied for 7 hours per day. At the same time 45 (56.25%) respondents expressed that power was not supplied for 7 hours a day, According to 79 (98.75%) respondents power was supplied for 7 hours per day in winter season. Only 1 (1.25%) respondent expressed that power was not supplied for 7 hours per day.

All the 80 selected farmers have expressed that getting free power connection is easy. About 24 percent of the selected farmers opined that power was supplied continuously for 7 hours a day and as high as 76 per cent of them informed that power was not supplied continuously for 7 hours but supplied in 2 or 3 spells (refer Appendix). Majority of the selected farmers complained that the irregular supply of power caused much inconvenience to the farmers. It is observed that free power is more beneficial to all the selected farmers as it has reduced the cost of production.

It is also noticed that the free power is being continued to all selected farmers since its installation. About 61 per cent of respondents informed that the motor repair works were not done timely by the department concerned. A few farmers (16 per cent) also expressed that the tariff was imposed even on free power.
In the beginning of the study four hypotheses are framed. Out of them three appear to be incorrect. But the last one is true to some extent. The following points reveal the same.

The installed capacity of power projects in A.P. substantially increased from 213 MW in 1960-61 to 14625 MW in 2009-10 registering a 69 fold increase.

The power generated by state sector rose from 784 MU in 1960-61 to 29551 MU in 2009-10. In the total power, the hydel power accounted for 77.8 per cent and that of thermal for 22.2 per cent in 1960-61. But in 2009-10 the share of hydel declined to 7.30 per cent and that of hydel stood at 32.30 per cent.

If revenue of power sector of A.P. is taken including subsidy, there is surplus (profit) in majority of the years except in 2001-02 and 2003-04. The surplus ranged from Rs. 9.65 crore in 1983-84 to Rs. 655.32 crore in 2005-06.

The number of sub-stations (including all voltages) in A.P. significantly increased from 71 by end of the second plan to 4096 by the end of the 2009-10. Hence the performance of power sector in A.P. is satisfactory.

After reforms the share of private sector in total power generation has been increased from 10.55 per cent in 2002 to 19.1 per cent in 2009-10 in India.

In India the transmission and distribution losses declined from 27.8 per cent in 2001-02 to 25.47 per cent in 2008-09.

After 1999, 25 states initiated State Electricity Regulatory Commissions. In 20 states SEBs and EDs have been unbundled and corporatised and almost all states SERCs / JERCs issued tariff orders.
Twenty states achieved 100% metering for 11 kV feeder and 4 states achieved above 90%, 2 states achieved above 80% metering. Mizoram state’s 11kV feeder metering percentage is 70%, Manipur is 21%. The 11kV feeder metering is not done in Arunachal Pradesh. Only two states namely Himachal Pradesh and Kerala achieved 100% metering at consumers level.

Plant load factor increased from 69.9% in 2001-02 to 77.49% in 2009-10. The PLF of central and private sectors increased from 73.3% and 84.3% to 73.1% and 84.4% during the same period. But the state sector PLF was increased only by 4.1% during the same period.

After power sector reforms, in A.P. the quality power supply and customer services were improved. Because, the number of sub-stations increased from 1996 in 2000 to 4096 in 2010. Especially 33 kV sub-stations rose from 1764 to 3714 during the same period. The transmission and distribution Lines also increased from 640804 KM to 864064 KM in 2010.

In Andhra Pradesh state the power shortage declined from 8.5% in 2000-01 to 0.7% in 2004-05. After that it increased to 6.6% in 2009-10. Energy metered sales increased from 27207 MU in 2000-01 to 59607 MU in 2009-10. The revenue from sale of power rose from Rs. 5569.06 crore to Rs. 15520.95 crore during the same period. The average power purchase cost increased from 179.5 paise/unit in 1999-2000 to 297.00 paise/unit in 2009-10. The average revenue realization increased from 174.23 paise/unit to 266.42 paise/unit during the same period.

A.P.S.P.D.C.L achieved a good performance during the period from 2001-02 to 2009-10. It earned profits continuously from 2003-04 to 2009-10. Net surplus ranged
from Rs. 2.61 crore in 2003-04 to Rs. 54.16 crore in 2009-10. Aggregate technical and commercial losses declined from 22.01 per cent in 2001-02 to 11.36 per cent 2009-10.

The percentage of metered sales increased from 50.36 per cent in 2001-02 to 61.42 per cent in 2009-10. The T&D losses are also reduced from 21.31 per cent in 2001-02 to 12.98 per cent in 2009-10.

A.P.S.P.D.C.L has not recovered the dues properly. Dues ranged from Rs. 503.07 in 2004 to Rs. 244.08 crore in 2005. In 2010, L.T consumers are responsible for 65.87 per cent and H.T consumers for 34.13 per cent of dues. Among the L.T consumers, the consumers of domestic and those of cottage industries and among the H.T consumers, Industrial consumers are responsible for more dues.

The number of power theft cases rose from 5064 in 2001-01 to 51837 in 2005-06. By 2008-09 the number of cases declined to 18967. Similarly the assessed amount increased from Rs. 2000-01 to Rs. 8.89 crore in 2005-06. Later on it declined to Rs. 2.81 crore in 2008-09. Here also the A.P.S.P.D.C.L showed improved performance.

The selected rural consumers (Domestic, Non-Domestic and Agriculture) of electricity expressed the following problems.

(i) The uninterrupted power was not supplied to agriculture.

(ii) Fuses fail frequently in distribution transformers. Those fuses are being arranged by consumers and not by the department.

(iii) Distribution lines are not maintained properly. Due to this there was interruption in power supply.

(iv) There was delay in the installation of meters for new connections.
Suggestions

The installed capacity of thermal remained more or less same between 2000-01 and 2005-06. While that of hydel also remained stagnant between 2003-04 and 2006-07. It was only in 2009-10 the installed capacity of both hydel and thermal showed improvement. So measures must be taken to increase the installed capacity of at least thermal power stations continuously in order to generate sufficient power.

The dependency of state on central sector & private sector for power is increasing. Hence there is need for utilizing the available resources fully. On the other hand the on going power projects must be completed quickly to increase the state sector (APGENCO) power generation. So that the power purchase from central sector and private sector decline. This will in turn help to increase revenue.

The power supply in A.P. is not sufficient to meet the demand and peak demand. Therefore energy conservation methods must be implemented strictly and proper meter billing is necessary. Besides, power theft must be controlled by taking stringent action.

It is noticed that there is no steady growth in APSEB’s expenditure on Transmission and Distribution between 1st plan and 10th plan. The Board’s expenditure as per cent to total plan expenditure varied from 39.10% in 1st plan to 8.71% in 5th plan. But in 11th plan (2007 to 2012) the Board’s share was only 2.99% in 2009-10. It implies that the Board’s share in total state plan expenditure tremendously declined. It is therefore, necessary to increase the budgetary support to APTRANSCO to improve the transmission and distribution net work.

The revenue and expenditure particulars of A.P power sector reveal that there is deficit in almost all years except in 2001-02. The deficit amount increased from Rs. 4.52 crore in 1983-84 to Rs. 7874.15 crore in 2008-09. Because the purchase cost of power is
greater than the sale value of power. This gap is filled by subsidy. So measures must be
taken to improve the position.

In A.P. the revenue from agriculture to power sector declined due to free power
and un-metered supply. Hence there is need for arranging meters for agriculture
connections. Beyond certain limit of consumption tariff must be imposed. Free power and
subsidies must be given only to eligible consumers.

The dues of A.P. power sector are increasing from time to time. In 2009-10 the
dues were estimated at Rs. 2245.95 crore. Of this the dues to be collected from live
services accounted for 24.52%, from disconnected services 21.10%, from Govt.
departments 14.33%, from the cases pending in court 17.11% and local bodies 13.88%. Hence the cases which are pending in court must be settled. The government departments
and local bodies must pay arrears immediately and the arrears from disconnected services
must be collected timely.

It is observed that the theft of energy is the major problem of power sector in A.P.
as the theft cases registered increased from 35536 in 2001-02 to 117312 in 2009-10. This
should be prevented in order to improve the revenue position of power sector.

Efforts must be made to reduce the loss of units and the aggregate technical and
commercial losses in A.P.S.P.D.C.L. As per statistics of 2010, of the total arrears the
arrears of L.T, the domestic consumers are responsible for 38.77% of arrears, agriculture
consumers for 38.77%. Among the H.T consumers, Industrial consumers are responsible
for 72.96% and that of REC for 11.05% of arrears. So the A.P.S.P.D.C.L should take
steps to recover the arrears by using revenue recovery act from the consumers mentioned
above.
As per field survey most of the respondents are using NON-ISI electrical items. These consumers must be encouraged to use standard items.

Majority of respondents opin that some of the meters are not functioning well. Hence the non functioning meters are to be replaced by new meters. Delays in the installation of meters for new connections and improper billing (over billing, under billing and average billing) should be avoided.

Free power connections are given without meters for agriculture development. But power was not supplied continuously for seven hours a day. So quality power should be supplied to agriculture without interruptions. All the respondents using free power inform that the free power is more beneficial and helpful to increase agriculture production. Hence free power to agriculture must be continued.

General suggestions

At present, spot billing system is followed. But the said system is so defective as they are not taking accurate meter reading. So billing should be according to meter reading.

Some times the farmers themselves are arranging fuses, for transformers. The department should look after this.

Some the farmers have paid the amount for arrangement of transformers and electricity connections. But there was too much delay in the arrangement of transformers and connections. As a result, the farmers are trying to take illegal connections to their motors directly.

In summer season, the prescribed 7 hours of uninterrupted power should be supplied to agriculture.
Some farmers are providing water to the others’ lands and collecting amount from them. By this act, the water is being supplied to more than the prescribed area under free power supply scheme. This should be prevented.