CHAPTER II
REVIEW OF LITERATURE

Review of literature plays a vital role in the overall research process. It starts from the very beginning of the research process i.e. from the stage of selection of the research problem. The documentation and review of relevant literature continues till the research work is concluded in its final shape. A researcher is expected to consult the relevant literature using various sources in order to identify the gaps in the available stream of the subject area. The gaps existing in the contemporary literature are major determinants of the scope of a proposed study. The proposed study is expected to bridge some of the theoretical as well as methodological gaps in the existing literature as far as possible.

Power sector has been a subject of serious discussion and debate both in academia and policy-making process. The main reason for this is that the power sector has been undergoing radical structural and policy changes for the last two decades all over the world. As a result, there has been lot of formal discussion and scholarly research on the various aspects of reform and performance of power sector across the globe. Though there are a large number of studies available to review the power sector reforms across various countries, it is useful to make references of some studies which are
highly relevant to the study area. Therefore, a brief review of some of the relevant studies is undertaken in this Chapter

Due to high indivisibility of service and existence of economies of scale, Electricity Supply Industry was treated as a natural monopoly all over the world. It was designed as an integrated system and generally a single entity was created which was responsible for the generation, transmission & distribution of power. In most of the countries, the electricity supply industry has been established and operated under public ownership.

Because of imperfect competitive nature of the industry, privatization was not preferred. Until the beginning of 1990s, the Electricity Supply Industry (ESI) was developed as integrated system under the public ownership in most of the countries. In India also, the ESI was designed as an integrated system combining the functions of generation, transmission, and distribution of power. State Electricity Boards (SEBs) were constituted under the provisions of The Electricity Supply Act 1948. Until the initiation of power sector reforms in mid 90s, the industry remained in a monopolistic market structure under the public ownership.

Until the initiation of power sector reforms, the journey of fifty years (from 1948 to 1998) showed impressive physical growth in terms of installed capacity and network expansions. There are many official as well
as independent studies which show that the physical growth of the power sector was significantly high. For example, per capita consumption of power in India increased from 50 kwh in 1947 to 500 units in 1998-99 and 779 in 2009-10. However, the operational and financial performance of most of the SEBs was not satisfactory. The transmission and distribution losses were reported at very high levels. The main reason for poor operational performance was the lack of organizational autonomy and commercial outlook in the operation of SEBs. Some studies have highlighted various problems faced by SEBs in relation to their financial performance & pricing policies. Some recent studies also examined the role of State Electricity Regulatory Commissions (SERCs) in improving the financial performance of the respective electricity distribution companies.

This chapter is divided into three sections. In the section II.1, the studies focusing on technical and financial performance of the electricity utilities are reviewed. In these studies, the operational performance of SEBs has been measured in the pre-reforms as well as post reforms period (in some of the studies). In the section II.2, the studies focusing on the pricing policy of electricity utilities have been discussed. Pricing policy is a major determinant of the financial viability of the electricity utilities. Section II.3
presents an overview of the studies focusing on the regulatory reforms in the power sector.

II.1: Studies Focusing on the Technical and Financial Performance

A study was conducted by the CRISIL (2010)<sup>1</sup> to make an assessment of the financial viability of the distribution companies. This study was sponsored by the Forum of Regulators (FOR)<sup>1</sup>. The study drew a sample of nine states, namely Andhra Pradesh, Punjab, Rajasthan, Delhi, Haryana, etc. The main objective of the study was to put a light on the financial viability of the electricity utilities. Focusing on the Punjab Power Sector, it was pointed out that the main problem of power distribution company in Punjab was the deteriorating financial performance. Gaps between the revenue realised and cost of supply has increased over time. The deteriorated financial viability has a long term financial implications. Because of high energy losses and poor financial performance, the Punjab State Electricity Regulatory Commission (PSERC) reduced the estimates of revenue requirement proposed made by the distribution company. PSERC disallowed some of the important expenditures to be incurred by PSEB. For example the disallowance was reported to be Rs. 1581 crore for the FY 2009-10. This reduction included disallowance on account of transmission

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<sup>1</sup> FOR is a formal association of Electricity Regulators constituted under the provisions of the Electricity Act 2003
and distribution losses, employee cost and interest expenses. Finally, the study has concluded that the power utility of Punjab should improve its technical and financial performance.

A study was conducted by Pani, B. Saranga (2007)<sup>2</sup>, on the Power Sector Reforms in Andhra Pradesh to assess the impacts of electricity sector reform. In the study, an attempt was made to evaluate the operational performance of generation as well distribution segments as a result of power sector reforms process initiated in the state. The proposals of Annual Revenue Requirement (ARR) and the Tariff Orders (against various ARRs) issued by Andhra Pradesh Electricity Regulatory Commission (APERC) were used main data sources for the study. It was concluded that the reforms had led to a neglect of capacity addition programmes in the state sector. At the same time, the share of private sector in total generation capacity increased. Per unit cost of power purchase from the private producers was higher. Consequently, the average cost of power purchase showed an increasing trend. The study further pointed out that in spite of huge investment made in the distribution sector, the energy losses level was reported to be at the higher side. However, there were substantial improvements in the revenue collection efficiency of the distribution companies.
At Indian Institute of Public Administration (2006), ‘A Group of Experts’ was constituted to conduct a study to examine the outcomes of restructuring of SEBs. The main objective of the study was to assess the outcomes of the restructuring process across various states so that lessons may be drawn for other states which were still undertaking the reforms in the power sector. The study collected the information using various official reports such as Central Electricity Authority (CEA) publications, Planning Commission reports, etc. In the study, a total of twelve states were selected to measure the improvements in the operational performance resulted from the process of power sector restructuring. The key findings of the study may be summarised as:

- Restructuring of the power sector was a necessary but not a sufficient condition for turnaround of the sector. It was highlighted that restructuring was only the beginning and not the end of the process. The restructuring process must be accompanied by continuous complementary efforts to enhance efficiency in the sector and improve the quality of service supplied to consumers.

- Strong and sustained political support during the all phases of restructuring is very essential. Taking the employees into confidence and enlisting their willing support and strengthening the institution of
Electricity Regulators are critical factors for success and sustainability of power sector reforms.

- Most of the generation and transmission companies and some of the distribution utilities have now become financially viable. Consequently, they are able to attract additional investments and better technological and managerial interventions in the sector.

- It has been noticed that most of the restructured utilities are beaming positive trends in respect of key parameters wherever reasonable autonomy has been provided to them. The level of consumer satisfaction in these states is also significantly higher than the states who have not initiated the reforms process. Restructuring has brought in the required accountability in the power sector triggering improved performance.

A study was conducted by Singh, Kulwant et. al. (2006)\textsuperscript{4} to measure the technical and financial performance of Punjab State Electricity Board (PSEB). It highlighted some of the inefficiencies in the operation of the generation, transmission and distribution functions of PSEB. It stated that PSEB has been incurring high energy losses. Despite the restructuring process being initiated at the state level, no adequate measures were taken to improve the financial performance of the Board. Because of highly
subsidised electricity tariff, PSEB was unable to generate the adequate revenue to recover the cost of power supply. The commercial losses of PSEB increased drastically. The commercial losses (with subsidy) of PSEB increased from Rs. 580 crore in 1990-91 to Rs. 1636 crore in 2002-03. It was suggested that the PSEB should took the required steps to improve the technical and financial performance.

**Jain, Varinder (2004)** made an observation on the power sector reforms process being initiated in Punjab. He stated that the State Government should provide more focus on taking appropriate reform initiatives in the power sector. The State Government should not undertake the reforms under the undue pressures put by various global agencies such as World Bank. The Government should focus on the improving the operational efficiencies. It should try to improve the operational and financial performance of the PSEB. The study further suggested that reliable metering, transparency & accountability in electricity subsidy may be used as key measures to plug the operational inefficiencies in the sector.

**Sinha, Sidharth (2003)** conducted a study to examine the effectiveness of the power sector reforms initiated in the state of Orissa. The main objective of the study was to review the outcomes of electricity reforms and draw lesson for other states that are in the process of
restructuring of power sector. In the study, key steps taken by the Government of Orissa such as unbundling and privatisation of Orissa State Electricity Board have been highlighted. The study has used the information available from the annual revenue reports of the companies and tariff orders issued by Orissa Electricity Regulatory Commission (OERC). It was pointed out that even after privatisation of distribution business there was no improvement in the technical performance of the distribution companies. The level of Transmission and Distribution losses (T&D losses) was reported to be very high. The losses level was reported more than 50% for the FY 1997-1998. In the initial four-five years after its constitution, OERC approved tariff hikes almost every year to compensate the commercial losses of the distribution companies. However, the utilities were unable to generate any surplus revenue and serve improved quality of service to the consumers. Therefore, the Orissa model was not appreciated and followed by other states while undertaking the power sector reforms.

Kannan and Pillai (2001) analysed the physical and financial performance of various SEBs in India in the pre-reforms period. The data was collected and analysed for the period from 1970-71 to 1997-98. The issues related installed generation capacity to technical efficiency, T & D losses and some aspects of institutional and organizational efficiency were
examined. The financial performance was measured by comparing the average revenue realised to the cost of supplying power to various categories of consumers. The study was designed making a comparative analysis of various SEBs in India. It was pointed out that on an average, the country made a significant progress in installing new generating capacity. However, in some of the states, the capacity additions initiatives were inadequate. The annual average compound growth rate in adding the installed capacity was about 8% in Andhra Pradesh, Jammu Kashmir for the period from 1970 to 1998. On the other hand, the growth rate was reported to be about 4% in Delhi, Orissa and West Bengal. Another important finding of the study was that the country could not tap the hydropower potential which was available in various states. The Plant Load Factor (PLF) and Plant Availability Factor were reported at very low levels (PAV). In some states, the PLF was below 50%. The T& D losses were estimated to be in the range of 20% and 30% for most of the SEBs. In Delhi, Jammu & Kashmir and Orissa, the energy losses were estimated more than 40%. But the actual losses were much higher than what was reported by the SEBs. The un-metered supply to the agriculture sector was overestimated by 30% to 40%. So, the unaccounted consumption including theft of power was booked as the consumption made by agriculture sector. The study has compared the labour productivity of
SEBs in India with some other countries such as Chile, Norway, USA, etc. Labour productivity was measured in term of the number of power units (KWH) sold per employee for the year 1990-91. The study concluded that the labour productivity was very low in India in comparison to these countries. It was observed that some consumer categories were charged at very low price, therefore, the commercial losses increased over the years. The domestic and agriculture consumers were highly subsidised at the cost of SEBs as well as other consumer categories such as commercial and industrial users.

Das Anjana and Parikh Jyoti (2000) conducted a study to evaluate the financial performance of the Maharashtra State Electricity Board (MSEB). It examined the pricing policy followed by MSEB. It concluded that the pricing policy adopted by the Board was not appropriate. The tariff structure was highly skewed across various categories of consumers. Some consumer categories such as agriculture and domestic were charged at very low rates. Further, the subvention paid on part of the state government was not adequate to cover the cost of power supply to the agriculture sector. It was suggested the tariff should be based on the cost of power supply. The state government should pay adequate subsidy to the Board to compensate its revenue gap on account of power supply to agriculture sector.
A study was conducted by M Govinda Rao & others (1998), for making an evaluation of the financial performance of SEBs in the country. The study has examined the technical and financial performance of all SEBs for the period from 1980-81 to 1994-95. This study used the secondary sources of data available from various sources such as Planning Commission’s Annual Report on the Working of State Electricity Board and Reports on Energy published by Centre for Monitoring Indian Economy (CMIE). To measure the technical performance, Plant Load Factor (PLF), Transmission and Distribution losses (T&D losses), electricity consumption were taken as performance indicators. Various components of cost of supply such as cost of power purchase, average cost of supply, average tariff, etc. have been measured as indicators of financial performance. The study concludes that the technical and financial performance was very poor for the period of study. Some of the states could not achieve the target of rural electrification. The access of the rural people to the network was just 6% in Bihar and 11% in Uttar Pradesh in FY 1994-95. The study suggested that there was a urgent need to initiate power sector reforms to improve the technical and financial performance of SEBs. At the state levels, rationalisation of electricity tariff should be initiated at the earliest. Further,
the subsidy to be paid on part of respective state governments should be adequate to cover the revenue gap of the SEBs.

Reddy and Sumitra (1997) conducted a study on Karnataka’s power sector. In the study, they made an attempt to estimate the power consumption of irrigation pump-sets. The main objective of this study was to develop a methodology for making a reliable estimate of the transmission & distribution losses. It was observed that most of the agricultural consumption is un-metered, so the reliability of estimates of energy losses depends on the accuracy ensured in measuring the power consumption made by agriculture sector. The study concluded that major component of the T&D is the pilferage of power. The study has also pointed out that overstaffing was one of the major problems in the development of power sector in Karnataka.

Parikh, Painuly and Bhattacharya (1996) analysed the performance of various SEBs. It concluded that there was un urgent need to take appropriate steps to improve the operational as well as financial performance of the SEBs. By taking various measures for performance improvement, the SEBs can not only sustain their daily operations, they can also generate surplus revenue internally to finance the capacity addition programmes.
Rao S L (1996)\textsuperscript{12} analyzed the performance of the SEBs in India examining the technical as well as financial aspects the power sector. The study highlights that in the pre-reforms period, operational performance of the power plants of SEBs was inefficient. Some improvements were reported in the Plant Load Factor (PLF) after the introduction of medium size gas based power plants (200 MW to 500 MW). The study did not observe any remarkable progress in initiating the renovation and modernization programmes in the pre-reform period. The study also highlighted some issues on the poor efficiency of the SEBs in supplying electricity. It revealed that poor commercial outlook was the main reason, which was responsible for deteriorating financial performance of the SEBs.

Kumar, Surinder (1984)\textsuperscript{13} conducted a study on pricing policy in public utilities in the power sector. It found that the SEBs did not enjoy any autonomy, its pricing policy was not based on any rational economic principles. The technical and financial performance of SEBs was very poor. The decision making process of SEBs, particularly the tariff setting process was manipulated by unwanted interferences on part of the respective state governments. SEBs were forced to provide electricity either free of cost or at the rates significantly lower than cost of supply to specific consumers’ categories without socio economic justification. Further, there was also huge
cross subsidisation. Cross-subsidisation means that some consumer categories such as domestic and agricultural were being charged at lower rates than the cost of electricity supply, whereas others (industrial and commercial) were paying tariff higher than the cost of supply. The cross subsidisation from industrial and commercial sectors was used as a means to reduce the losses, incurred by SEBs. Further, the study has suggested that pricing policy should be based on sound economic principles.

**Government of India (1980)** constituted an Expert Committee to make a comprehensive study to examine financial performance of the SEBs in the pre-reform period. The main objective of the study was to identify weaknesses in the system and suggest some appropriate measures to improve the financial health of SEBs. The study used the information on average tariff, cost of supply and electricity subsidy paid by respective state governments as indicators of financial performance. The Expert Committee concluded that the on an average the revenue realised was not adequate to cover the cost of supplying power to various consumer categories. The study further suggested that the tariff applicable to various consumer categories should be adequate to make the SEBs financially viable. Respective state governments should pay adequate amount of subsidies to compensate for the
financial losses to distribution utilities on account of subsidised power supply to agriculture sector.

II.2 Pricing Policy of Power Utilities in India

A study was conducted by CUTS International (2010) on the pricing policy and subsidy issues in power sector. The main objective of the study was to highlight very distortions existing in the subsidisation of agriculture sector. The study examined the electricity pricing policy for the agriculture sector for the selected states. The study used the data on electricity tariff during the period from FY 2004-05 to FY 2006-07 for various states including Andhra Pradesh, Punjab, Tamil Nadu, Haryana, Rajasthan, etc. In the study, it was observed that in most of the states, the tariff for agriculture sector was not fixed in consistent with the provisions of National Electricity Policy (2005) and Electricity Tariff Policy (2006). The agriculture sector was highly subsidised and cross-subsidised by industrial sector. Moreover, the subsidy payments on part of the respective state government were inadequate to compensate the distribution companies. It was suggested that the regulatory commissions should be provided more autonomy so that they can set the tariff on the basis of cost of supply.
A study was conducted by **CRISIL (2009)**\(^{16}\) to examine the pricing policy followed by various State Electricity Regulatory Commissions (SERCs). The study was mainly based on the analysis of tariff & other related orders of SERCs. The time period for the study was taken for the period from FY 2004-05 to FY 2008-09. The study focused on the issues in tariff rationalisation and the commitment in making timely subsidy payments on part of the state governments.

In the study, it was pointed out that one of the key objectives of setting up the SERCs is rationalization of end-users’ tariffs. Therefore, tariff rationalisation is a very important aspect of the power sector reforms in India. The tariff structure is marked by high levels of cross subsidies and no. of consumer categories/ slabs is very high across various states. The Electricity Act 2003 and the National Electricity Policy (2005) has provided adequate focus on the reduction of the cross subsidies existed in the electricity tariff structure. The policy mandated the respective SERC to notify a roadmap to eliminat the high cross-subsidies in the power sector. It was stated that the tariff for various consumer categories should be fixed within a limit of 20% plus and minus of the average cost of supply. The study concluded that some of the SERCs have taken initiatives for reducing the cross subsidy and rationalizing the tariff structure for consumer
categories. The study has also provided lot of data on the progress in tariff rationalisation across various states. However, a clear roadmap specifying milestones to bring down the cross subsidy levels to the required limit has not been notified by any of the SERCs.

In a study conducted by Jain, Varinder (2006)\textsuperscript{17}, some issues on the pricing policy being followed in the Punjab power sector were highlighted. It was stated that the existing policy on electricity subsidy was not consistent with the principles of equity and efficiency. The subsidy was available on open ended basis without ensuring proper rationing of the energy. On the basis of a sample survey conducted for 300 farmers, it was concluded that most of the small farmers were not able to utilise the benefits of subsidy. Because, these farmers were not having a electricity connection, so they could not utilise the service. Therefore, the subsidy was actually utilised by the medium and large size farmers. It was suggested that there is need to rationalise the electricity tariff so that the subsidy is provided on the basis of economic merit.

Joel, Ruet (2002)\textsuperscript{18} argued that due to irrational tariff policy adopted by SEBs, they are not able to invest adequate resources to initiate the modernisation and innovations of the system. In the context of poor financial position, it was argued that because of low tariff, the SEBs are not able to
generate any surplus revenue. However, the operational performance was also one of the major reasons responsible for poor financial performance. The poor financial position of SEBs led them into financial bankruptcy. Consequently, they were unable to pay the input suppliers and national generation companies. SEBs were also failed to fulfil their short-run as well as long-run capital requirements. It was further argued that subsidies made available to agricultural and domestic consumers have increased mainly due to political decisions. Theoretically, the amount of subsidies has to be paid by the respective state governments through adequate cash transfers to meet the statutory 3% rate of return. But in practice, it was not implemented. The actual cash transfer was inadequate to compensate the losses of SEBs on account of power supply to agriculture sector.

S.L Rao (2002)\textsuperscript{19} pointed out that in most of the states, the electricity tariff is determined on the basis of political considerations ignoring the economic principles. The electricity is priced quite lower than the costs of service to farmers and domestic consumers in various states. Industry, commercial and railways are overcharged to make up for the losses on these accounts. He, further, argued that though some multilateral lending agencies are pushing the power sector restructuring process in the name of expert advice and support to the country. However, one of the major motives of
lending agencies is to promote their own business for their country’s suppliers to protect its lending and make profits. In order to ensure high debt servicing, such lenders might promote high end-user tariffs. It would help them to get their money back. So, there was an urgent need to examine the whole reforms process and its suitability to Indian electricity sector especially the electricity consumers.

**India Infrastructure Report (2000)** made it clear that at the root of chronic inability of SEBs to raise required investment is the uneconomic pricing of power supply. Absence of cost based economic principles in fixing consumer category-wise tariff design and uneconomic level of cross subsidies were the main problems in the development of power sector. Inability of the State Electricity Boards (SEBs) to recover the cost of supply has further compounded the problems of the power sector.

A study was conducted by Rao M Govinda, et al (1998) to highlight various commercial aspects of the SEBs’ in India. This study reviewed the existing pricing policy and its impacts on the SEBs’ financial position. In the study, the data was analysed calculating various parameters such as average cost of supply and average revenue realized from various consumer categories. It concluded that the due to the lack of operational efficiencies and organizational problems, there was no incentive to SEBs to improve the
technical and financial performance. It further added that there were many evidences when political considerations played important role in day-to day management as well as making decision on setting prices in the electricity sector. The electricity tariff for some consumer categories was too low to cover the cost of power. Consequently, it adversely affected the financial health of most of the SEBs in the country.

Sarkar and Kodekadi (1998) made an attempt to formulate a macro economic model to assess the impact of energy price changing on crucial variables such as growth, inflation, payment of income distribution etc. It was observed that the price changes had a significant impact on these variables. So the frequent changes in the tariff for electricity should be avoided.

Kumar, Surinder (1988) observed that currently there was high cross subsidisation in power sector. Some consumer categories such as agricultural and domestic users were charged below the cost of supply. While other users such as commercial and industrial consumers were required to generate a revenue surplus. Heavy cross-subsidisation was not a good practice because it may promote wasteful use of power. On the other hand, excess paying consumers have started shifting to captive power generation. Apart from the higher tariff applicable to industrial users, poor quality of service was the
main reason that promoted captive generation. This way, the ability of SEBs to generate additional revenue from industrial users decreased significantly. Thus, the policy of cross subsidisation has resulted into heavy losses to the SEBs.

Kumar, Surinder (1985a)\textsuperscript{24} further examined the pricing policy being followed in the power sector. He has observed that the average revenue received from agricultural and domestic consumer categories was very low in relation to the cost of service. He suggested that the subsidisation should be based on social cost-benefit analysis. The tariff making process should be completely depoliticised. If any category of consumers such as agriculture needs to be subsidized, the respective state government should pay full subvention for the subsidised supply of electricity to that consumer category.

II.3 Regulatory reforms in Power Sector

A detailed study was conducted by Mehta, Pradeep S et. al. (2009)\textsuperscript{25} on competition and regulatory issues in the power sector India. The main objective of the study was to examine the impacts of regulatory reforms initiated in the power sector in India. It also evaluated the role of regulatory agencies in promoting the economic efficiency in the electricity sector. The study made the following observations:
It was observed that the regulatory bodies were not functionally and financially independent from the respective state governments. The state governments were reported intervening in the functions of the regulatory bodies.

The decisions on electricity tariff were still influenced by political considerations. In most of the states, the tariff for agriculture sector was kept at very low level in comparison to other consumers categories such as industry.

Some improvements were reported in the reduction of energy losses. After the initiation of regulatory reforms, the transparency and public participation in the decision-making process have increased.

The study suggested that there is a need to provide more autonomy to the regulatory bodies. Regulatory decisions should be based on economic merit. Transparency and effective public participation in the decisions making process are the key measures to hold the government, regulators and the regulated companies to be accountable to the performance.

**Dubash Navroz K and D Narasimha Rao (2007)** examined the major issues involved in the practices and politics of regulation in India. This study was a first independent work highlighting the regulatory performance on the basis of various practices followed by electricity regulators. The study
examined the regulatory practices and procedures followed in the three states namely Andhra Pradesh, Delhi and Karnataka. The studies used secondary as well as primary data sources for analysing the regulatory performance. Broadly, the issues related to institutional structure, regulation in practice and role of various stakeholder have been covered in the study. Some of the major findings of the study are as follows:

- In the early stage of reforms and restructuring, it was very difficult for the regulatory agencies to take bold decisions without having the required credibility and a track record. Therefore, the role of respective government was very crucial in establishing the regulatory credibility.

- The selection process followed for appointing regulators was weak. The process was directly or indirectly influenced by the political leadership. This practice hampered the capacity of the regulatory institutions.

- The scope for stakeholders’ participation has increased after the initiation of regulatory reforms. However, the institutions need to be strengthened to ensure effective stakeholders’ participation in the decision-making process.
In a study concluded on regulatory issues, Kumar, Rajesh et. al. (2005) evaluated the experience of power sector in Haryana. In the study, the role of Haryana Electricity Regulatory Commission (HERC) was examined in promoting the transparency, accountability, and public participation in the decision-making process. It was observed, after the constitution of HERC, the scope for transparent and participatory decision-making process has increased. However because of the lack of awareness among consumers, the public participation in the regulatory process was not very effective. The number of persons participating in public hearings was very low. A few representations were made only on behalf of commercial and industrial consumers. From the FY 1999-2000 to FY 2003-04, the participation on behalf of domestic as well as agriculture users was negligible. So, the HERC should take initiatives to generate awareness among all consumer categories on the regulatory and policy issues in the power sector.

Phadke et al (2003) have emphasized the need for introducing sector-disciplining mechanisms either through effective independent regulation, or significant competition among a large number of public and private entities. The success of power sector reforms will to a large extent depend upon the existence of such restraining or disciplining
mechanism in the sector. The authors further argued that issues related to protection of environment, extending access to the poor and other off-grid population and strategic concerns related to import dependence and foreign private ownership need to be addressed to make reforms to be in broader public interest.

Dubash et al (2001) have analyzed the social and political context in which power sector reforms have taken place in India. The authors argued that the design of the restructuring process should aim promoting the economic efficiency on the one hand, and protecting larger public interest on the other. It is a matter of great public concern that most of the international donor agencies were not very sensitive to the local issues in power sector. It is further suggested that the electricity consumers especially the civil society actors should play a more active role in the process of reshaping the power sector industry in India. The authors argue that increased access to the electricity, social pricing and the promotion of sustainable energy policy should be the important issues in the overall process of power sector reforms in the country.

The analysis made by Prayas, Pune (2001) evaluated the outcomes of power sector reforms in India. In the study, it was observed that the power restructuring model selected by most of the states was not really appropriate.
The role of regulatory commission was examined taking the issue of accountability as the major plank. It was pointed out that the main problem with erstwhile SEBs was accountability. There was excessive interference in the functioning of SEBs on behalf of state governments. This was the main reason for the poor technical and financial performance of the SEBs. The present model as initiated in the reforms process providing wide power to regulators without holding them accountable to the public. The real crisis was unaccountable interference by the politicians. This model does not adequately ensure any mechanism for solving these problems. Hence this model was not an appropriate model for a country India.

Rao, S L (2000)\textsuperscript{31} has examined the political economy of power in India. He makes general suggestions for transformation of the power sector. In this context he stresses the need for developing a management and commercial mindset in the sector, introducing competition among suppliers, allowing freedom of entry and exit, taking stringent action against thefts, introducing electricity trading and developing market structures and separating rural supplies from the rest instead of cross subsidies.

Morris Sebastian (2000)\textsuperscript{32} studied the appropriateness of reforms model adopted by various state governments under the supervision of World Bank. It studied the reforms process initiated in Gujarat focusing of two issues-
unbundling of SEBs and tariff regulation process. The study observed that a complete separation of distribution segment from generation business is neither necessary nor desirable in the Indian context. Even, within the existing integrated system performance improvements are possible. He also examined the suitability of cost plus tariff regulation method in the Indian context. The cost plus method was being followed by Gujarat Electricity Regulatory Commission (GERC). He argued that price cap regulation would be more appropriate in promoting economic efficiency. Price cap regulation provides more incentives to the regulated firms to improve the technical and financial performance.

Ahluwalia S Sanjeev (2000)\(^{33}\) conducted a review of the pricing policies followed by various electricity regulatory commissions in India. He observed that most of the regulatory commissions had followed the cost of service methodology for the purpose of determining electricity tariff for electricity consumers. The cost of service methodology was not an appropriate method in the Indian context. Since most of the power supply to agriculture sector was un-metered, therefore, it was not possible to estimate the actual cost of electricity supply. Moreover, under the cost of service method, the utilities have a tendency to overestimate the cost of service. So, this method would not be suitable for India in the process of tariff
determination. He has suggested the performance based-rate making is the better method to promote economic efficiency in the power sector. Under the performance based methodology, the price is linked with level economic efficiency achieved by the regulated utilities. For, improved performance on part of the utility, some incentive is given to the utility. That is why this method is considered as superior method of tariff regulation.

According to India Infrastructure Report (2000) the financial performance of power utilities depends upon the pricing policy and management efficiency level achieved by respective utility. In the pre-reforms period, the financial and administrative decisions of the utilities were highly influenced by political pressures. It led to utilities into huge financial crisis. Consequently, the utilities were not able to manage the operational activities efficiently.

Devendra G Kodwani (2000) argued that regulation of economic activities is often justified as a policy instrument to minimise the harmful impacts of market failure. But the role of a regulatory body should be defined clearly. The existing relationship between the regulator and regulated utilities needs to be rationalised. The role of regulator is to promote economic efficiency protecting the economic interest of electricity consumers.
A study was conducted by Ghose Nilabja (1998)\(^{36}\) to examine the economic benefit of subsidy available to farmers. It was observed that in majority these were large size farmers who were taking the actual benefit of the power subsidy. Small farmers were using only a fraction of total power supply to the agriculture sector. All this was happening just because of political interventions. So, there was an urgent need to mitigate the political interventions in the decision-making process of the SEBs.

Rao, M Govind, et. al. (1998)\(^{37}\) concluded that prevailing structure of tariff had provided wrong signals to electricity consumers. Some of the consumer categories were charged significantly lower than the cost of supply. The tariff structure was based on the historic cost of assets. It led to wastage of energy across various sectors. The tariff should reflect the social cost of supplying power without providing undue advantages to the political interventions in the decision-making process on tariff and related issue.

A study was conducted by Amerjeet Singh (1998)\(^{38}\) to examine the level of economic efficiency in the consumption of power. It was observed that the pricing policy followed by State Electricity Boards (SEBs) with not consistent with the principles of economic efficiency. It contributed to inflate the demand for electricity and resulted into irrational use of power. The tariff needs to be linked with the level of economic efficiency in
consumption. There was a need to discourage the farmers from making unnecessary and uneconomical use of power.

Gupta V. P et. al. (1996)\textsuperscript{39} made a study on Electricity pricing in India by selecting three SEBs namely: Gujarat State Electricity Board, Maharashtra State Electricity Board and Rajasthan State Electricity Board. They worked on cost of electricity generation, Interest & finance Charge, average cost of power supply and tariff structure. They criticised that the low tariff was applicable even to the rich farmers. It was suggested that rich farmers should be charged on the basis of marginal cost of supply. Small farmers may be provided subsidy if required. However, the amount of subsidy to be paid by the government should be equivalent to the difference between the marginal cost based tariff and actual revenue realised from the agricultural consumers.

Gellerson (1980)\textsuperscript{40} made an attempt for the estimation of marginal cost pricing for electricity undertakings in India. Analysis was made using average incremental cost method. After estimating marginal cost prices, it compared them with the prevalent electricity tariffs. It concluded that the marginal cost approach of pricing is the more appropriate method in ensuring price stability. Under this method, it is ensured that the generation capacity is fully utilised. It further concluded because of differences in the
technologies used, the marginal cost of energy was higher in the northern as well as southern regions in relation to eastern as well as western regions.

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