# An Overview of Electricity Sector in Kerala

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The electricity scenario in Kerala is at a turning point, as the state is making a shift from hydro sources to non-hydro sources (fossil fuel) of power generation. The year 1940 marked the beginning of the electricity generation in Kerala, under the Department of Electricity, at Pallivassal. This hydroelectric project with an installed capacity of 37.5 MW was the first of its kind in Kerala. With another 8 more hydro electric projects including the Sabarigiri Project (1966), with an installed capacity of 300 MW and the Idukki Stage I (1976), with an installed capacity of 390 MW, the total installed capacity in Kerala had gone upto 1011.5 MW by 1976. (Economic Review, 1976). Fig No. 1 indicates the growth in the installed capacity of electricity in Kerala.

Later, with the commissioning of more hydroelectric projects, Kerala achieved the status of a power surplus state, which lasted till the late 1980's. The period of surplus between 1969 and 1985 enabled Kerala to sell power to the neighbouring states at very cheap rates. (Economic Review, 1997).

During this period, the state resolved to encourage the setting up of power intensive industrial units. In the case of some of the industries, power is used as a raw material. Examples are the Indian Aluminium Co. Alwaye, the Travancore Electro Chemicals, Kottayam etc. In1979-80 as against 35.82 paise per unit realised from the domestic consumers, the realisation from these big industries was a mere 9.36 paise per unit.

However, by the late 1980's there occurred a total reversal, from a position of power surplus, to one of power deficiency. This reversal was explained away by the KSEB as a monsoon failure. "A power surplus state till 1987, when the state was in a position to supply power to the neighbouring states, Kerala faces to lay a reversal of the situation with power shortages of varying magnitudes, depending on the intensity and vagaries of the monsoons." (Economic Review, 1997. P 59).

It has been further explained that the increasing environmental objections and inter state differences stopped the further development of hydropower. (Economic Review, 1997). The Silent Valley Project, which the state wanted to take up in the late 1970's to maintain the pace of hydro development, was denied clearance on environmental considerations.[1] The Pooyamkutty project, which was proposed by the KSEB as a substitute, is still to be given clearance, in spite of it being scaled down in the face of environmental objections. Some other projects involving inter state sharing of water are awaiting clearance.

The KSEB's explanation of the power crisis as one brought about by monsoon failure is too simplistic. The reasons for the same need to be unravelled. All through the process of building dams across the major rivers in Kerala, there was no initiative to protect the catchments of these reservoirs. Even if one perilously keeps aside the ecological implications of deforested catchments and unsustainable land use, at least for ensuring the water availability in the reservoirs which in turn guarantees consistent power generation, we should have protected the catchments of these reservoirs. Even this basic logic was ignored, as the state encouraged the conversion of forests into plantations, and to agricultural land, and gave silent support to encroachment on forestland. Hence, even the small fluctuations in the monsoon pattern, began to affect the inflow of water into the reservoirs which were successively getting filled with sediments from the destabilised upstream.[2]

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[1] The State Government's plan in the 1970's, to generate hydro power by damming the Kuntipuzha, which drains the Silent Valley watershed was opposed by different sections of society. This 89.5 sq. km area of relatively undisturbed, wet evergreen forest, is one of the richest in terms of biological and genetic heritage, across the world. A campaign was launched against the destruction of this very valuable forest, and the government was forced to abandon the idea of damming the Kuntipuzha.

[2] The change in the land use pattern caused by the Idukki dam includes massive in-migration causing severe deforestation in the catchment area of the reservoir, causing siltation of the reservoir, leading to a reduction in the

However, in order to understand the projected power crisis, we need to look into some of the other crucial factors such as the intricacies in the overall pattern of power consumption, the T & D losses, the increasing domestic consumption etc.

**Pattern of Power Consumption**

As has been stated earlier, during the 1970's and the early 1980's, when electricity was in surplus, the KSEB was busy selling it out to the neighbouring states. Further, the industrial development of Kerala was expected to get a boost with very cheap electricity supplied to them. The construction of more and more dams was justified on the above two grounds. This understanding of 'cheap' hydro electricity was based on the assumption that hydropower came free of cost. The social and ecological costs were considered as indirect costs and were written off.

**Cost of Hydro Power**

Kerala's hydro projects are located in the hilly, forested Western Ghats. The forests are 'owned' by the state, and hydroelectric dams are also implemented by the state agency. So, in most of the cases, there was no assessment of the costs pertaining to forest loss due to submergence, migration etc. Forests get fragmented due to artificial reservoirs, transmission lines etc. In case of the Pooyamkutty Hydro Electric Project, the study conducted by the Kerala Forest Research Institute, KFRI, concludes that if the economic value of the forests to be submerged is taken into account, then the cost-benefit ratio will be negative. (KFRI, 1992). There have been no detailed studies on the number of people displaced by dams in Kerala and their rehabilitation. However, a detailed listing of forest damage due hydroelectric projects is available. (Nair, 1988-See Appendix 1).

The thought that characterised the govt. and the KSEB thinking is reflected in the following quotes:

*"Availability of cheap power is an essential precondition for rapid industrialisation. Power generation in Kerala is perhaps the cheapest compared to the other states in India. Gifted with a large number of rivers the state is naturally placed in an enviable position in respect of power development. Due importance was therefore given for generation of hydel power during the two decades of planning in the state."* (Economic Review, 1975 P. 162). Moreover, the policy guidelines were in favour of harnessing "clean and cheap" hydro potential of Kerala, to the maximum, so that even the Southern Regional Grid of the country, could be fed by the same. *"Under the integrated operation of the Southern Regional Grid (SRG), if Tamil Nadu Electricity Board or other constituent Electricity Boards require surplus energy at low load factors, from Kerala, to meet peak demand, installation of three more units of 130 MW each under the Idukki Second Stage will be necessary… Therefore it is a step in the right direction to pose two or three large hydro electric schemes of Kerala for implementation as part of the power pool for the participant States of the Grid"*. (Fifth Five-Year Plan: A Draft Outline, 1974-79 P.250). Accordingly, large dams were constructed and a major portion of the power generated was supplied to the neighbour states as well as to the big industrial units within the state at considerably low rates. Sale of energy to the neighbouring states was one of the major sources of income to the KSEB upto 1985.(See Fig No. 2 & 3, which indicate the sale of electricity to the neighbouring states, and the revenue realised from the same, during the period of so called surplus, 1969-85).

It needs to be underlined that, electricity was supplied to high-tension industries and to the neighbouring states at very low rates especially when compared to the rate at which it was supplied to other sectors within the state, especially the domestic sector. For example, the industrial consumption of power, especially that of high voltage power was of the order of 60.65% in 1970, while the revenue from this sector was the lowest (27.3%). On the other hand the domestic consumption of electricity in the same year was only 3.43% of the total, while the percentage of the revenue collected from this sector was 15.33%.

By 1977, the percentage of energy consumed by the high voltage industrial section went up to 63.91%, while the domestic sector was only 10.43%. However, the revenue collected from these two sectors was 35.5% and 18.23% respectively. Even in 1984-85, the industrial sector had a share of 54.35% of

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storage capacity of the same.(Nair, 1984).

the total energy consumed in the state, with a contribution of only 40.87%, to the revenue. In successive years, if one is to go by percentages alone, the percentage of energy consumed by the industrial sector seems to be declining and that of the domestic sector seems to be increasing. However, this does not imply a corresponding decrease in the net energy consumed by the industrial sector. In fact, the net consumption of energy in this sector has been increasing over the years.

Even the relationship between the amount of electricity consumed by these industries, and the employment generated is not at all satisfactory. Table No. 1 indicates the relationship between electricity consumption and employment generation in the industrial sector of Kerala. For instance, it may be noted here that electricity consumed by the Indian Aluminium Company, in order to generate employment for one labourer per day is as high as 1000Kwh. There seems to be no plausible reason as to why these high energy consuming and low employment generating, electro chemical and electro metallurgical industries continue to thrive in the state. Here it may be noted that as against the policy decision taken by the government in 1994, to discourage the further establishment of such industries in Kerala, ten such industries have been set up in the Palakkad district recently. Not only have these energy intensive industries been given electricity at a subsidised rate of 54.25 paise per unit for the first five years, but they have also been exempted from any hike in the rate during this period. In Palakkad district, two such units alone consume 8.70 million units of electricity per month generating employment for less than 350 people. Had these industries been located in the state of Tamil Nadu, they would have to pay 345 paise per unit of electricity consumed. The profit that they derive from this alone is more than two and a half crores per month. ( Menon, 1999).

Added to the fact that they are under charged for the electricity they use, these HT and EHT consumers do not even pay up for the under-priced electricity that they consume. For example, as on 31-3-93, the arrears of payment of EHT and HT consumers was as high a figure as Rs. 568,626,274 and Rs. 154,967,055 respectively, totalling upto Rs. 723,593,329. (KSEB,1994). As against a major portion of power being supplied cheaply to the HT and EHT consumers, and even being sold to the outside states, the electrification of villages in Kerala remained as declarations on paper. If one goes by Government and KSEB declarations alone, 100 % of all Kerala villages have been electrified by as early as 1979. However, 40% of the households in this state are not electrified, even today. (Economic Review, 1997).

**THE STAR ATTRACTION TO ELECTRICITY.**

The entire range of subsidies provided to the different types of consumers and the corresponding amount of energy consumed by each category of consumer, is not made available to the general public. For example, tourism has been included in the category of industry, and accordingly, electricity was supplied to this sector at a subsidised rate. Recently, the KSEB decided to cut off the subsidies, and to increase the rate from Rs. 2.20 per kWh to Rs. 6.60 per kWh. However, the powerful tourism lobby put up a strong opposition and forced the KSEB to cancel this order. Here it may be noted that it is mandatory that 25% of rooms in all star hotels be air conditioned, with a restaurant and bar etc. This implies a huge consumption of heavily subsidised electricity.

It should be further noted here that the KSEB purchases electricity from NTPC @ Rs 2.75/kWh. Hence, the supply of electricity to the Star Hotels at the rate of Rs 2.20/kWh implies a loss of 55 paise/kWh to the KSEB. So the Star Hotels flourish at the cost of the taxpayers of the state.

Source: (Malayala Manorama, 9.11.99)

It is a fact that this remaining 40 % of the households do not lie in close proximity to the main grid. However, this has not been an accidental development. The grid system has been designed and developed in order to ensure quality power supply to the industries. In this process of ensuring quality power through well-laid out grids to the industrial centres, the T & D systems to the domestic sector got neglected. This 'remoteness' which is a fall out of the grid design catering to the industries, is often portrayed as the reason for discrepancy in the distribution system. The other reason of course is the fact that many households cannot afford to pay monthly electricity bills. Even in cases where the supply was made free, the initial capital investment (wiring, connection charges etc.) was not affordable.

**Increasing Domestic Consumption**

Over the years, as in the case of all other consumables, the per capita consumption of electricity has also been increasing in Kerala. (See Fig. No.4). Given the fact that even today 40 % of the households

are un-electrified, an increase in the per capita consumption implies an increasing consumption by the already existing consumers. This reflects the increasing consumersitic trends in Kerala, especially among the middle and the upper middle classes. This situation is further aggravated by increasing impact of tourism, star hotels, entertainment parks, urbanisation etc. This trend is likely to continue and will accentuate the existing power crisis. Unlike the T & D issue, where technical interventions can make positive changes, this issue is much more complex. However, the perspective plans and the policy guidelines are seemingly not assessing this situation with due seriousness. It may be noted that night time consumption (6pm-10pm) is more than twice that of the day time consumption, creating a very high demand during peak time (Govt. of Kerala, 1998). A carefully planned out strategy for demand side management can effectively address this issue.

**Transmission and Distribution**

For the past 50 years, Kerala has been consistently maintaining a very poor T & D system, which led to a very high T & D losses. (See Fig. No.5). As may be noted from the figure, T&D loss is not a new phenomenon, though measures to overcome the same were initiated only a few years back. It may be added that after the initiation of these measures, there has been a perceptible decrease in the % of T & D loss.However, even gross figures like 19.95% of T&D loss in 1987 is questionable in the light of micro level studies which indicate that T&D loss at the local level distribution alone, is over 30%(Suresh, 1999).

**Are We Ready for Demand Side Management?**

There are 5210674 consumers in Kerala, as on 31-3-98. Even if we approximate this total number of consumers to 50 lakhs, and assume that all of them use only two 60 watts bulbs during the evening peak time, the total consumption will be 2x60x50 lakh, which is 600 MW. If we replace these 60 watt bulbs with 11 watt compact fluorescent lamps which will give equal illumination, the electricity consumption will be 2x11x50 lakh, which is only 110 MW. Thus, the energy saved will be 600MW-110MW, which is 490 MW. Even if we assume that a CFL costs Rs. 500, the total cost incurred for such a transition will be Rs. 500 crores. This will be much lower than the cost of producing the saved 490 MW of electricity.

*(Source: Calculated from Economic Review, 1998, (p. S-80) and Menon, 1999, (p. 5).*

T & D loss is essentially a problem which can be explained and corrected by a combination of technical and managerial efforts. In developed countries, the T & D loss is limited to 6-7% by the installation of appropriate technical interventions. However, in Kerala, till recently, the state never looked into this matter with due seriousness due to the *'surplus'* and *'cheap'* nature of electricity available in the state. Further, we never invested enough resources in developing the T & D system in par with the electricity generation. Even today, when the government is planning for another power surplus scenario by setting up of a series of thermal power stations, the T & D system to take care of such an increased power generation is not being developed. Across the state, the work related to voltage improvement and extension of low-tension distribution system has been pending for years. According to the policy documents of the state government, they will be able to complete the T & D work sanctioned on 31-3-97 only by 2001 AD (KSEB, 1998). This implies that even in 2001, the state will be 4 years behind schedule.

"The existing ratio between HT & LT distribution system is 1:5. This should have been 1:1 only". (KSEB, 1998. p. 14) The increase in distribution loss is mainly due to this factor. The necessary infrastructure development for voltage improvement and supply of good quality electricity has been pending for years. The quantity and quality of equipments, especially that of transformers, play a crucial role in ensuring effective T & D. This can be ensured only by a competent and committed management system within the Electricity Board.

**Cost Escalation and Delay in Implementing Projects**

Almost all hydro projects implemented by the KSEB have been delayed in the process of completion. Correspondingly, there has been a notable increase in the actual cost. Table No. 2 gives details regarding the same. It may be noted here that the % increase of the revised estimate over the original estimate, in each of the projects, varies from 12 to 957.7%. However, based on the justification that some money has already gone into it, the work continues, sometimes for more than a decade and more.

**T & D LOSS OR GAIN?**

T &D system depends upon the installation of quality equipments. However, each year's audit report from the AG brings out more and more stories of purchase of low quality equipments. For example, 400 transformers of 160 KV each were purchased and 95% of the cost of the same (Rs. 3.16 crores) was transferred to the Hyderabad based company on delivery of the transformers. Later when, these transformers were installed in the Malabar region, which suffers from a very poor T & D system, most of these systems were found to be faulty.However, the then Chief Engineer, who was responsible for the purchase, went onto become the Board Member of the KSEB, and continues in the very same position.

*(Source: Malayala Manorama 9.11.99)*

**Conclusions**

Hence all the above factors namely high levels of T & D loss, increasing domestic consumption by a few, subsidised supply of electricity to the industrial and the tourism sector, decreasing storage capacity of reservoirs, the unreliability of monsoons etc. have led to a very vulnerable electricity generation system in Kerala. The KSEB's answer to this very complex issue was rather simple, viz. in the form of fossil fuel based electricity generation systems. Three of the same are already operational and another five are in the pipeline, including both public and private sector undertakings.

The state has therefore been looking for options to meet the demand for power from non-hydro sources such as coal, diesel, etc. The statistics indicate the growing shift towards non-hydro options. (Economic Review, 1998). However, the search for non-hydro options is not going to be very smooth, on the following grounds:

- The coal bearing regions being situated far from the state, it may not be economically viable to operate coal-based systems.
- It is not easy to find out locations for coal based thermal power stations anywhere near the sensitive coastline or within the densely populated midlands.
- High per unit cost of power production in the case of any option other than hydro, including diesel and naphtha make it less attractive. However, the state has decided to go in for non hydro options, so much so that by 2002 AD, as much as 50% of the state's electricity needs will be met from non hydro sources.

The above is an outline of the pattern of electricity generation in Kerala, and the proposed plan for the future. It is in this present context of declining priority given to hydropower, that we need to evaluate the history, potential and the future of SHP's in Kerala.

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# Power Sector Reforms: An Overview of Kerala

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Geographical, social, economic, political and cultural factors of a region have a bearing on its power consumption patterns. The case of Kerala with regard to reform in the power sector reflects the positive as well as negative aspects characteristic of a society with a rural production base and an urbanized culture.

The Kerala State Electricity Board (KSEB) is catering to the electricity needs of the entire state with an area of 38863 sq. Km and a population of 305 lakhs (i.e., hundred thousands). The state has 1452 revenue villages situated in 14 districts and the density of the population is 747/sqKm. Kerala's quality of life index is high with literacy, life expectancy, infant mortality rates and birth rates comparable to those of developed Scandinavian countries. At the same time, per capita income is low. Food production and industrial production are also meager. Despite glowing tributes to the 'Kerala Model' of development, this contradiction has created many problems for Kerala. It is a consumerist state in spite of the fact that real income is low. The fact remains that it has a people sustained more or less by remittances from natives working abroad or elsewhere. The facade is that of a prosperous city with palatial houses, well-dressed people, five star hospitals and people fond of conspicuous consumption of expensive consumer goods. The entire state appears to be an out-stretched town, with people of a totally urban orientation.

With the advent of economic liberalization Kerala's agricultural products (mostly for exports) which have been bringing in foreign exchange and supporting most of the people, viz. coconut, rubber, pepper, arcanut, and cashew nut have lost out to competition and have reached rock-bottom prices. At present, farmers (most of them have only small holdings, unlike in other states) and agricultural labourers are facing the worst economic crisis of their life. Cottage and small-scale industries like handloom and readymade garments are also crumbling down in the global market place. Unemployment both for the educated and the uneducated has reached alarming proportions. These are harsh realities to be reckoned with while considering the proposed power sector reforms. Reform is a must as the KSEB is not free from the trials and tribulations of other SEBs; but one has to he careful before suggesting a homogenous set of measures and procedures in all the states of the country. Kerala is not Orissa; nor is it Haryana or Andhra Pradesh. What is meant is just that the unique socio-cultural and politico-economic peculiarities of each state have to be taken into account before proposing a package of reforms in one of the most vital sectors like power. Reform, which is intended to promote the efficiency and viability of the SEB's and welfare of the people should not culminate in perpetuating the inefficiencies and making electrical energy a luxury item, which people can not afford. Reform should therefore be region specific and people specific if it has to deliver the goods. If reform has failed in other states on many counts, one of the lessons to be learnt is that privatization per se is no solution to the ills of the power sector.

**KSEB and Reforms: The Promise**

The Power Policy Statement of the Government of Kerala 1998, categorically states that private investment will not be allowed in transmission and distribution and that the SEB will be retained in public sector. It also states that through restructuring, and reorganization, the SEB's efficiency will be enhanced to make it a flawless public sector undertaking.

The declared aims of the reform include making Kerala a power surplus state by the year 2000; revival, expansion and modernization of existing projects; permanent solution to power cut and load shedding, providing encouragement to investors in the generation sector: reduction of T&D losses; adjustment of production and consumption through proper and careful demand side management; enacting legislation to ensure quality of equipment and consumption patterns; achieving conservation of energy and completion of projects within strict time limits. A detailed programme has been proposed in each sector for these purposes.

In the policy document there is a proposal to reorganize the SEB into three 'profit centers', each one for generation, transmission and distribution. In the case of distribution, the state will further be divided into three regional profit centers with head quarters at Trivandrum, Franakulam and Kozhikkode. The profit centers will have autonomy with powers to take decisions in matters of vital importance like capital investment, resource mobilization and appointment of staff. At the same lime the broad aims and objectives and spheres of activity of each profit center will be decided by the KSEB.

Owing to resource crunch the board has resorted to loans, both internal and external, and has issued bonds and debentures in the recent past. The policy document declares that private capital investment will be allowed in the generation sector and that all possible co-operation will he extended to promoters who have signed power purchase agreements (PPAs) with SEB for timely completion of projects. The SEB also proposes to ensure 16% return to the board on equity fund, instead of the existing 3% on total assets, in the light of the practice adopted by the Government of India (GoI) recently. The board also declares that the subsidy provided at present by various government departments, will he made directly available to the consumers. There is also a declaration that a State Electricity Regulatory Commission (SERC) shall be constituted to regulate tariff from time to time and that the recommendations of the commission in this regard will he final and binding.

**The Performance**

The board appointed task forces comprising of board officials and representatives of trade unions to study the proposed reform package and to submit recommendation. The task forces have already submitted comprehensive reports and the board has already started its initial movements towards reform. As a result, the following measures have been undertaken.

- Spot billing system, which has prevalent in certain cities and towns has been extended to all the areas of the state, making revenue collection faster.
- The existing anti-power theft squad has been given powers for stringent action

against offenders.

- The initial step towards the reorganization of the SEB's into profit centers has been undertaken.
- Regarding the constitution of a regulatory commission there was a controversy and it has been stalled for the time being.
- A Canadian agency is over seeing the reorganization and restructuring of the SEB
- The board has entered into contract with Ms SNC Lavelin of Canada for renovation of hydroelectric projects.
- Metering equipment have been installed to assess the total intake of energy from generation to transmission and from transmission to distribution at, different dispatching points to measure the exact quantity being distributed and to ensure accountability.
- TOD meters have been made mandatory for major industries. To check the differences in base load and peak load.
- Computerization on a large scale is being envisaged to promote efficiency of operations and quick managerial decisions.
- *Vydyuthi Adalaths* have been resorted to, to redress long pending grievances of the public.
- Work norms of employees have been modified to rationalize work input.

**Benefits**

The attempt to enhance efficiency has started yielding results. It has improved the overall performance of the SEB. Installed capacity prior to 1996 is given in Table 1. Emphasis on time bound completion of projects has resulted in the enhancement of installed capacity by 977.2 MW within a short span of two years (see Table 2). System improvement measures have gained momentum. Rapid construction of substations and strengthening of lines have helped to reduce low voltage problem in many areas. About 50 numbers of 33 kV substations will be completed shortly reducing line loss to a considerable extent. T & D losses have come down from 21-22 % to 17-18%. There is no more power cut or load shedding in the state from November 2000 onwards, though the northern districts like Kannur and Kasaragod even now face low voltage problems.

Interest in demand side management has resulted in local bodies supplying compact fluorescent lamps to several entitled households. The prejudice against mini micro hydel projects is slowly vanishing and the Board has entered into contract with Chinese agencies for implementation of many a mini project.

All these developments indicate that cleansing the Aegean stables of SEB's is no Herculean task if the Boards are willing to insist on reforms and if they enlist the cooperation of employees. Much remains to be done for improving the efficiency of the system and the quality of service to the consumers. Yet, the fact that it is in public sector need not hamper any SEB's attempt to manage changes and if reforms are carried out transparently.

***Table 1: Installed Capacity as in 1995***

| *Sr. No* | *Station* | *Installed Capacity in MW* | *Generation Capacity in MU* | *Date of Commissioning* |
|---|---|---|---|---|
| 1 | Pallivasal | 37.5 | 284 | 19-03-1940 |
| 2 | Sengulam | 48.0 | 182 | 01-05-1954 |
| 3 | Neryamangalam | 45.0 | 237 | 27-01-1961 |
| 4 | Panniyar | 30 | 158 | 29-12-1963 |
| 5 | Peringalkuthu | 32 | 170 | 06-03-1957 |
| 6 | Sholayar | 54 | 233 | 09-05-1966 |
| 7 | Sabarigiri | 300 | 1338 | 18-04-1966 |
| 8 | Kuttiyadi | 75 | 268 | 11-09-1972 |
| 9 | Idukki | 780 | 2398 | 12-02-1976 |
| 10 | Edamalayar | 75 | 380 | 03-02-1987 |
| 11 | Maniyar (private) | 12 | 36 | 31-03-1994 |
| 12 | Kallada | 15 | 65 | 05-09-1994 |
| 13 | Kanchikode (wind) | 2 | 3.0 | 15-08-1995 |
| | **Total** | **1505.5** | **5752** | |

***Table2: Capacity Addition upto December 1999***

| *Sr. No.* | *Station* | *Installed Capacity in MW* | *Generation Capacity in MU* | *Year* |
|---|---|---|---|---|
| 1 | Peppara | 3 | 11.5 | |
| 2 | Brahmapuram (diesel) | 106 | 535 | |
| 3 | Lower Periyar | 180 | 493 | |
| 4 | Mattupetti | 2 | 6.4 | |
| 5 | Kayamkulam NTPC I, II, III | 359.5 | 2064 | |
| 6 | Kochi BSES I, II, III | 129.6 | 849 | |
| 7 | Peringalkuthu Left bank | 16 | 38 | |
| 8 | Kakkad | 50 | 262 | |
| 9 | Malampuzha | 2.5 | 5.6 | |
| 10 | KDPP | 128 | 674 | |
| | **Total** | **977.2** | **4938.5** | |

**Bottlenecks**

Fossil fuel based power veneration is going to face acute crisis in Kerala as it has no such resources. Imported fuel will result in higher costs. Diesel Naphtha based plants cause escalation of costs driving SEB to losses. The Board cannot accept even the rate at which NTPC is supplying power at present from Kayamkulam Thermal power Plant. The proposed costs of power purchase from various sources are given in Table 3.

***Table 3: Cost of Power Purchase 2000-2001***

| *Source* | *Purchase* | *Rate (Rs/kWh)* | *Total Cost (Rs in crores)* |
|---|---|---|---|
| NTPC | 1975.6 | 136.4 | 269.47 |
| MAPP | 259.60 | 220.42 | 57.22 |
| NLC I | 528 | 125.37 | 66.19 |
| NlC II | 627 | 186.59 | 1 16.99 |
| BSES, Kochi | 138 | 428 | 59.6 |
| | 890 | 383 | 340.87 |
| Kayanikulain | 1426 | 303 | 431.37 |
| KasarauodRPG | 30 | 3.30 | 9.90 |

If private sector is roped in on a large scale and is to be paid heavily for fossil fuel based generation, the SEB will have to hear the brunt of mounting losses.

Scope for tariff enhancement is limited as the existing tariff itself is fairly rational and cross subsidies are much less when compared to those of other SEB's. The domestic sector consumes a major share of electricity and tariffs range from Ps 70 to Rs 3.55 per unit based on the different slabs of consumption (see Table 4). The average tariff comes to Rs 1.04. Details of net power available and the consumption pattern are given in tables 5 and 6 respectively.

***Table 4: Domestic Tariff***

| *Units* | *Rate(Paise)* | *Unit* | *Rate* |
|---|---|---|---|
| Upto 40 | 70 | 151-200 | 210 |
| 41-80 | 110 | 201-300 | 265 |
| 81-120 | 130 | 301-500 | 345 |
| 121-150 | 160 | 500 & above | 355 |

***Table 5: Net Energy Available***

| | |
|---|---|
| 1. Total insured capacity | 1993MW |
| 2. Tolal internal generation | 8665.75 MKWH |
| 3. Less auxiliary consumption | 110.97 |
| 4. Net internal generation | 8554.78 |
| 5. Power purchase | 6072.20 |
| 6. Total energy available | 14626.98 |
| 7. Less T&D losses (17%) | 2523.15 |
| **8. Net energy available** | **12103.83** |

**Table 6: Consumption Pattern**

| *Category of Consumers* | *Sales in units (MKWH)* | *Ps/KWH* | *Revenue in lakhs* |
|---|---|---|---|
| 1. Domestic & residential | 5804.88 | 104 | 40370.77 |
| 2. Commercial | 729.62 | 458.3 | 33438.4 |
| 3. Public lighting | 167.07 | 130 | 2171.86 |
| 4. Irrigation & Dewatering | 529.77 | 59.55 | 3154.75 |
| 5. Public water works | 396.93 | 158 | 6271.53 |
| 6. Industrial LT | 1075.20 | 268 | 28815.39 |
| HT&EHT | 3085.06 | 281.79 | 86933.8 |
| 7. Railway traction | 17.12 | 151 | 258.46 |
| 8. Bulk supply | 248.19 | 185 | 4591.48 |
| **Total** | **12053.83** | **187.5** | **226006.45** |

The acute crisis that Kerala's economy is facing due to declining prices of plantation crops makes chances for upward revision of tariff bleak. Political considerations also stand in the way of further revision of tariff to make good the losses. In addition to these, people's stiff resistance to tariff revisions by governments like AP will naturally have its repercussions on a politically conscious state like Kerala.

The chances for private sector players do not appear to be rosy in the state for political as well as environmental reasons. None of the major projects for which PPAs have been signed has materialized so tar. Projects like KPPL (513 MW) Kasaragad Power Project initialed by promoters like KPP Nambiar and RPG have not come through, hitting against vehement public opposition on environmental and economic grounds. In spite of the Government's attempts to promote the private sector, foregoing its bold ideological stances, people at large are in no mood to hear heavy financial burdens for energy; nor are the industrialists ready to share the burden. Attempts to install TOD meters in a few energy intensive industries invited resistance not merely from the industries but also from workers, threatened by lockouts. The overall mood in Kerala is not conducive to privatization or to enhancement of tariff. Proposals for nuclear plants and coal based thermal power plants were aborted in the past in the face of strong protests raised by environmentally conscious people's movements. The apprehensions about the reluctance of the private sector in ensuring pollution control on the grounds of cost effectiveness make its credibility very low.

At present, all trade unions are spearheading a movement against the introduction of Electricity Bill 2000 and are seeking revocation of all unjust measures adopted in the name of reforms in other SEB's. A national strike is scheduled on 12th December in which all electricity employees, irrespective of their political affiliations will participate.

Thc lesson to be learned, but persistently ignored, is that any reform would be welcomed only if it is preceded by open discussions and debates among the public. Anything imposed from above will be opposed even if some of its implications might be beneficial to the public. KSEB appears to be resorting to the new process of reform, slowly but steadily. Enlisting consumers' support for it. People will co-operate if they are convinced that they will be benefited; not just by promises and demagoguery. The credibility of an institution, be it an SEB or SERC should be established beyond doubt, it people are to accept a reform package. What is true of Kerala in this respect, can he true of other states as well.

**Recommendations for the Future**

From the experiences so far, the following suggestions could be proposed to improve the conditions of the Kerala power sector.

- Complete all hydel plants that have already been started. This will add capacity of about 150-200 MW.
- Construct MINI-MICRO Hydel plants to the extent possible. Feasibility studies have been completed for more than 100 such units. Some experts indicate the possibility of capacity addition of about 4000 MW though this type of plants.
- Continue the betterment of T & D system to reduce the losses at least by 10% so as to save 200 MW at least.
- Reduce the usage of thermal plants to a minimum. Stop construction of all Diesel plants immediately.
- Reduce unnecessary wastage of energy in public and private sector.
- Change the industrialization pattern of the state (this is to reduce the population in the state where the pollution density is very high). Move towards industries using the available skilled labor and away from the present energy-intensive chemical industries.

***Geo Jose, C. R. Neelakandan Namboodiri***

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