

Chapter 7

CONCLUDING OBSERVATIONS

The study of power scenario has considered certain important issues of Indian Power Sector. Indian Power Sector is passing through concrete legal framework as a separate Ministry through introduction of several Acts enacted time to time and the most recent Act has paved the way for privatization and open competition among utilities. Now it is operated by state, central and private institutions with maximum contribution of state sector in generation of power. Percentage of plan outlay for power sector is gradually increasing except in 9th Plan. About the categories of consumers and their trend in proportion, domestic and agriculture is gradually increasing but as both of them till now receive subsidized power, it may hardly contribute to economic advantages for the utilities. Establishment of high voltage inter regional transmission line has contributed for better utilisation of power and for achieving balance between demand and supply of different locations. The study of power scenario has formed the base on which the detail analysis of demand and cost of electricity has been done afterwards. The study observed the nature and extent of different types of demand variations which restricts stabilization in power system and as a result, the generation units are forced to run the plants at a below capacity in some hours of the day leading to uneconomic power generation. To envisage this problem attempt has been made to achieve power stabilization from consumers end by introducing differential tariff and other techniques for different types of consumers through Demand Side Management. Indian power sector is passing through the continuous process of addition of installed capacity under different Five Year Plans and Annual Plans. The composition of installed capacity is dominated by thermal plants followed by hydel generation along with introduction of nuclear and other non-conventional sources at a marginal level in our country. In spite of continuous capacity addition the demand supply gap of

electricity persists. The utilisation of installed capacity at national as well as at state level appears not to be satisfactory although from the year 2003-04 it is improving in both the cases. A close look into the study has revealed that inability in meeting the peak demand is not because of inadequate installed capacity but due to poor utilisation of existing capacity. So this underutilisation which is caused by operational inefficiency aggravates the necessity of capacity addition involving higher capital cost. In Indian Power Sector, large variations are observed in inter-state and inter-utility cost structure. These variations are caused by generation mix, extent of capacity utilisation and some plant specific factors. Unit cost is influenced by change in demand in different seasons and in different hours of the day. The behaviour of cost with respect to different factors which contributes cost variations has been analyzed in the study.

The first objective of study of sector wise demand pattern and fluctuation in demand has been duly addressed in the study. The study has revealed a continuous trend of growth of domestic power demand where as a declining trend in industrial demand of power in terms of proportion of total demand at national level. Similar trend is observed in west Bengal also. Fluctuations in demand with sector wise break up has been analysed through accumulation of primary data from different parts of the state. Extent of fluctuation has been reviewed through graphical presentation. Experiment has been attempted based on collected data by application of Demand Side Management to reduce demand fluctuation which has given positive results at a reasonable level.

About the second objective of study of supply position of power, supply is still lagging behind the demand. But the study has substantiated the fact that this demand supply gap is not because of insufficient supply capacity but because of inefficiency in utilisation of the capacity. Through application of curve fitting technique, the study has thrown light on the growth trend of demand, supply capacity, actual supply and

the consequent demand supply gap at national and state level. This analysis has manifested that situations in national and state level are different. The status of West Bengal is much promising than the country as a whole because in all India situation, in spite of steady growth of installed capacity, demand supply gap is continuously increasing because of poor and non improving capacity utilisation rate where as in West Bengal the demand supply gap is gradually diminishing over the years with marginal increase in installed capacity along with continuous improvement in capacity utilisation rate. To combat the problem of demand supply gap, possible alternatives that have been explored are increase in supply capacity which will require huge investment, improvement in utilisation of capacity through efficiency enhancement which can be achieved by modernization and training and reduction of peak demand through Demand Side Management. Appropriate combination of alternatives has to be undertaken considering cost effectiveness.

On testing of hypotheses the study has found that, unit cost of power of different utilities is substantially correlated with hydro-thermal mix as composition of source of power. Proportion of hydro power in composition of installed capacity is inversely correlated with unit cost of power. For achieving economy in power generation the national policy may consider the tapping of hydro potential of the country. Plant Load factor is found to be inversely correlated with unit cost of power. That is why cost effective generation of power requires optimum utilisation of capacity. Demand variation of different dimension is like natural phenomena which drives production schedule far deviated from stationary. The research has revealed the other technical and commercial causes of underutilisation of capacity besides the phenomenal cause of demand variation which increases cost of inefficiency in power generation. Different generating plants produce power at different per unit cost caused by some plant specific factors. Therefore, priority scheduling of different plants within a utility should be arranged as per their cost efficiency factor i.e. scheduling as per minimum marginal cost. To maintain this scheduling properly, updated information about the

cost structure of different plants should be available at Load Dispatch Centers and this policy should be adhered at the time of operation.

Thus in nutshell it can be said that generation capacity should be increased to meet the demand gap in the peak time. Average energy generation should be increased for minimisation of cost. This could be achieved by increasing the duration of peak demand and by increasing the level of off-peak demand. However there is no gain in increasing the volume of peak demand as it happened to be above the generation capacity leading to shortage. The generation capacity must be increased after ensuring that idle capacity will not rise in consequence. This is because, increase in idle capacity would bring down the capacity utilisation to push up the cost per unit. Thus rise in generation capacity must be supported by at least equal rise in average demand and not by rise in peak demand. Modernisation of plants has a positive impact on cost reduction. The huge investment cost for per MW of installed capacity appears to pose a problem for modernisation. However, cost analysis reveals that unit cost of generation inclusive of huge cost of capital falls below the unit cost of electricity in traditional process. Thus modernisation, in spite of huge investment appears to be economically viable. However the increased installed capacity due to modernisation should be fully supported by increased average demand as mentioned earlier.

Besides cost efficiency there are other objectives of generation and distribution of power such as environmental, social, public welfare some of which may be in conflict with the objective of cost efficiency. However, as this study being limited to the objective of cost efficiency, other dimensions have not been considered in this study. Again this should be pointed out that the present research having focused on cost of generation of power only has not taken up the issues related to transmission and distribution losses. Separate endeavor would be necessary for those important areas of research.