

## **FINANCIAL PERFORMANCE OF POWER SECTOR IN INDIA: AN OVERVIEW**

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### **ABSTRACT**

This study investigated the financial performance of power sector in India. For the analysis of this objective, tariff-cost ratio and its annual growth analysis have been employed. In the study of financial performance of the power sector it consists mainly costs structure, and revenue. In cost section the study found that power purchase is one of the major components which is crucial to maintain the electricity supply in various states, while the fuel cost is such component which has the lower share in the cost of electricity supply. Intervention of tariff and revenue by government in some particular categories depicts the inefficiency in electricity generation in India. Electricity generation unit, based on their own availability of resources, should be established in states of India. It would reduce the transportation cost as well as cost of purchasing of raw materials for the electricity generation. Heavy subsidy granted on agriculture by the government causes the loss in the electricity sector in various states and this can be minimized or eliminated such burden, the GOI should offer subsidy on power generating equipments.

**Keywords:** Electricity consumption and Transmission, Power Sector, Tariff Cost Ratio, electricity revenue and cost.

### **1. Introduction:**

Development is one of the major concerns of the developing countries including India. The economic structure that India inherited from the Britisher was limited to a small number of selected industries and industrial centers to serve the colonial interests at the time of freedom. The model and tempo of industrialization also demonstrated a distorted scenario. There was disproportionate expansion of raw materials and production, lack of entrepreneurship, inadequacy of banking and transport infrastructure. Almost all the important characteristics of an underdeveloped economy were present in the Indian economy. After independence, the Government of India (GOI) decided to give a big push to the relatively stagnant economy through planned development process. Besides reducing inter-regional disparities, attaining self-sufficiency was considered to be essential. With the efforts of the GOI, significant economic development has indeed taken place during the last two decades of planning. But unfortunately, disparities among social groups and regions have widened. India, after China, is a fastest growing country in the world. It accounts one fifth of world population and one fourth of world's poor (India Infrastructure Report, 2000). Infrastructure development is very important for development of an economy. Development of an economy is to be viewed as a process in which its different sectors move from the existing levels to the higher level of performance. Now a concept of economic development has become more comprehensive. Development is a multidimensional procedure involving transformation in economic structure, changes in attitudes and institutions, speeding up of economic growth, lessening of inequalities and reduction of absolute poverty (Todaro, 1977). In a line, development must symbolize the entire spectrum of changes by which all the socio-economic system shifts from environment of miseries and sorrow and provides social justice with better standard of living to all. The accessibility of infrastructure facilities is vital for the overall economic progress of a country. A high positive correlation is present between the availability of various infrastructure services (*viz.* telecommunication, power, road and availability of safe water) and per capita GDP (Rao, 1971). Therefore, basic infrastructure facilities *viz.* power, water, irrigation and road are quite essential for low-income countries. The most important sector in infrastructure is power sector. Power is a crucial necessity in all facets of our life; and is recognized as a fundamental human need. The socio-economic development of any country depends on infrastructure to boost up growth of the economy and global competitiveness. Power is the key driver for India. Electricity is a key element of power sector, prime mover of growth and a very important for the nutrition of modern economy. The desired growth of Indian economy also depends greatly on the performance and progress of power sector or

electricity in the country. Power or energy is one of the key constituents of infrastructure as it drives the engine of growth in a nation. It plays an essential role as it significantly affects the demand and supply forces of the economy. For the demand side, energy is one of the products a consumer makes a decision to purchase for his utility. For the supply side, energy is one of the main inputs of production in addition to labour and raw materials. In the globalized economy, countries with huge power supply gap may become uncompetitive due to high energy input cost. The power sector is possibly the single biggest catalyst for inclusive growth in urban and rural India. It is a prerequisite not only for economic growth but for social advancement also. Therefore, the magnitude of energy consumption can be taken as an indicator of development status of any economy. All these issues are much related to inefficiencies that come out in inflated proportion in the cost of electricity supply. Generally, two factors are crucial for the variation in supply cost which is source of power and coverage of electrification. It is underlined in the several studies that those regions have to bear lesser cost for their energy fulfilment who have strong power generation system than those who have weaker power generation system. Major dimension in the power sector are availability of finance, lack of efficiency to install and produce, supply the produced power to the required destination. These circumstances prompt to examine the problem at both dimensions for efficient allocation of resources. Thus, it is vibrant to study financial performance of the power sector in India.

As power sector itself is business sector, it has to be financially viable. Though GOI participate in various activities of power sector, still it's certainly not a welfare sector. Unless, financial performance of power or energy sector in India becomes satisfying, the dreams of inclusive growth will be a nightmare. Therefore, the major objective of present study is analysis of the financial performance of power sector in India.

## **2. Review of literature:**

A lot of literature is available on the performance of power sector in different countries. This study includes some literature related to financial performance of power sector the financial:- **Gupta (1996)** made a study on electricity pricing in India. This study has selected three SEBs which are Gujarat State Electricity Board, Maharashtra State Electricity Board and Rajasthan State Electricity Board. Mainly this study concerned with the electricity generation cost, interests & charges of finance. It also concerned with average cost of power supply and the tariff structures. This study criticised the low tariff facility for the rich farmers and also advised that the amusing agrarians ought to be charged on the base of marginal costs of supply. For

the sake of small farmers study has also suggested that if it is necessary subsidy may be provided to them. On the other hand, the amount of subsidy paid by the government ought to be comparable to the difference between marginal cost based tariff and actual revenue realized from agricultural consumers. **Parikh et al. (1996)** analyzed the performance of various SEBs and found urgent requirements to receive proper pace for the improvement of the working as well as financial enhancement. It is also found that the help of with accepting several measures of the upliftment of performance, the State Electricity board can not only maintain their daily procedures but also produce surplus revenue inside to fund the capacity accumulation program. **Amulya et al. (1997)** examined the present situation of Karnataka power sector and looked at the trend of demand and supply of electricity of its state electricity board. It also checks the financial problems, important policies and technical landmark in the evolution of the state power sectors of Karnataka. It does not only investigate the problems, but also provide the map forward. They conveyed the opinion that Karnataka power sector uses the irrigation pump sets package for the sake of hiding various technical and marketable short comings particularly in distribution and transmission losses. They also corrected the offer to private power to all allied profits including in the situation of foreign private power. **Rao et al. (1998)** analysed in the study that existing structure of tariff had been responsible to provided wrong signals to the consumers' of electricity. There were some categories of consumer which were charged significantly less than cost of supply. The historic cost of assets was the base for the tariff structure. Wastage of energy was led across various sectors by it. The charge should emulate the social supplying cost of power without only if unwarranted rewards to the political involvements in the executive process on charges related issue. **Ghose (1998)** conducted a study to examine the economic benefits of subsidy provided to farmers. The study found that large size farmers have been availed with the actual benefits of the subsidy in power sector. In agriculture sector, only little farmers were using segment of power supply to agriculture sector. Study founded that the political interventions were responsible behind this discrimination. So, there is an ominous necessity to moderate the political interferences in the resolution constructing process of the State Electricity Boards (SEBs). **Singh (1998)** has checked the level of economic efficiency in the power consumption. In the study, it is analysed that the state electricity boards follow useless and conflicting pricing policy. It gives to rise the demand for electricity and as a result appears as the unreasonable use of power. The study suggests the tariff should be linked to the height of financial effectiveness consumption. It also urged to discourage the farmers to use needless and uneconomic use of power. **Reddy and Murthy (1999)** made an attempt on power sector

of Karnataka's. The study evaluates the power consumption of irrigation pump-sets. The main objective of this study was to develop a methodology for making a consistent evaluation of the losses in distribution and transmission of electricity. In this study found that the consumption in agriculture sector is un-metered. So approximation consistency of energy losses depends on truth warranted in the calculating of power consumption prepared by the agriculture sector. Conclusion of the study reveals that a major factor of distribution and transmission is the theft of power. In Karnataka power sector overstaffing is also main problem. **Antointte et al. (1999)** made an attempt on the capacity and efficiency of the power generating in India. Moreover, the study also explained the participation of public and private sectors in power generating. The results of the study revealed that investment in infrastructure has been made by state governments rather than private sector. Due to the basically long gestation periods together with the relatively low rates of return from serving all categories of consumers had reduced such projects commercially useless. **Das and Parikh (2000)** made an attempt to evaluate the financial strength of the Maharashtra State Electricity Board. In this study MSEB pricing policy was examined. It pricing policy analysed in this study which is adopted by the Board was full of inappropriate. There was found huge discrimination in the tariff structure across numerous groups of consumers. Consumer of some categories such as domestic and agriculture were charged at very low rates. Further, the subvention paid on part of the state government was not suitable to cover the cost of power supply to the agriculture sector. It was advised that tariff should be on the bases of cost involved in supply of power. The Adequate subsidies should be paid by the state government to the governing body to fill the revenue gap on account to agriculture sector. **India Infrastructure Report (2000)** made an attempt to evaluate the financial performance of the utility of power depends upon policy of pricing and achieved level of pure efficiency by relevant utility. In the pre-reform era, decisions of the financial and administrative utility were vastly influenced by political interventions. It led to reduce utilities and creates huge financial crisis. As the result of these interferes, the utilities were not able to manage the operational firms/decision making units efficiently. **George (2000)** uttered the various indicators named high levels of distribution and transmission losses, increasing domestic consumption by a only some, subsidized supply electricity to the tourism and industrial sector, decreasing capacity of reservoirs, the irregularity of monsoons etc., have led to a very weak electricity generation system in Kerala. The SEB's answers to these very complex issues those were rather simple which are in the form of fossil fuels based electricity generation system. Among three of them are already prepared and another five are in the pipeline including both public and private sectors

undertakings. Therefore, the state has been finding options to fulfill the demand for power from non –hydro sources such as diesel, coal etc. The figures point to the growing shift towards non –hydro options. However, the search for these options is not going to be very smooth on the following argument. The coal bearing areas are being situated far from the state; it may not be reasonably viable to activate coal- based systems. It is uneasy to find out locations for coal based thousand MW power stations anywhere near the sensitive coastline or within the densely populated midlands. However the state has decided to go in for non-hydro option. By 2002 AD, as much as 50% of the state’s electricity needs would be met from non-hydro sources. Study conducted by **Pryas (2001)**, an institution in Pune city, on the role of regulatory commission. In this study, the issue of accountability has been taken as the major plank. It was focused out that the main problem was accountability with former SEBs. There was extreme intervention of state governments in the functioning of SEBs. This was the main cause for the poor financial and technical performances of SEBs. In the present study the reform process were introduced that provided the extensive power to controllers without holding them responsible to the public. Unaccountable interference by politicians was the major reason for the crisis. This model does not ensure any mechanism for solving these problems. Hence, the model was not an appropriate model. The strategy paper on power of the Government of **Andhra Pradesh (2001)** this study existing numerous phases of power sector in Andhra Pradesh. The paper involves of a complete performance of year wise expenses, revenues, operating surpluses and grants of electricity board in Andhra Pradesh. This paper examined several matters like private sector participation in generation schemes, raise of non- unadventurous energy distribution and transmission in the state. The paper also discussed about power sector reforms and highlighted that the crucial aim of the reform method is to confirm that power will be supplied under the peak competent circumstances in relationships of cost and value to maintenance the economic development of the state that’s why the power sector concludes to be a burden on the state’s budget and ultimately becomes a net producer of the resources. The paper also focused consideration on the results of reform planned and said that Vision 2020 document of the government pictures the supply of world class superiority power at reasonable prices, discount of energy losses to 10 percent and total exclusion of commercial losses by 2020. **Ruet (2001)** analyzed the development in the Plant Load Factor and decrease in the non-technical losses at smallest price current tariffs can rise 17 percent energy level. These will allow us not to go in for unpopular events such as tariff rise. He also said the opinion that these schedules are not done because of the aims that state electricity boards are worked based on self-enforcing administrative expensive order, absence

of emphasis on costs and budgets. **Ninth Five Year Plan (1997-2002)** recommends that ‘the most essential reason of the difficulties being handled in the power sector is illogical and non-remunerative tariff structure. Though the tariff is stable and recognized by SEBs, the state Government have frequently obstructed in tariff background subsidization SEBs for the losses arising out of state government need to deliver power at low rates to assured sections mainly agriculture. Therefore, power supply to domestic and agriculture consumers is deeply subsidized. SEBs through irritated subsidization of cost from industrial and commercial consumers is capable to protections only a part of this subsidy. The SEBs in the method, have been suffering substantial sufferers. If the SEBs were to stay on the same lines, their internal source creating during the next ten years will be negative, being of the order of Rs. (-) 77000 crore. This increases serious fears about the facility of the states to contribute their share to capability addition during the ninth plan and thereafter. This shows the need of power sector reforms and the importance of tariff justification. **Sinha and Sidharth (2003)** had examined the usefulness of the power sector reforms developed in the Orissa state. 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 42 restructuring of power sector. In the study, key steps taken by the Government of Orissa such as unbundling and privatization 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 delivered by Orissa Electricity Regulatory Commission. It was revealed that there was no development in the technical performance of the scattering companies even after privatization of distribution business. The level of distribution losses and transmission was described to be very extraordinary. The level of losses was described more than fifty per cent for the financial year 1997-1998. In the crucial years of its structure, OERC agreed tariff hikes practically every year to reward the commercial losses of the distribution firms. However, the utilities were not able to produce any income surplus and help to better quality of service to the users. Therefore, the Orissa model was not appreciated and followed by other states while undertaking the power sector reforms appropriate model. **Jain and Varinder (2004)** made an attempt to evaluate the power sector reforms procedure being originated in Punjab. He founded that these reforms are not sufficient and indicated that the State Government should afford extra attention to take more suitable reforms creativities in the power sector. The State Government should not come below the unjustified burdens of numerous international agencies such as World Bank for reforms. There is need to attention on the improving the active efficiencies and state government should attempt to improve the financial and operational performance of the

Punjab State Electricity Board (PSEB). The main recommendations of the study were that transparency, accountability and reliable metering in electricity grant may be used as basic processes to stop the operational disorganizations in the power sector. **Majumdar (2005)** found that inter-regional disparities in infrastructural facilities have been reason behind uneven development in India .This study examined the validity of this argument at district level using composite indices of power and infrastructure availability at four points of time 1970-71, 1980-81, 1990-91 and 2000-01.significant association between infrastructure and power level of region observed, though the greatness had dropped in current years. **Indian Institute of Public Administration (IIPA)** conducted a study to examine the outcomes of restructuring of SEBs in 2006. The objective of the study was to evaluate 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. This study has been taken twelve states to extent the developments in the operational performance caused from the process of power sector restructuring. The crucial conclusions of the study were fast need of operative restructuring process and independence of power sector improves the performance of the limitations. **Singh (2006)**, in his study, had measured the financial and technical performances of Punjab state electricity Board (PSEB). It decorated some inefficiencies in the process of the transmission, generation and distribution utilities of PSE This study has highlighted that PSEB has seen high energy losses and there were no such steps taken to enhance the financial performance of the electricity board. It was suggested that Punjab State Electricity Board should take step to improve the technical and financial performance. **Dubash and Rao (2008)** have examined the political and social framework in which power sector reforms have been occupied place in India. The study has claimed that the shape of the restructuring process should aim increasing the economic efficiency on the one hand, and on the other hand the larger public interest should be protected. It is a matter of public anxiety that most of the international contributor bodies were not very sensitive to the regional issues related to power sector. Further, it is also recommended that the electricity consumers particularly the civil culture players should play a more dynamic role in the process of restructuring the power sector industry in India. The paper argued that improved access to the electricity, the promotion of sustainable energy policy and social pricing should be the significant issues in global development of power sector reforms in the kingdom. **CUTS International (2010)** examined on the subsidy and pricing policy disputes in power sector. The main objective of the study was bringing to light very distortion existing in the subsidization of agriculture sector. In the study electricity pricing policy for the agriculture



sector for the selected states has been examined. Time period of the study was 2004-05 to 2006-07. In the study area various states has been included such as Punjab, Andhra Pradesh, Tamil Nadu, Rajasthan and Haryana. The study found that in most of the state, tariff of agriculture sector was unfixed. The main suggestion of the study was that the regulatory commission should be provided more independence to establish the tariff on the source of cost of supply. **CRISIL (2010)** made an attempt for the assessment of the financial possibility of the distribution companies. The major objective of the study was to put a light on the financial viability of the electricity utilities. Concentrating on the Punjab power sector, this study concluded the major problem here in Punjab was the declining financial performance of the sector. With the passage of time, the revenue realized and cost of supply has been enlarged. 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) has decreased the evaluations of revenue necessity recommended made by the distribution firm.

### **3. Research Methodology:**

**3.1. Data Source:** For the assessment of financial performance of power sector, the data of cost incurred and revenue generated by power sector was taken from various annual reports of Ministry of Power, GOI.

**3.2. Research Methods:** To analyzed the financial performance of power sector, Tariff-cost Ratio Analysis and its Annual Growth Trend Analysis have been employed.

$$\text{Annual growth} = \frac{\text{Current Year} - \text{Previous Year}}{\text{Previous Year}}$$

$$\text{Tariff Cost Ratio} = \text{Average Tariff} / \text{Average Cost}$$

$$\text{Total Average Cost} = \text{AVC} + \text{AFC};$$

Where,

AVC= Summation of Average Fuel cost, Average Power purchase cost, Average O & M expenditure, Average Administrative cost and Misc. Expenditure.

AFC= Average Cost of Depreciation and Interest

### **4. Results and Discussion:**

In this section financial performance of power sector has been analyzed, its need of hour to evaluate the financial performance of power sector in India as it would undermine its

feasibility. In this section, the technique of growth rate analysis has been adopted to measure the financial performance of the power sectors in India. This analysis includes the whole financial structure of power sector which helps to understand the cost, revenue and profit margin of Indian power sector during the study period.

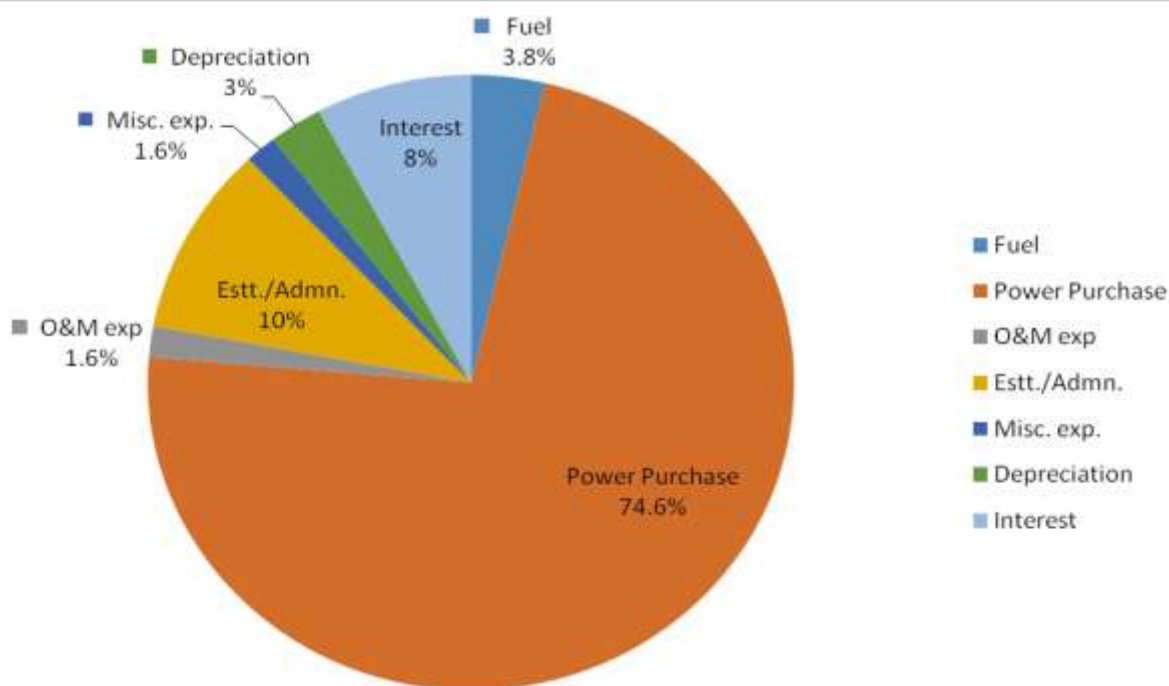
#### **4.1. Cost Structure of Indian Power Sect**

Cost of electricity supply is crucial for power sector. The major components of cost of electricity supply are spending on fuels, power purchase and O & M. Apart from these variable costs, some fixed cost also occurred which significantly affect the supply of electricity. Besides machinery and equipments, the key components of fixed cost are depreciation and interest payable to institutional creditors and to the concerned state governments. Cost structure of SEBs for the year 2013-14 is given in the Table 4.1 and Figure 4.1.

<b>Table 4.1. Cost Structure of SEBs (2013-14) (Paise/Unit)</b>								
<b>States</b>	<b>Fuel</b>	<b>Power Purchase</b>	<b>O&amp;M Exp</b>	<b>Estt. / Admn.</b>	<b>Misc. Exp.</b>	<b>Depreciation</b>	<b>Interest</b>	<b>Total</b>
Andhra Pradesh	0.0	502.84	3.54	26.79	2.65	15.86	11.47	563.15
Bihar	57.0	569.05	13.55	62.8	9.94	29.81	42.45	784.59
Gujarat	0.0	452.88	3.3	27.05	0.0	12.06	0.25	495.54
Haryana	0.0	501.56	4.61	40.54	10.1	8.53	80.72	646.06
Karnataka	0.0	418.28	2.96	44.98	5.53	10.43	22.61	504.79
Kerala	22.3	362.12	16.53	151.7	-11.47	23.65	31.93	596.71
Madhya Pardesh	0.0	388.94	3.71	76.85	3.21	26.7	39.20	538.61
Maharashtra	0.0	477.79	6.94	76.85	27.87	11.91	13.19	584.19
Odisha	0.0	525.28	10.17	76.85	52.53	17.02	31.98	539.89
Punjab	122.9	239.82	10.17	112.50	2.37	20.41	67.83	578.47
Rajsasthan	0.0	484.92	13.4	38.03	3.9	17.41	147.8	697.58
Tamil Nadu	120.3	362.09	16.63	63.39	0	13.33	81.35	645.72
Uttar Pardesh	0.0	560.24	16.63	32.79	12.55	12.17	70.89	706.23
West Bengal	0.0	490.23	19.86	38.45	20.02	14.1	39.47	612.91
<i>Average</i>	<i>23.03</i>	<i>452.57</i>	<i>10.14</i>	<i>62.11</i>	<i>9.94</i>	<i>16.67</i>	<i>48.65</i>	<i>606.74</i>
<i>Percentage Share</i>	<i>3.79</i>	<i>74.59</i>	<i>1.67</i>	<i>10.23</i>	<i>1.63</i>	<i>2.74</i>	<i>8.01</i>	<i>100</i>

*Source: Power & Energy Division, Planning Commission, GOI*

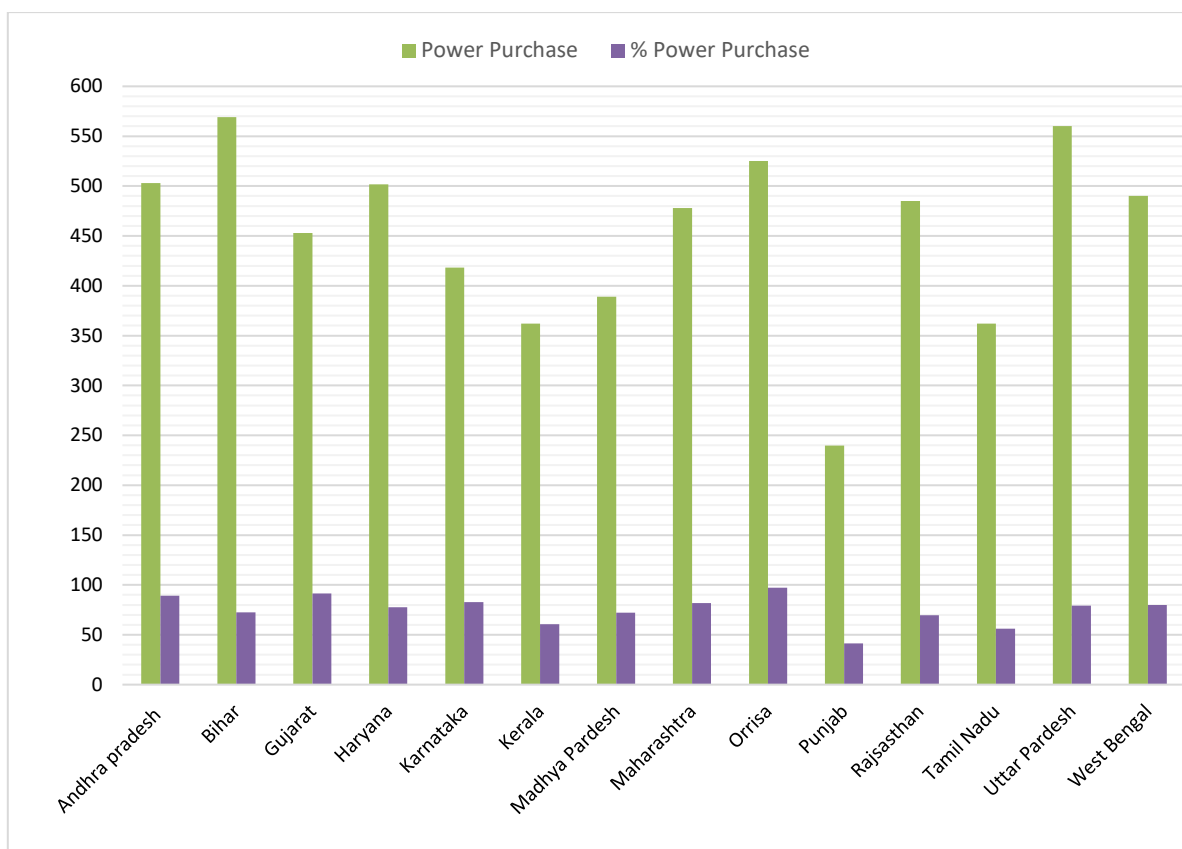
Figure 4.1. Share of Constituents in Cost Structure of SEBs in India (2013-14)



**4.1.1. Fuel Cost:** Fuel cost is one of the components of variable costs. It depends, besides other factors, on the specific consumption of coal and oil and the transportation costs of these fuels. It has accounted for only 3.8 per cent of total supply cost in 2013-14. Punjab, Tamil Nadu, Kerala and Bihar are the states wherein the share of fuel cost is relatively higher in comparison with other states. Punjab is the state which has higher fuel cost than the all India average fuel cost (See Table 4.1).

**4.1.2 Power Purchase Cost:** Purchase cost of power is the prime factor for the power sector; and it depends on various factors. There is disparity in the cost of power sector from one region to another (See Table 4.1). The wide variation of cost for power supply is caused by mainly two factors - first is sources of power generation i.e. thermal and hydro; and the second is coverage of electricity in villages and households. The states having availability of such sources are able to produce electricity easily but those who are comparatively less rich in such sources are fulfilling their electricity requirements by purchasing power from other states. This makes the cost of power purchase is one of the largest constituents of the total electricity supply cost.

Figure 4.1.2. Cost of Power Purchase of SEBs in India (2013-14)



In Table 4.1 and Figure 4.1.2, cost of power purchase is shown for the year 2013-14. The cost of power purchase is averaged to 452.57 Paise per unit in India in 2013-14. It accounts for highest share in the total cost. Here, it can be seen that it is contributing 74.6 per cent in the year 2013-14 (Table 4.1 and Figure 4.1). It can easily be seen that the states making larger expenditure on power purchase are Bihar, Uttar Pradesh, Odisha, Andhra Pradesh and Haryana. These states accruing cost more than the national average expenditure on power purchase. The reasons behind this are-1) they are populated states with high energy requirement, and 2) these states are highly dependent on other states for power. Punjab is the states which has recorded the lowest expenditure of power purchase. It is so because Punjab is almost self-reliant for power as it is possess five big thermal power plants and five functional hydro power plants.

**4.1.3. Establishment and Administration Cost:** Establishment and administration cost include largely wages and salaries of staff and pension payments. The share of establishment and administrative expenses account second largest share that is 10 per cent in the cost of

supply for the year 2013-14. It also varies state to state as number of employees and their rewards varies state to state (See Table 4.1 and Figure 4.1).

**4.1.4. Operation and Maintenance (O &M) Cost:** O & M cost is the expenditure which occurs due to day-to-day working and maintenance of the power units. In the year 2013-14, O & M expenditure averaged to at 10.84 Paise per unit that shares 1.6 percent in supply cost of in India. West Bengal, Uttar Pradesh, Tamil Nadu, Kerala, Bihar, Rajasthan, Odisha and Punjab are those states which have more expenditure on O & M. while Andhra Pradesh, Gujrat, Haryana, Madhya Pradesh and Maharashtra come in the group of those states which have lesser expenditure on O & M for power supply (See Table 4.1 and Figure 4.1).

**4.1.5. Fixed Cost:** Interest payments and depreciation comes under the basket of fixed cost in the supply cost of power sector. Interest payment has larger control than depreciation over the share of cost for power supply. The national average for cost of interest payments and depreciation are 48.65 Paise per unit and 16.67 Paise per unit respectively for the year 2013-14. These two components accounts for 8 percent and 3 percent share respectively in the total supply cost of power. When the state wise payment for interest has been analysed, it is found that there are few states which are bearing higher interest payment. The states which bear the interest payment towards the higher end are Rajasthan, Tamil Nadu Haryana, and Uttar Pradesh whereas Bihar, Karnataka, Kerala, Andhra Pradesh, Madhya Pradesh, Maharashtra, Gujarat Odisha, Punjab and West Bengal are spending lesser cost on interest payment in the year 2013-14. (See Table 4.1 and Figure 4.1)

**4.2. Tariff and Revenue Realisation:** The average tariff signifies the tariff charged for sale of electricity per unit of electricity sold by the utilities to the final consumers. This represents the source of revenue for SEBs. Tariff is categorized into four categories. They are domestic, commercial, agriculture and industrial. Tariff also varies state to state in India. The analysis of tariff reveals the picture of variation in tariff both category-wise and state-wise across India. For the year of 2013-14, state wise average tariff for all four categories is given below in Table 4.2.

States	Domestic	Commercial	Agriculture	Industrial	Average Revenue
Andhra Pradesh	473.86	1128.49	44.25	535.88	547.21
Bihar	328.90	799.25	410.55	671.72	515.66
Gujarat	462.05	595.58	217.56	607.90	462.78
Haryana	437.13	554.42	46.48	573.01	401.49
Karnataka	422.84	784.31	306.73	610.18	476.92
Kerala	281.09	777.12	172.94	567.86	441.99
Madhya Pradesh	474.70	716.51	350.70	580.61	423.52
Maharashtra	524.21	1110.65	258.33	771.81	582.30

Orissa	453.68	820.93	296.96	674.50	470.66
Punjab	424.23	616.84	0.00	586.68	367.03
Rajasthan	549.60	729.44	180.57	582.25	429.65
Tamil Nadu	255.53	856.29	0.00	735.76	493.26
Uttar Pradesh	435.06	463.59	224.18	736.35	508.83
West Bengal	540.25	716.02	415.22	650.45	580.85
<b>Average</b>	<b>433.08</b>	<b>762.10</b>	<b>208.89</b>	<b>634.64</b>	<b>478.73</b>
<i>Source: Power &amp; Energy Division, Planning Commission, GOI</i>					

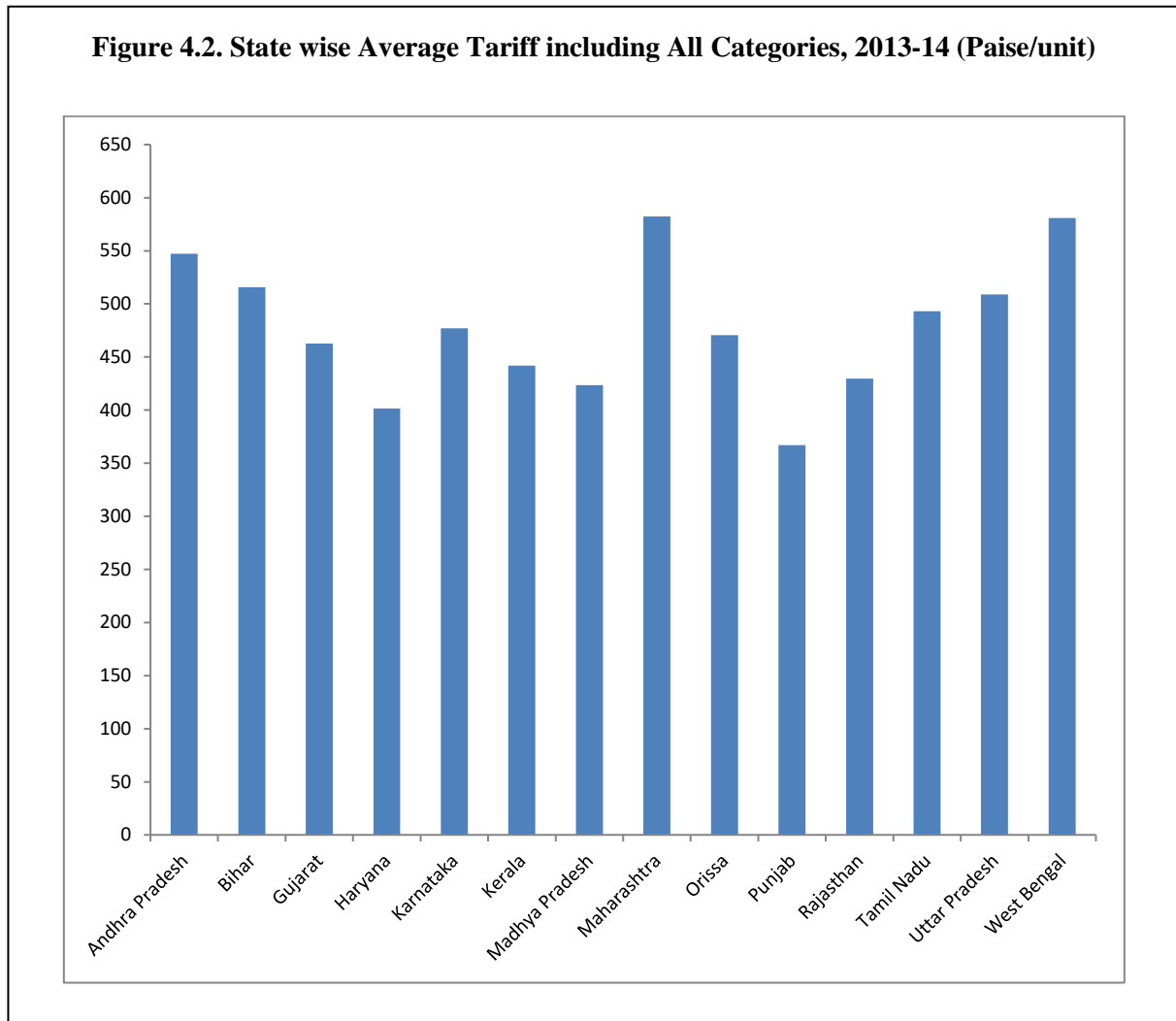
In the category of domestic tariff, it's clear from the above table that there are only two states Haryana and Uttar Pradesh have the tariff close to the national average that is 433.08 Paise per unit. Maharashtra, Rajasthan and West Bengal are the states that have highest tariff. Apart from these states, there are some states which are performing poorer in the terms of tariff in the domestic category. These states are Bihar, Kerala and Tamil Nadu. In the category, Bihar has 328.9 Paise per unit, Kerala has 281.09 Paise per unit and Tamil Nadu has 255.53 paise per unit. Thus, in domestic category, Tamil Nadu is charging lowest tariff.

In commercial category of tariff, national average tariff of the states is 762.10 paise per unit. The states who have more tariff than the national average tariff are Andhra Pradesh, Maharashtra, Tamil Nadu, Odisha, Bihar, Karnataka, and Kerala. In these states Andhra Pradesh, Maharashtra and Tamil Nadu are showing the tariffs which are 1128.49 paise per unit, 1110.65 paise per unit and 856.29 paise per unit respectively. While Rajasthan, Madhya Pradesh, West Bengal, Punjab, Gujarat, Haryana and Uttar Pradesh are generating lower revenue than the national average from commercial segment of tariff. Uttar Pradesh gets the lowest that is 463.59 Paise per unit in the category.

SEBs are charging very low tariff in the agriculture sector. This is the sector in which average tariff is 208.89 Paise per unit. In the year 2013-14, the states who have charging more than the average tariff in the agriculture sector are West Bengal, Bihar, Madhya Pradesh, Karnataka, Odisha, Maharashtra, Uttar Pradesh and Gujarat. Among these states the West Bengal is at the top with tariff 415.22 Paise per unit while Gujarat is at the lowest position with 217.56 Paise per unit. Apart from these states, Rajasthan, Kerala, Haryana and Andhra Pradesh are getting lower than the national average of the agriculture tariff. Punjab and Tamil Nadu are the two states where tariff in agriculture is almost negligible due high subsidy offered by the SEBs.

The average tariff in industrial sector is 634.64 Paise per unit in year 2013-14. Among the states taken in this study, almost half of the states are getting more tariff than the average. Such states are Maharashtra, Uttar Pradesh, Tamil Nadu, Bihar and West Bengal. Among these states Maharashtra and Uttar Pradesh are at charging highest tariff of 771.81 Paise per

unit and 7736.35 Paise per unit respectively. The state wise average tariff including all categories is given in Figure 4.2



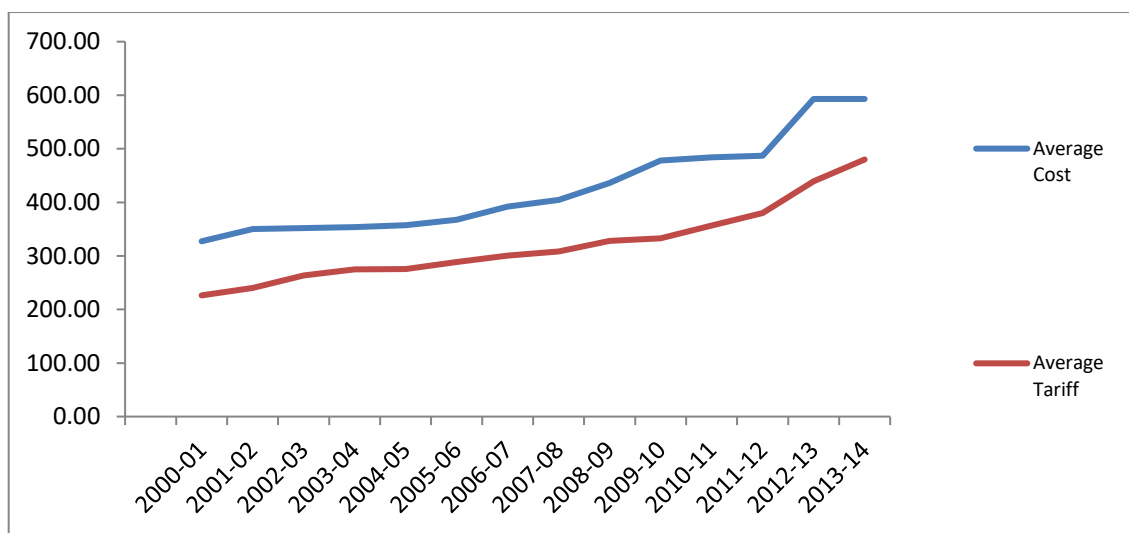
**4.3. Comparative Analysis of Average Cost and Average Revenue:** The revenue generated from sales must be adequate to recover costs of supply is essential for the health of any industry. The comparative analysis of average cost and average tariff reveals the financial performance of the power sector in India. By comparing the average cost and average tariff and calculating growth rate (GR) of tariff cost ratio, this study has tried to present the picture of the financial performance of this sector for 2000-01 to 2013-14; and the results are shown in the Table 4.3 and Figure 4.3 & Figure 4.3.1.

Year	Average Cost	Average Tariff	Tariff Cost Ratio (Tariff/Cost)	Growth Rate of Tariff Cost Ratio
2000-01	327.30	226.30	0.69	~
2001-02	349.90	239.90	0.69	-0.84
2002-03	351.72	263.63	0.75	9.32
2003-04	353.80	275.04	0.78	3.71

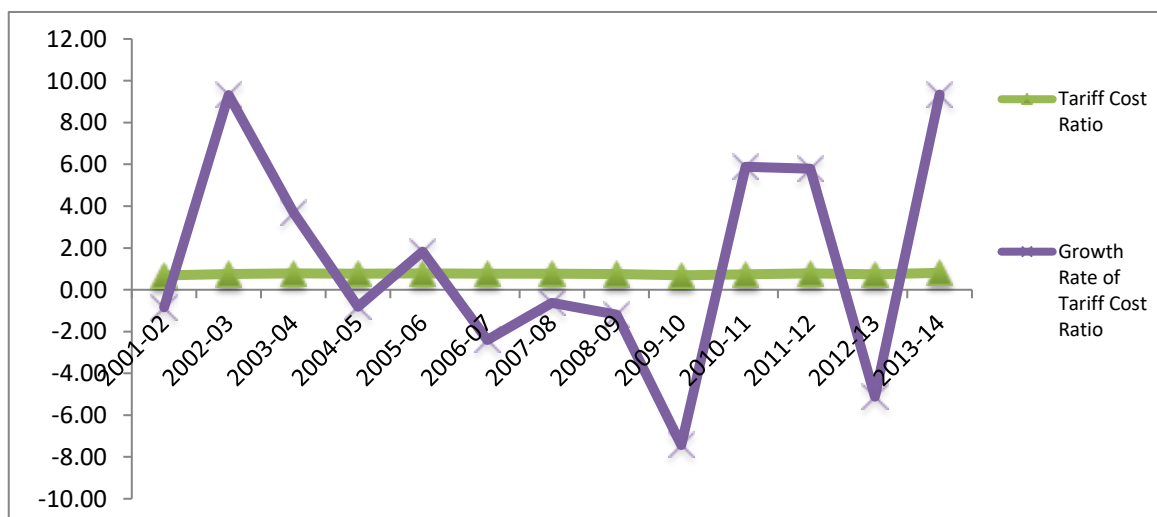
2004-05	357.35	275.55	0.77	-0.81
2005-06	367.62	288.63	0.79	1.82
2006-07	392.17	300.51	0.77	-2.40
2007-08	404.66	308.17	0.76	-0.62
2008-09	436.09	328.17	0.75	-1.19
2009-10	478.00	333.00	0.70	-7.43
2010-11	484.00	357.00	0.74	5.88
2011-12	487.00	380.00	0.78	5.79
2012-13	593.00	439.00	0.74	-5.12
2013-14	593.00	480.00	0.81	9.34
<b>MEAN</b>	<b>426.83</b>	<b>321.06</b>	<b>0.75</b>	<b>1.34</b>

Source: Ministry of Power, GOI

**Figure 4.3. Trend and Pattern of Average Cost and Average Tariff**



**Figure 4.3.1. Trend and Pattern of Tariff Cost Ratio and its Growth Rate**





As shown in the Table 4.3 it is revealed that tariff cost ratio is less than one for the entire period of the study. This clearly indicates that power sector in India is far beyond breakeven point, but as it is observed that tariff cost ratio has improved from 0.69 in 2000-01 to 0.81 in 2013-14. Therefore, it presents slight positive improvement in financial performance of power sector. As far as growth rate of tariff cost ratio is concerned, there is high fluctuation recorded as shown in Figure 4.3.1. Mean values presented in the Table 4.3 express that there is big gap between average cost (426.83 Paise per unit) and average revenue (321.06 Paise per unit). Similarly, mean tariff cost ratio of the period is 0.75 which is 0.25 below to breakeven point. But, the mean of growth rate is positive that reveals a minor improvement in the financial performance of the power sector during 2000-01 to 2013-14.

### **5. Conclusion and Policy Implications:**

This study primarily focused on costs structure and revenue realization in power sector. As most of the states are dependent on other states for power, power purchase cost is one of the major components of cost of electricity supply in India. As electricity is highly subsidized in India, revenue generated out of tariff is much lesser than the cost incurred. In the revenue section the study found that the government is intervening the tariff and revenue in some particular category. It prompts to the inefficiency in the electricity generation in India. As tariff cost ratio is less than one for the entire period of the study, it indicates that power sector in India is far beyond breakeven point. Therefore, financial performance of power sector is really a matter of concern in India. Cost is an important factor to fulfill the demand of electricity. The cost structure varies across India. It is due to dissimilarity in the availability of natural resources required for the power generation. Some states are rich in coal while some are rich in water. Production of electricity from a particular source need to be paid heavy amount of money to full fill the electricity requirement. It is far better to produce electricity in the region that is based on their own resources. Electricity generation unit, based on their own availability of resources, should be established at regional level. It would reduce the transportation cost as well as cost of purchasing of raw materials for the electricity generation. here is significant gap between cost of electricity supply and revenue generated from it. It leads to severe loss. In some categories as in agriculture, heavy subsidy is granted by the government. This creates burden on the aggregate economy. To minimize or eliminate such burden, the GOI should offer subsidy on power generating equipment's i.e., community solar power equipments instead giving subsidy on specific consumption. Similarly, the GOI

can promote advancement and application of power saving technologies and equipment i.e., manually operated irrigation pumps.

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