

Cost Overruns In Power Projects

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Abstract: Cost overruns in the power sector have been analysed in this paper to know its extent and variation across sectors, regions, plans, capacities, pre and post Electricity Act stage. Since power is essential for the infrastructure growth. Infrastructural growth has direct relationship with economic growth. Delays in power projects has negative effects on infrastructural growth and on India's Gross Domestic Product.

Keywords: Power projects, cost overruns, sectors, regions, capacities, pre and post Electricity Act and across plans.

Introduction

Adequate availability of energy is one of the basic requirements for faster economic growth. Ensuring certain minimum level of energy consumption for everyone is a critical requirement for providing basic amenities. India faces formidable challenges in meeting its energy needs and in providing adequate energy of desired quality in various forms in a sustainable manner and at competitive prices. India's power sector continues to be a stumbling block for its infrastructure growth and overall development.

The objective of the present paper is to study the cost overruns in the thermal power projects and to know its extent and variation across sectors, regions, plans, capacities, stage through data analysis. Data collected for analysis include thermal power projects completed in 9th to 11th Plan. Thermal power generation contributes 65% of total installed power generation capacity in the country as on October 2011, and contributes 74.6% of capacity addition in the 11th Plan.

The data for 241 completed projects was collected from the various monthly and quarterly Reviews of Thermal Power from CEA (November 1996 to November 2011). Finally, 233 projects were analysed as some projects had to be excluded due to lack of actual completion cost data. The dataset of 233 projects represents 90.1% of actual thermal generation capacity added till August 2011. As private participation picked up since 1997, we have compared and analyzed projects in the Central, State and Private Sectors from 9th to 11th plan. The complete information about a project is made available once project has successfully run for some time so completed projects till August 2011 have been considered.

The information about the following variables was collected from the monthly, quarterly and Annual Reviews of Thermal Power from CEA.

Cost Overrun (COR) was calculated as the difference between the actual cost of the project and the initially planned cost of the project in Rs lakhs. Data about actual cost and initial cost was collected from CEA.

Cost Overrun in Percentage (COR %) was calculated as the ratio of cost overrun and the originally planned cost of the project multiplied by hundred.

In-depth analysis of the COR% has been done with respect to factors like Plans, Sector, Capacity, Region, and Stage. The results of the analysis are shown below with descriptive statistics and charts.

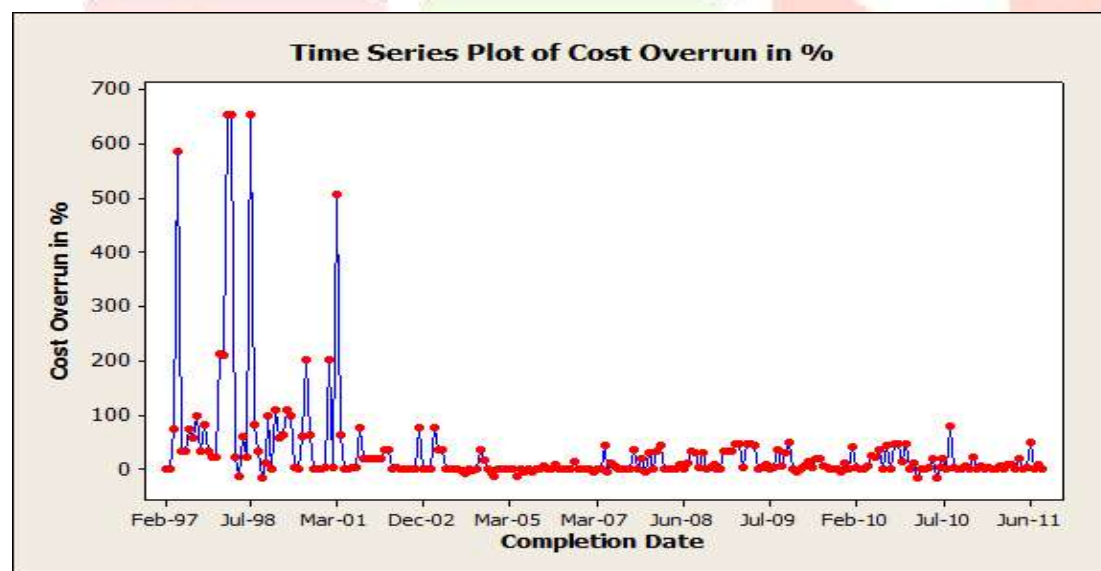
Data Analysis

Plan wise cost overruns

Plan is 9th, 10th, or 11th plan. Projects which have been completed during the period, January 1997 to December 2001 have been considered in 9th Plan. Similarly, projects completed during January 2002 to December 2006 have been considered in 10th plan. In the 11th plan projects completed during January 2007 to August 2011 have been considered.

The **cost overruns %** over the **plans** show that the cost overruns were maximum in the ninth plan and least in the tenth plan. The costs overruns have again picked up slightly in the eleventh plan as capacity addition target is almost double that of tenth plan. This is shown in the time series analysis and figures below. (Table 1, Figure 1,2)

Figure 1

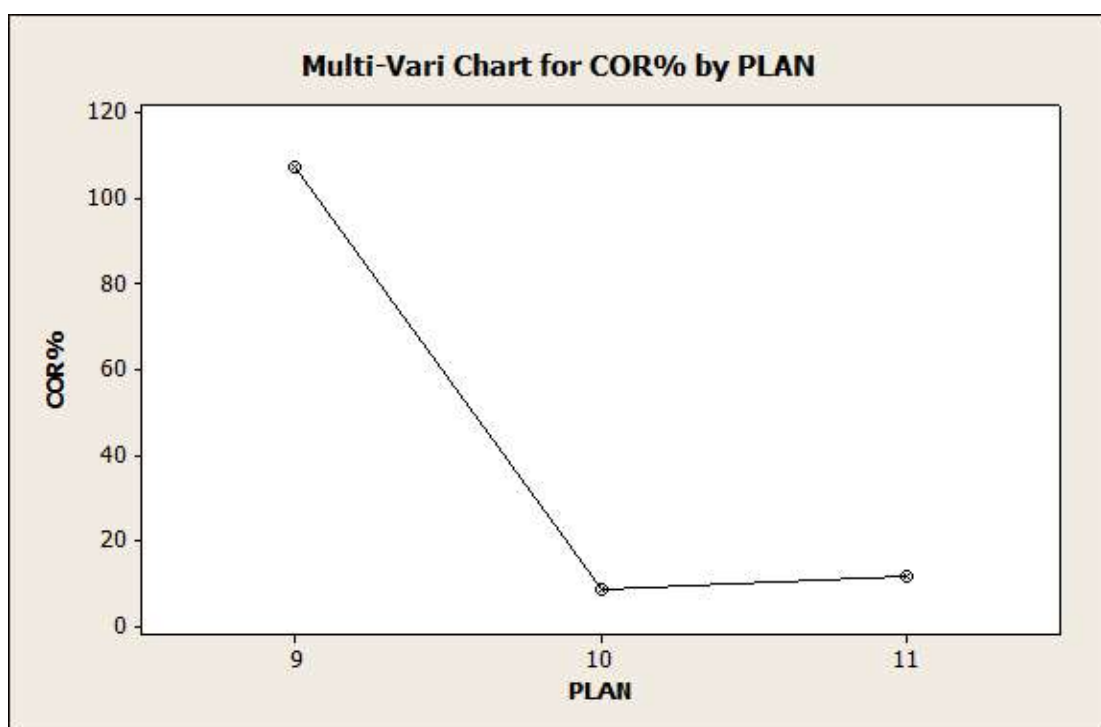


Descriptive Statistics: COR%

Table 1

Variable	Plan	N	Mean	Std. Deviation	Minimum	Median	Maximum
COR%	9	50	107.6	179.9	-16.9	45.2	654.2
	10	56	8.73	20.07	-14.76	0.00	76.11
	11	127	11.43	17.32	-15.07	2.91	77.97

Figure 2: COR% by Plan



Sector wise Analysis Implementers, the owners of the project, have been divided into three categories **Central**, **State** and **Private** Implementers. This has been done to know the variation sector wise.

Analysis of sector wise cost overruns shows that Central sector projects have the most cost overruns in percentage in this (Fig 3, Table 2) as Kathalguri project in Assam in the ninth plan had maximum cost overrun in percentage 654.21%. If we remove this one exceptional project then the mean % cost overruns are least 9.67 This is shown in COR% without Kathalguri (Figure 4).

Descriptive Statistics: Sector wise COR%

Table 2

Variable	Sector	N	Mean	Std. Deviation	Minimum	Median	Maximum
COR%	C	48	50.0	160.8	-14.8	0.0	654.2
	P	69	10.21	17.71	-15.07	0.0	56.90
	S	116	36.35	79.51	-16.91	12.41	584.19

Figure 3: COR% by Sector

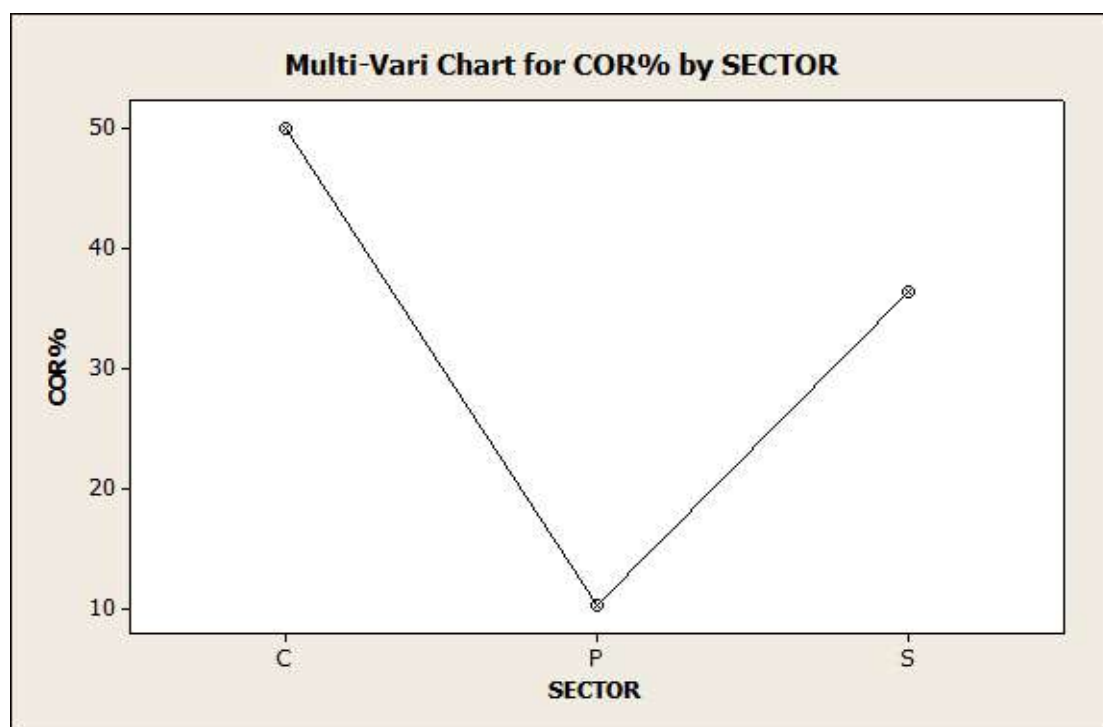
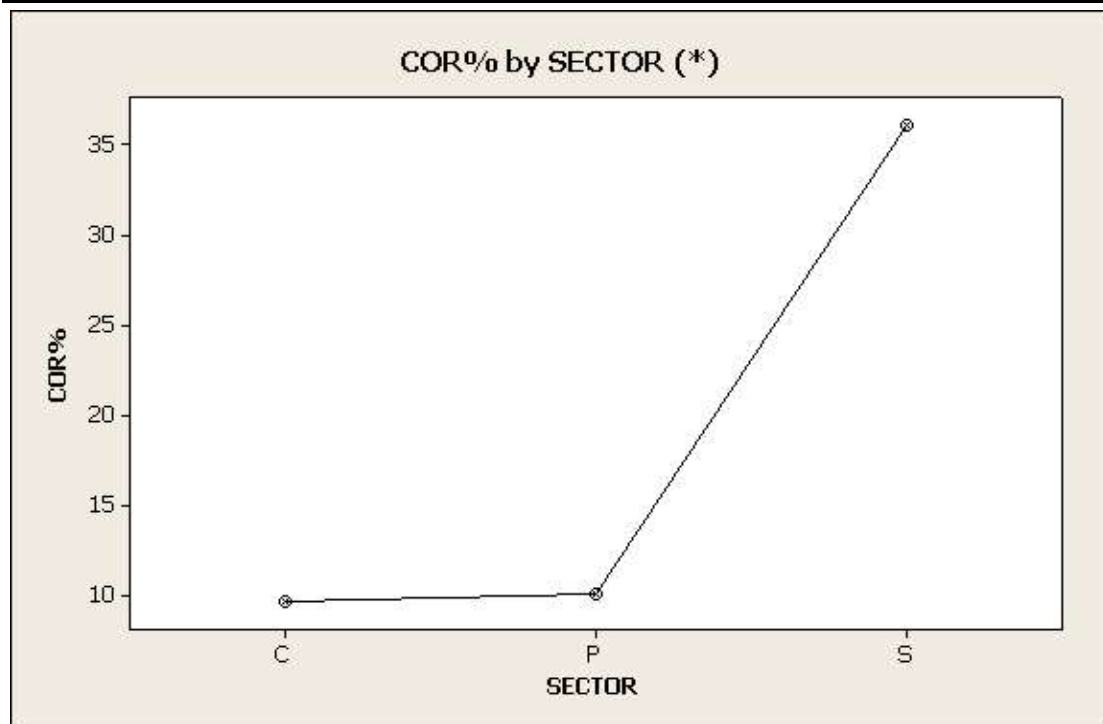


Figure 4: COR% by Sector (*)

* Without Kathalguri Project



Region wise COR%

States represent the respective states where the plant is located. **Regions** are divided into five regions as North (N), South (S), East (E), West (W) and North Eastern (NE).

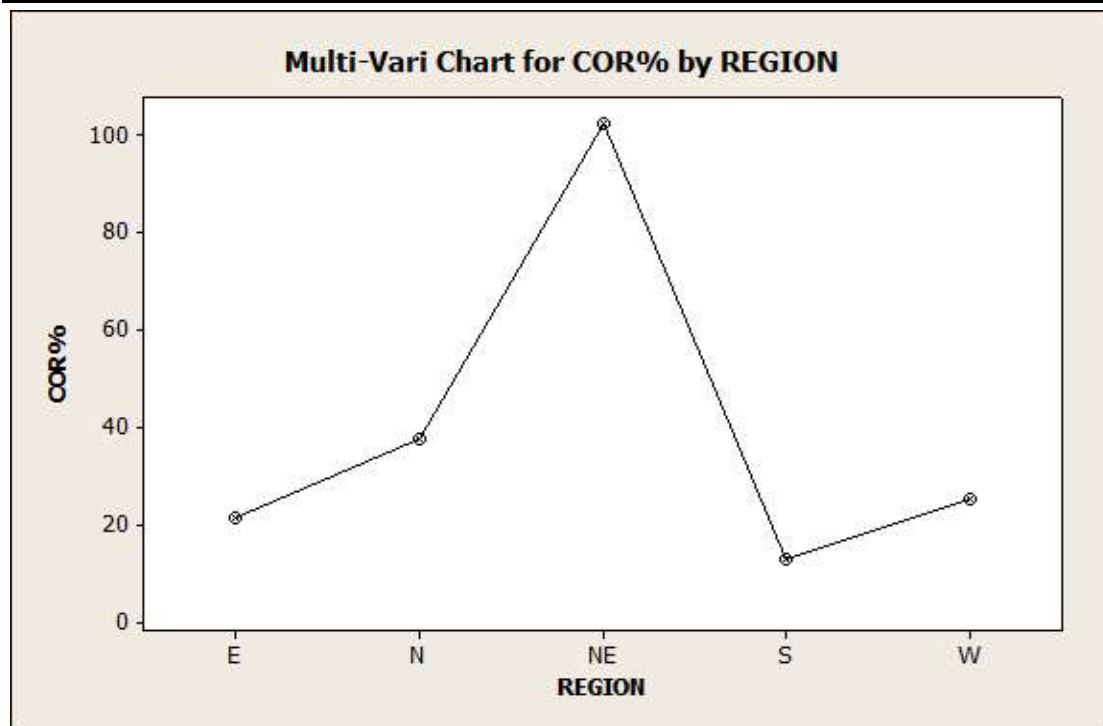
The histogram shows the analysis of **cost overruns** according to the **region**. It however also depends on the capacity added per region. North-Eastern region shows the maximum cost overruns which is due to poor infrastructure, difficult terrain and climatic conditions prevailing there. (Figure 5, Table 3).

Analysis of COR% by Region

Table 3: Descriptive Statistics: Region wise COR%

Variable	Region	N	Mean	Std. Deviation	Minimum	Median	Maximum
COR%	E	34	21.38	40.76	-9.02	0.0	210.12
	N	35	37.5	92.9	-14.8	2.1	506.7
	NE	25	102.4	209.0	0.0	21.8	654.2
	S	64	12.94	24.38	-15.07	0.0	109.96
	W	75	25.20	75.75	-16.91	3.91	584.19

Figure 5: COR% by Region



Analysis of COR% by Stage

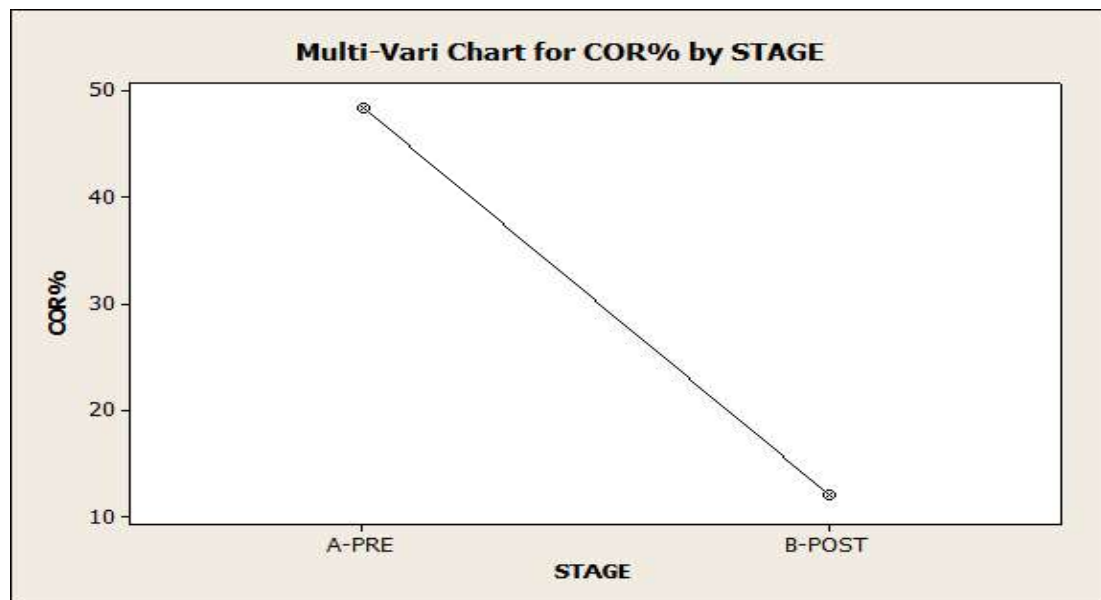
TEC is the date of Techno Economic Clearance of the project granted by CEA. This has been considered as after Electricity Act 2003, TEC is not required for thermal generation projects. So, we have divided the data into two stages **Pre and Post** Electricity Act under **Stage**. Date of TEC has been noted from the various monthly and quarterly issues from CEA.

This histogram clearly brings out the impact of Electricity Act 2003 on the **cost overruns** of the thermal power projects in the country. There is decrease in the cost overruns of the projects in the post Electricity Act 2003. The median of post era is 2.33% while median of the pre-era is (Table 4, Figure 6).

Table 4: Descriptive Statistics: Stage wise COR%

Variable	Stage	N	Mean	Std. Deviation	Minimum	Median	Maximum
COR%	Post	109	12.11	20.08	-15.07	2.33	77.97
	Pre	124	48.4	124.1	-16.9	4.4	654.2

Figure 6: COR% by Stage

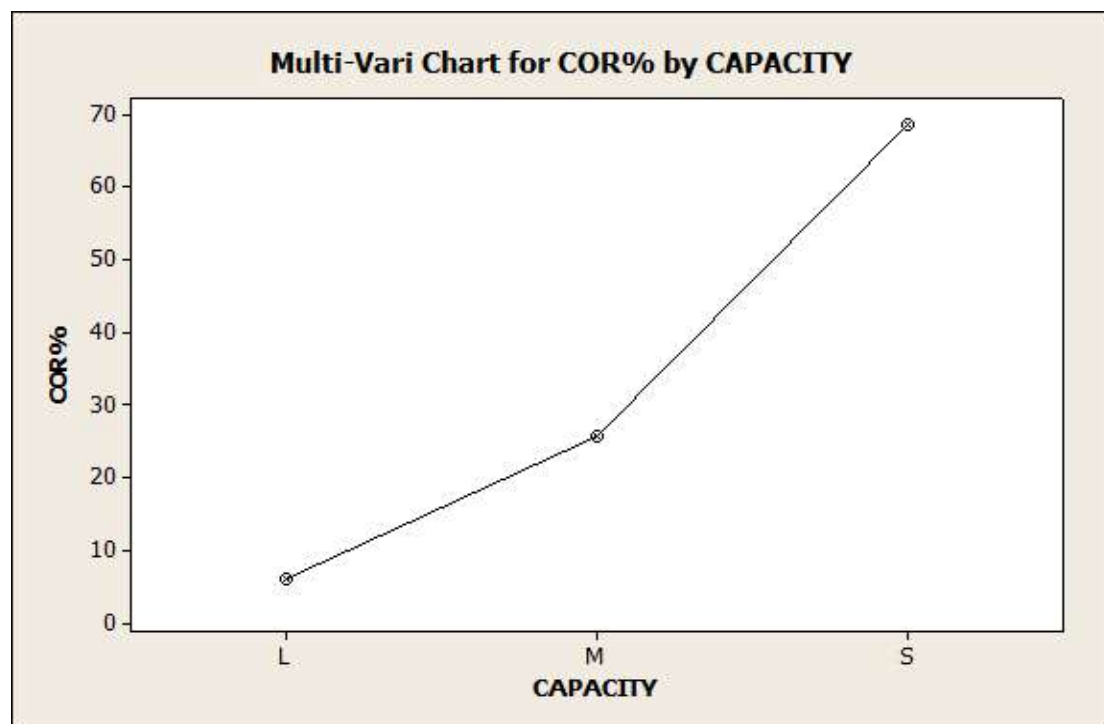


Analysis of cost overruns by capacity addition

Capacity of the projects has been divided into three types **Small** for project capacity up to 100MW, **Medium** for project capacity more than 100MW and up to 500MW and **Large** for capacity of 500MW and more. This has been done to know the variation in the cost overruns capacity wise. The general perception is that small projects are neither cost effective nor completed in time. Capacity wise large size projects are best as they have least time and cost overruns in percentage terms. This is the one of main reasons why government plans to add capacity by medium and large plants in future. (Table 5, Figure 7)

Table 5: Descriptive Statistics: Capacity added COR%

Variable	Capacity	N	Mean	Std. Deviation	Minimum	Median	Maximum
COR%	L	44	5.96	19.23	-15.07	0.00	97.28
	M	137	25.54	57.86	-16.91	3.91	506.70
	S	52	68.4	168.0	-5.3	18.4	654.2

Figure 7: COR% by Capacity

Findings

Data analysis shows that the cost overruns have come down but still they range from 100% to 0%. Cost overruns of projects range from Rs 41418 to 134772 (Rs lakhs). Fifty percent of projects have cost overruns more than Rs 547 lakhs. The cost overruns were maximum in the ninth plan and least in the tenth plan. The costs overruns have again picked up slightly in the eleventh plan as capacity addition target is almost double that of tenth plan. State Sector projects are the worst in terms of time and cost overruns in percentage terms. Poor health of State Electricity boards, law and order situations, interstate problems and lack of coordination between Centre and State and higher inefficiencies could be responsible for this. Also, other major factors include execution of civil works, funds issues, lack of skilled labour, land acquisition issues, fuel availability and legal disputes between parties. The cost overruns are highest for the North Eastern Region due to the terrain and poor infrastructure. There is sharp decrease in the cost overruns of the projects in the post Electricity Act 2003. Capacity wise large size projects are best as they have least time and cost overruns in percentage terms. This is the one of main reasons why government plans to add capacity by medium and large plants in future.

Suggestions

Better project management techniques should be adopted to eliminate cost overruns. Coordination between stakeholders should be improved, proper delegation of work and IT based monitoring of projects will help in reducing the costs and timely completion of projects. Financial health of State Electricity Boards should be improved. This can be achieved if State Governments minimize the free electricity sops and clear their dues to SEBs. Government should make medium and large sized plants as they are cost effective. North Eastern States Road connectivity should be improved to make the projects cost effective.

References

Central Electricity Authority <http://www.cea.nic.in>

India Development Report, (1999) Government of India

Indian Infrastructure Report, (1997) Government of India, Vol. I, II, and III

Ministry of Power <http://powermin.nic.in>

Ministry of Statistics and Program Implementation www.mospi.nic.in

Monthly Reports on broad status of Thermal Power Projects in the Country, CEA

World Bank Development Report (1994)

