Project Management Of Power Projects: A Review

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Abstract. Power is essential for any manufacturing activity. If India is able to setup power projects efficiently and on time, the benefits will be manyfold. As Power is an important component for development, the present paper's focus is on project management of Power projects. Power projects from ninth to eleventh plan have been analyzed as per project management stages to improve delays in contract closing.

Keywords: Power projects, ninth, tenth, and eleventh plan, project management.

Introduction

Project management is the discipline of planning, organizing, and managing resources to bring about the successful completion of specific project goals and objectives. The primary challenge of project management is to achieve all of the project goals and objectives while honoring the preconceived project constraints. Typical constraints are scope, time, and budget. The secondary and more ambitious challenge is to optimize the allocation and integration of inputs necessary to meet pre-defined objectives.

Projects in the Electricity Supply Industry

Projects for the electricity generation in comparison to other industrial and utility projects

have few distinct features:

- They are highly capital intensive more than other engineering projects.
- They have serious environmental impact, mitigation of which can significantly affect the capital cost.
- Most power projects are an extension or strengthening of an existing large electrical power system and network. The impact of power plant is not limited to a particular project but has system effect.
- In electricity industry demand and markets are available and predictable and tariffs can be regulated. Therefore, the extent of risk for investment in the electricity supply industry although significant is lower than the average market equity.
- Most electrical utilities are monopolies (now though this is changing) plus they are regulated by the government, they are shielded from market risks. Risks of wrong non optimal decisions are shifted from utility to consumers through tariffs.

Traditionally, project management includes a number of elements: four to five process groups and a control system. Regardless of the methodology or terminology used, the same basic project management processes will be used.

Major process groups generally include:

- Initiation
- Planning or development
- Production or execution
- Monitoring and controlling
- Closing

Further these have been classified as per the project management stages for better analysis and suggestions for improvement. (Figure 1)

Figure (1) Project management stages in power projects

Project Set-Up	Project Plan	Budget Allocation	Engg. and Procurement	Execution	Contract Closing
• Project Definition • FR Preparation • Statutory Clearances	• Schedules • Land Acquisition • Infrastructure Development • Fuel Linkage • Power Transmission Tie-ups • Power Purchase Agreement • Rehab & Settlement	• Funds Tie-ups • Pkg. wise • Budget Allocation • Yr. wise Budget Schedule • Budget Release Availability • Control	• Finalize Pkg. List • MNW • Finalize Cost Estimate • Finalize Specs • Tendering • L1 Schedule • L2 Schedule • Detailed Engg. Supply • Mfg. • Inspection	• Site construction & erection • L3 schedule • Field Quality Checks • Progress Report & Monitoring • Payments • Commissioning. & Handover	• Settlement of Variations, LDs, other contractual issues • Reconciliation of contract documents • Final Payments • Closing of Contract

Analysis of Power Projects (9th to 11th plan)

233 power projects which represent 90 percent of capacity added in the 9th Plan to 11th Plan (till August 2011) have been analyzed.

Capacity Covered in Dataset	54949.4 MW
Actual Thermal Capacity Addition till Aug 2011	61006.34 MW
% Covered	90.1

The main reasons for the delay in project commissioning were individually analyzed and classified as per stages 1 to 6 of project management cycle as shown below. (Table 1 to 6)

Table 1

Project Life Cycle (Stage 1) Project Set-up	**No. of Projects**	**% age**
Misc. Statutory Clearance	9	2.6
Total	**9**	**2.6**

Table 2

Project Life Cycle (Stage 2) Project Plan	**No. of Projects**	**% age**
Fuel Linkage	16	4.6
Water Linkage	12	3.5
Power Purchase Agreement	6	1.7
Capacity Change	3	0.9
Power Transmission Tie-ups	2	0.6
Misc. Infrastructure Dev	2	0.6
Total	**55**	**15.9**

Table 3

Project Life Cycle (Stage 3) Budget Allocation	**No. of Projects**	**% age**
Funds	39	11.2
Total	**29**	**11.2**

Table 4

Project Life Cycle (Stage 4) Engg. & Procurement	**No. of Projects**	**% age**
Foreign Supplier Problem	31	8.9
Sinking of Vessel	3	0.9
Balance of Plant Supply	2	0.6
Misc. Tendering	2	0.6
Total	**140**	**40.3**

Table 5

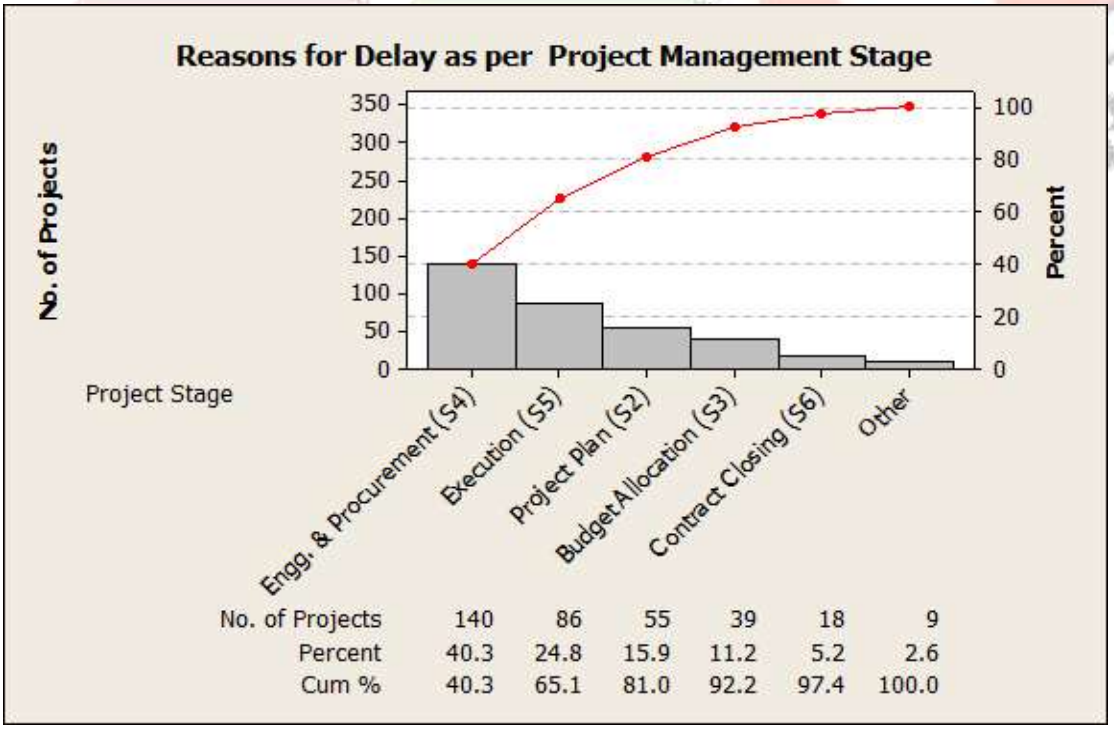
Project Life Cycle (Stage 5) Execution	No. of Projects	% age
Labour	22	6.3
Transportation	10	2.9
Climatic	7	2.0
Misc. Monitoring	2	0.6
Total	**86**	**24.8**

Table 6

Project Life Cycle (Stage 6) Contract Closing	No. of Projects	% age
Misc. Administration delay	2	0.6
Total	**18**	**5.2**

Further above results are summarized in the Pareto chart below (Figure 2).

Figure 2: Reasons for Delay as per Project Management Stage



Findings

As can be observed major reasons for delay are due to

(a) Engineering and Procurement (stage 4)

(b) Execution of Civil Works (stage 5) and

(c) Project Plan (stage 2).

Major reasons responsible for delay and cost overruns in **Engineering and Procurement (Stage 4)** are main equipment delay, foreign supplier problems like visa issues for Chinese suppliers, and delay due to balance of plant supply.

Major reasons responsible for delay and cost overruns in **Execution of Civil Works (Stage 5)** are related to construction of cooling tower, chimney, design changes and standardization, labor problems and transportation of big equipment due to lack of infrastructure facilities around the plant.

Further, major reasons responsible for delay and cost overruns in **Project Plan (Stage 2)** are related to various clearances for land acquisition, fuel linkages, and delay in finalizing Power Purchase Agreement.

Conclusion

The analysis of 233 projects representative of ninety percent of capacity addition in the ninth plan to the eleventh plan reveals that effective project management techniques can reduce the cost and time overruns of power projects. Major reason for the delay is engineering and procurement problem. Execution of civil works, power purchase agreements, land acquisition and fuel linkages are also cause of concern. India can accelerate its pace of development if these problems are addressed effectively.

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