

Chapter 2

SURVEY OF LITERATURE

There are several earlier studies made centering around the problem of the present study. Some of them have thrown light on the pattern of power demand, their growth and demand supply gap. There are some other papers which have described the power scenario of the country or state, some of them have analysed the potential of hydro power in our country. Literature on capacity utilization of power plants and energy conservation has also contributed a lot for making the present study. However not many papers have been found on economic aspects of power generation. The available literature relevant for different components of the present research have been surveyed for accomplishing the theoretical ground work.

Report of the Barman Commission of Power Generation and Supply (1975), which was constituted by Govt. of West Bengal, revealed various problems of the then State Utilities and Private Utilities of West Bengal. This report unearthed different technical snags of Santaldhi Thermal Power Station (STPS) and pointed out why the performance level of STPS was much bellow than optimum level. Reasons of short fall of generation have been reviewed in this report. It suggested some steps to obtain coordination among the different states and private utilities of West Bengal.

Lester D. Taylor (1975) in his paper 'The Demand for Electricity: A Survey' has reviewed many econometric literature on the demand for electricity. He has studied separately demand in the short run and demand in the long run. The paper concludes with some suggestions for future research.

Report of the Committee on Power headed by V.G. Rajadhyaksha constituted by Ministry of Energy, Govt. of India which was submitted in 1980 highlighted some pertinent issues. In planning new capacity, the Committee has dealt on the imperatives of moving away from the state as a geographical unit to the region and ultimately to the country as a whole because of the mismatch between the requirements of power of a state and its potential in power generation. The present power shortage is largely due to the poor utilisation of thermal capacity and it is on this, rather than the operation and maintenance of hydel plants and transmission and distribution system, that the Committee has focused its attention.

Chand Bahadur (1988) in his paper “Power development – the issues and options” has thrown light on power development in the 7th plan and 8th plan and has discussed some constrains of power resources. The paper has highlighted some issues like increasing investment cost of capacity addition, optimal utilization of existing installed capacity, reduction in transmission and distributions losses, conservation of energy, integrated operation of regional grids, environmental considerations etc.

Suri and Mukherjee (1988) in their paper “Power development in Eighth Plan – strategies, issues and options”, a few related issues relevant to power development programme implementation like financial viability of SEBs, need for restructuring of SEBs, necessity of early establishment of a national power grid etc. have been discussed.

Subramaniam, S. (1989) in “Recent trend in demand side energy management” stated about energy conservation programs in various parts of the world and traditionally efforts were made for conservation of energy from supply side only. Author cited a case study undertaken by Winconsin Electric Company, a leading utility in the U.S. who introduced a demand side energy management project called “Smart Money Programme”. As outcome of the project the author opined that, “the potential gains

arising from such a program to the national economy are obvious. Peak demand is pushed down and more cash is available for other priorities”¹.

Chowdhury, Dipak Basu (1989) in “Holiday for coal based power stations during 9th and 10th five year plans” mentioned about gradual change of situation of power stations in different five year plans and raised some issues on backing down of thermal plants in 8th plans, decline in PLF etc.

Singh, A.N. (1989) in “Hydro electricity is also an energy resource” highlighted about the utilization of hydro-electric energy resources of the country. He pointed out the environmental problems which we should consider in the context of various models of power generation.

Vaidyswaran, R. (1990) in “Energy scenario in China and India- a comparison” has made comment that low per capita energy consumption compared to world average in India and China is typical of a developing country. He stated that the two countries have large potential of hydel power but effective utilization is very low.

Bhattacharyya, D. (1991) in “Energy Demand Management Policy Issues in the Indian Context” highlighted energy related problems particular to India with respect to supply and demand management of energy resources and suggested some measures of energy utilization efficiency.

In the Report “Sectoral Energy Demand in India” (1991) which has been published by The Govt. of India in co-operation with The Economic and Social Commission for Asia and The Pacific, The United Nations Development Programme and The Govt. of France; a detailed analysis of energy demand of different sectors of consumers has been reflected. Trends in various socio economic parameters of the economy and per capita energy consumption in different sectors has been analyzed here. It reviewed the

¹ This has been discussed in Chapter 4.

energy planning studies in India and also reviewed the need of detailed study of the end uses of energy.

Narayana and Arumugan (1992) in their paper “Optimum use of electrical energy by proper conservation and management” has emphasized on the need of elimination or at least minimization of wastage of energy in all areas. The paper has focused on the fact that conservation of energy is the easiest and cheapest alternative towards meeting the ever increasing energy demand. It is a moral obligation of every individual to take up this. The paper has discussed the various measures in the area of energy conservation and management.

Roy, Arindam (1993) in his doctoral thesis ‘The impact of electricity generation and its absorption on a predominantly agrarian economy – A case study of irrigation system in Cooch Bihar District’ has made a detailed discussion on Indian Power Sector – its institutional pattern, regional structure, Transmission and Distribution infrastructure, growth potential of different sources of power etc. It had studied different aspects of agricultural power demand and how the agricultural power demand is increasing over time.

Mehta and Sahoo (1997) in their paper “NTPC’s contribution to the development of the power sector in India” has described the role of central sector particularly NTPC in the development of Indian Power sector. It has discussed different operational competencies of NTPC and how different power plants under NTPC are supplying power through out the country.

Sarwal, P.K. (1998) in his paper “Improved load staggering in rural areas: capacity utilization and energy conservation – a case study” has discussed about the different technical means by which capacity utilization and energy conservation can be improved and it has substantiated the facts by some case studies made on rural sector of Punjab State Electricity Board.

Singh, R.P. (1998) in his paper “Indian Power Sector: A pragmatic approach – the need of the hour” has pointed out the challenges faced by the Indian power sector in recent past. The paper has emphasized the requirement of development in transmission sector and has also presented to what extent that has taken place. It has made a study on effectiveness of integrated operation of regional grid and some related issues of reforms and restructuring of different SEBs.

Chatterjee, Shantanu (1998) in his paper “The power scenario in India – problems and prospects” has cited the inefficiencies of the power industry and the possible way outs as per his findings. The paper has ventilated the problem of undue political influences on power pricing and subsidisation in power sector.

Rahul Tongia and Ranjan Banerjee (1998) in their paper ‘Price of power in India’ highlighted the role of Central Electricity Authority (CEA) in the development of power sector in India. They have analyzed the structure of fixed cost and variable costs of different sources of power. The study has found the result that the rate of return of power plants is higher than 16%. The paper has pointed out some ambiguities of CEA guidelines and has suggested some incentive schemes for Independent Power producers (IPP).

Basu, Sambit (1999) in his doctoral thesis “Environmental Issues in the Planning for Power System for a Region in India: Power Environment Modeling for Andhra Pradesh” has ventilated some issues on sectoral energy demand, Demand Side Management, Scenario and pattern of investment in power generation sector.

Prasad, Yogendra (2000) in “An Overview of Hydropower” raised some points as benefits of hydro-power, utilization of hydro potential in India and role of different State Electricity Boards and Central sector in this respect.

Batthavatsalam, V. (2001) in “Small hydropower: Indian Experience” stated that all the non conventional renewable energy sources, small hydro units has highest potential and stands in the first place in the generation of electricity from such sources throughout the world.

Sinha, Soonee, Banpanda and Ram (2001) in their paper “Eastern region power demand scenario : a forecast” has pointed out that Eastern Region have suffered from chronic shortage of power during 70s and 80s and the growth of installed capacity in Eastern region picked up in the early 90s at the rate of 1000 MW per year. The paper has made a detailed analysis of energy demand as well as peak demand during the period of 1985-86 to 1998-99. The paper has considered the composition of total demand among domestic, commercial, industry, agriculture and public utility for the states of Bihar, Orissa and West Bengal and has highlighted the fact of gradual increase of proportion of domestic demand and gradual decline of proportion of industry and agricultural demand over the years.

MD. Golam Mohiuddin (2002) in “Cost-effective generation mix for Bangladesh Power Supply System” developed some model with mathematical formulation to determine the cost-effectiveness of the optimal generation mix for the future expansion program of power supply system in Bangladesh subject to a number of constraints.

Srivastava, A.; Shahidehpour, M (2002) in their paper “Restructuring choices for the Indian power sector” has described the reform and restructuring, that is taking place in our country, competitions and market models etc. they have opined that The recent reforms in the Indian power sector have exemplified changes in the players' role for providing policy directions, regulating, and running the sector for over 50 years.

Dhingra, K.K. (2003) in his paper “Sustainable development – challenges and opportunities” has pointed out the role of power sector for sustainable development of the country.

Swain, Singh and Kumar (2004) in their paper “Analysis of Power Sector in India: A Structural Perspective” has outlined the relationship between GDP growth rate and the need of growth of power sector. It has pointed out “Electricity consumption in India has more than doubled in the last decade, outpacing economic growth. The primary energy supply in the country is coal-dominant with the power sector accounting for about 40% of primary energy and 70% of coal consumption. It is also the single largest consumer of capital, drawing over one-sixth of all the Indian investments over the past decade. Fuelled by high coal and investment consumption, India’s power sector has grown 80-fold since independence to over 107,000 MW but the per capita power consumption is very low, approximately 350 kWh/year”. The paper has shown that agricultural sector is consuming almost same proportion of power with industry in all India level.

Filippini Massimo and Pachauri Shonali (2004) in their paper ‘Elasticities of electricity demand in urban Indian households’ estimated seasonal price and income elasticity of electricity demand in the residential sector of all urban areas of India using data for about 30,000 households. Three electricity demand functions were developed using monthly data for the winter, monsoon and summer seasons in order to understand the extent to which factors like income, prices, household size and other household specific characteristics, influence variations observed in individual households' electricity demand. The results showed electricity demand as income and price inelastic in all three seasons, and that household, demographic and geographical variables are significant in determining electricity demand.

Mahendru, V.P. (2005) in “Energy Conservation CFL - Evolution or Revolution?” has cited that, in India, gap between demand for power and supply of power is gradually

increasing. The measure he has suggested to bridge the gap is conservation of energy by use of energy saving equipments. By use of energy efficient equipments, mainly CFL bulbs, saving in investment can be achieved.

Kumar, Khetan and Thapa (2005) in their paper "Indian Power Sector - Emerging Challenges to Growth" has expressed their concern for crisis of coal for power generation which will appear in the present century. India's coal demand is expected to grow 7% annually over the next decade; much of this increased demand will come from power generation, which currently accounts for about 80% of total coal consumption. They have opined that Though India's power sector reforms are not yet free of difficulty, the ongoing restructuring efforts illustrates that a critical mass of reforms have been achieved. But Despite the potential offered by the India's power sector, private investors have not yet participated in this sector up to the possible extent.

Kottewar, A.B. and Kukde, P.K. (2006) in their paper "Financing electricity sector in developing countries - Indian scenario" has pointed out that the electricity is one of the most important input in the Industrial Sector, the development of the nation is generally compared by the per capita consumption of electricity. In the developing countries, the indicator can be related directly with the average development of the nation. Regarding funding of power projects, it has observed that for finance planning, the help of Private Sector has become compulsory. It is mentioned in the paper that, as per report of Government of India on Power projects, the foreign investors have applied for about 37,000 MW capacity addition by intended investment of Rs. 146,000 Crores, in India. The private sector again will comprise of elements of collaborations i.e. Private to Private, Private to Public sector, Foreign to Private and Foreign to Public sector combinations. It is necessary to work out on all these combinations as to how the 50% achievement in capacity building could be made possible in Power Sector. The C.E.A. has already identified about 20,866 + 7,624 M.W. of Coal + Hydro

mix Generating Plants in immediate future. The author has opined that, in India, the share of non-conventional mix or nuclear mix plan is generally neglected.

The above papers have relevance with the selected research problem and they have contributed in different segments of the present study. However, none of them has made an analysis of cost of electricity taking both the demand and supply aspect into consideration and that again with particular reference to West Bengal. Thus this thesis has been the result of independent research activity intended for contributing some additional value to the existing inventory of literature.