

Facing Project Cost Exposure during Front End Loading (FEL) Implementation

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Abstract

The planning of a project is the most critical phase, since all project definitions and requirements should be completed in this phase. Of all project variables, cost is the most sensitive one especially for project that has a limited range of return on investment. Thus, the project cost and planning team has to have a better planning process as well as incorporating the external commercial factors in the project cost.

Meanwhile, Front End Loading (FEL) stages used to evaluate a completed project have limitations in observing the project cost. The cost estimation level is developed and improved in accordance with three FEL stages; Appraise (FEL1), Select (FEL2) and Define (FEL3), prior to the execution phase. Although the actual cost will be realized after execution, the projective project cost needs to be confirmed at the end of FEL 3.

This paper concludes that the characteristics of cost exposure during the planning of an oil and gas project in the FEL stages must be identified and understood by the company. The company is therefore able to foresee the project risk, particularly regarding the project cost.

Keywords: Front End Loading (FEL), Project Planning, Project Cost.

1. Introduction

Project cost overrun has become a major issue for project management practices in recent years. Research related to project performance has shown that some negative indicators have arisen when projects are being executed. According to a 2009 survey conducted by Price Waterhouse Coopers (Westney 2012), the number of major projects that could be defined as successful was only 2.5%, an astonishingly low number. In 2009 the Standish group reported average cost overruns of 89% on 8300 IT projects, while research by US Census Bureau project in 2009 revealed average cost overruns of 80% (Halligan, 2012).

The data above indicate significant problems during the project planning phase. An improved approach and analysis in planning a megaproject has therefore been implemented. Front End Loading (FEL) and similar systems have become a valuable method adopted by many oil and gas companies to execute their megaprojects.

2. Front End Loading (FEL) Practices

Given the high capital requirements for oil and gas and associated process industries, most owner companies have adopted a formal, stage-gated process to develop business ideas into working capital assets and plants (Ogilvie, 2012). Figure 1 depicts a generic project life cycle, front-end loading, and decision gate consisting of initiate, select, define, execute and operate. At the end of each stage, decision

gate is available to evaluate and ensure that all deliverables and criteria have been met. In most cases, the first three (generically termed as appraise, select and define) consist of project definition (pre-authorization) or Front-End Loading (FEL) stage.

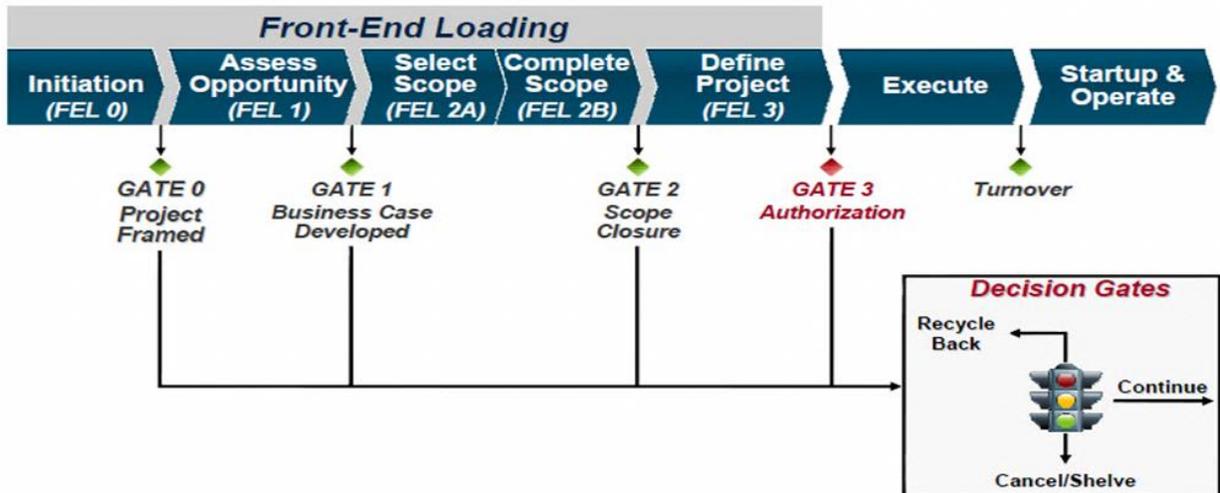


Figure 1: Front-End Loading (FEL) Main Process (Mishar, 2012)

The purpose of this FEL is to secure a detailed definition of the scope needed to satisfy the project's business objectives for capital investment. The process of definition establishes a framework for aligning the project objectives with business goals and ensures business objectives are translated to the project objectives. The alignment of objectives results in improved definition, which reduces changes later in the project. The results are more competitive and predictable project outcomes. Thus, the goals of FEL are the following (IPA, 2013):

- 1) Make the needs of the business the primary driver for capital project investment
- 2) Assign project responsibility to teams with multidisciplinary membership
- 3) Improve the capital productivity of projects by using the best available technology
- 4) Eliminate non-income-producing investment
- 5) Minimize changes during project execution

The FEL gate system will produce some deliverables for each stage, which have been defined and customized for each company. As a result, implementing such a system into a new entity requires adjustments from all aspects, even when the core processes can be maintained yet the scope needs to be modified. Some modifications to the FEL gate system are required in a way that will not overly complicate the process, taking into consideration the lower number of resources involved yet still maintaining the quality of its mandatory deliverables as outputs (Mishar, 2012).

3. Project Cost and FEL Processes

Most companies require an accurate cost estimate to meet and pass the FEL gate system. The system illustrates that these requirements generally follow the AACE International classifications, with some variations to the specific practices and related accuracy classifications required by each company or business unit. For this reason, the cost estimates for each FEL may not directly match the AACE International estimate classifications (Ogilvie, 2012). Nevertheless, Table 1 shows the matching of typical

FEL phases and AACE International estimate class referring to AACE International Recommended Practices 18R-97.

Table 1 Typical FEL Phase and AACE International Estimate Class (Ogilvie, 2012)

Phase	FEL 1	FEL 2	FEL 3
Objective	Business Planning	Scoping Facility Planning	Project Planning
Key Activities	Identify & Assess the Business Opportunity	Review Project Concepts & Select Preferred Scope	Define Project Scope & Complete Basic Design Package & Execution Plans
AACE International Estimate Class	Class 5 L: -25% to -50% H: +30% to +100%	Class 4 L: -15% to -30% H: +20% to +50%	Class 3 L: -10% to -20% H: +10% to +30%

4. FEL Implementation

The company has implemented FEL stage-gated system to evaluate major projects of more than US\$100 million value. The system has been modified and adjusted to the company's nature and organization. The gate process is shown in Figure 2.

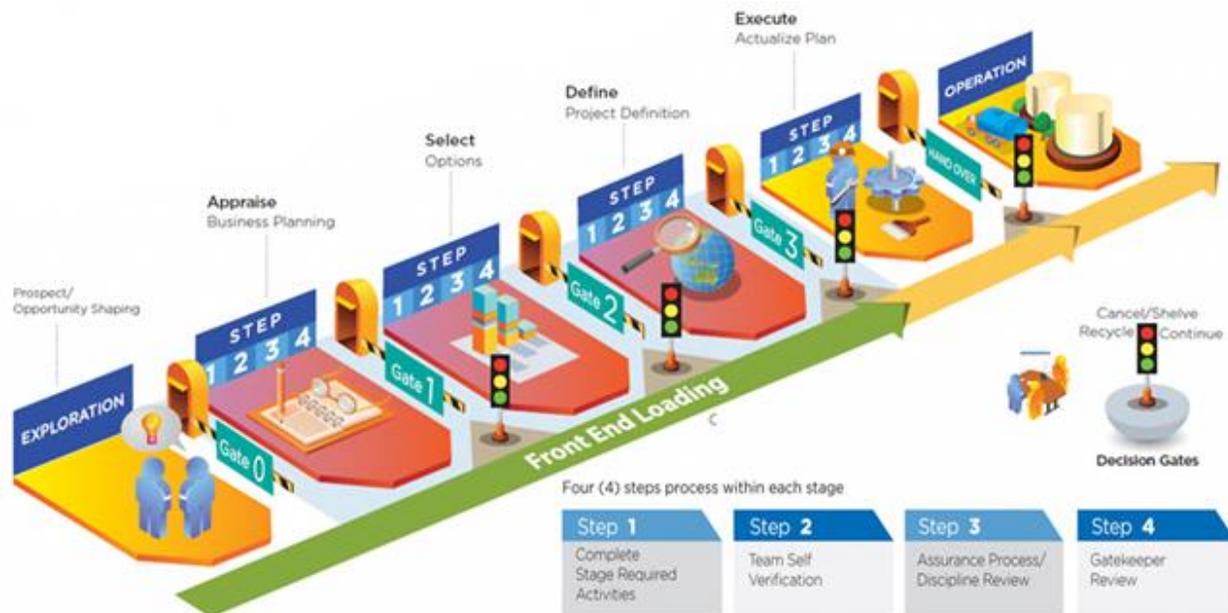


Figure 2: Stage-Gate Process (Mishar, 2012)

The stage gate system used at the company is custom-built to suit the organization's leaner structure or size and promotes practicality for the project teams to easily adopt the concept. Medco embeds the system by placing an overall framework in place with a focus on delivering value through understanding the objectives of each gate, thus setting limited mandatory requirements, while super majors focus on standardization and assurance through establishing best practice guidelines on the detailed aspects of project management which have immediate stand-alone value (Mishar, 2012).

The gate process provides more flexibility with a high level of guidance while still leaving to the discretion of the project team how projects are executed, at least during the initial stage of implementation. By adopting a less rigid system, a less predetermined definition and a less bureaucratic review hurdle, the project owners and decision-makers still have a major influence on determining the course of the project through value-based sanctioning. Therefore, missed opportunities due to sanction delay can be avoided or at least minimized (Mishar, 2012) by perfecting a prescribed level of project definition.

5. Concerns

The companies that implement stage-gated process to review and analyse the business prospects, they have to concern some issues related to project cost and its impact during FEL implementation.

- 1) The nature of cost exposure during FEL stages needs to be understood.

FEL system, consisting of Appraise, Select and Define stages, has enabled the company to adopt best practices through evaluating the feasibility of a project. Each stage has requirements and natures that have to be understood and completed prior to passing each stage gate. Particularly referring to project cost, statistical data using samples from 462 process industries depicted in Figure 3 show that cost estimation at FEL 1 was 70% lower compared to cost at completion, while cost estimation at FEL 2 was 20% lower and cost estimation at FEL 3 was 10% lower (Ogilvie, 2012).

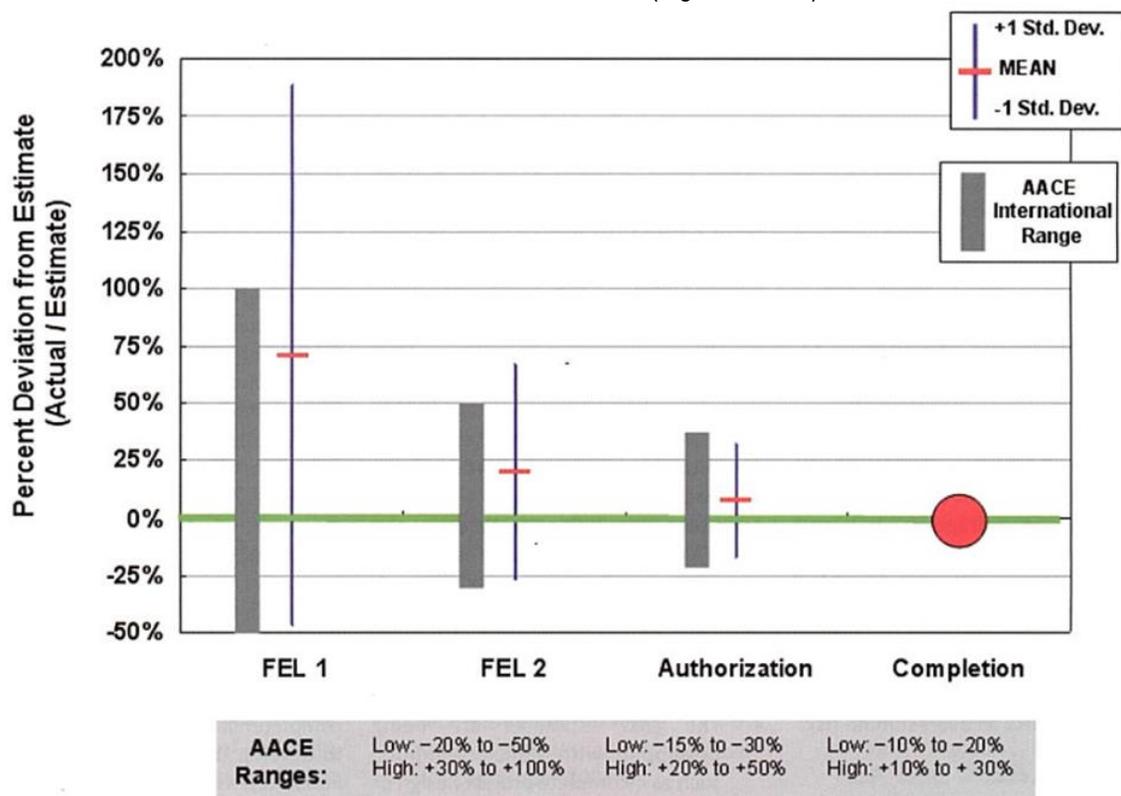


Figure 3: Industry Estimate Accuracy Compared to AACE International (Ogilvie, 2012)

In other words, the cost estimation at FEL stage has a strong tendency to be lower than the actual completion cost. The project manager must be aware, thus the cost estimation process should be properly done including the implementation of project cost contingency. Nevertheless, based on the

data above, the mean of industry sample data has a statistically consistency within the AACE cost estimate classification at any FEL stages

- 2) Gate process must be consistently followed, no matter what decision will be taken later on.
At the end of each FEL gate, the project owner or sponsor have to decide whether the project will be continued to the next FEL, recycled back to previous FEL, or even cancelled (shelved). Gate system is not the point of no return, so the owner cannot decide based on the required ideal data and accurate situations. Since the decision should be taken, the project owner has to realize the exposure of project cost for each gate. The situation may be getting worse, when the project is actually uneconomic. However, in such kind of situation, an uneconomic and/ or unrealistic project ideally can be detected earlier in this gate system in order to avoid a bigger loss and problems during project execution.
- 3) Overconfidence leads the project goes to the unexpected direction.
The FEL system, which provides a comprehensive and staging approach in assessing a project, might lead to a misconception due to over-confidence. Everyone concerned with a project regards the influence curve as the best practice associated with FEL practices. For instance, once a project passes FEL-1 gate process, it doesn't automatically mean the range of the project cost overrun has narrowed down. That range will depend on the processes of FEL-2, not FEL-1 that has been completed.

6. Conclusion

Currently we are facing many challenges in the search for exploration fields that have economical hydrocarbon in place. The development of new fields has also become more challenging due to the complexity of the project to be delivered, particularly with limited gas reserves and high development costs due to sour gas facilities. Therefore, the evaluation process in the planning phase is extremely important prior to sanctioning the project.

Front End Loading (FEL) system is a method to systemize and structure the evaluation of a business prospect by developing business ideas into working capital assets and plants. The generic project life cycle of front-end loading and decision gate consists of initiate, select, define, execute and operate. According to this process, cost exposure during FEL is very critical when maintaining the economics of the project.

This paper concludes that the nature of cost exposure during development project or FEL stages must be identified and understood by the company. In addition, gate process must be consistently followed, no matter what project decisions will be taken later, e.g. continuing to next FEL, recycling back to the previous FEL, or even cancelling (shelving). The company can therefore decide to balance its project downside risk by making strategic decisions.

In conclusion, by taking lessons learned from a sour gas facilities project which uses a proper FEL process, the company is therefore able to improve FEL implementation for other capital projects and foresee the risk exposure, particularly exposure to project cost.

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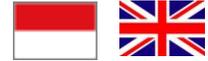
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