

## Effective evaluation software: A tool to reduce capital cost risk in EPC projects

**Determining the capital cost of a plant is complex. By using economic evaluation software platform, EPC companies can reduce capital risk and gain an economically-viable competitive advantage**

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Effective estimating is about making good decisions. Understanding the full scope of projects and acting upon the right engineering choices dramatically reduces capital risk. So, the ability to predict total installed costs faster with greater accuracy early in the process empowers estimators to analyse project execution strategies and maximise profitability.

Whether a project is for new plants, revamps or expansion projects, early and accurate cost estimates are vital for engineering, procurement and construction (EPC) companies and owner-operators to reduce uncertainty and avoid unanticipated overruns.

However, estimating is not just about enumerating items, obtaining quotes and applying factors. Using powerful and intelligent economic evaluation software, EPC companies can be more strategic, including more informed bidding, rapid reactions to client changes, transparency during scope and cost discussions, adoption of collaborative work processes, better capital project planning, change orders and supporting more effective decision-making. Standardised cost data can be calibrated and benchmarked to a company's specific matrix and a model-based approach can be adopted across the entire estimating lifecycle to generate both conceptual and detailed estimates for process plant capital projects in the oil and gas, refining, chemicals and mining industries.

Based on highly-scalable engineering models of process equipment, the software tools accurately model equipment costs, as well as the total installed costs for process equipment (ie, material, fabrication, paint, etc) and associated bulks (ie, piping, structural and electrical). Essentially, the software mobilises engineering and estimating knowhow into a powerful and flexible estimating engine, delivering vital business decision-making analysis.

### Time is critical

Global competition in the energy industries puts increasing pressure on the profitability of assets. For owner-operators, time-to-market, capital efficiency and operational integrity are paramount. While commercial pressures remain in today's turbulent market, it is vital that there is alignment between the EPCs and owner-operators and that the project scope is clearly defined for efficient overall management of project capital expenditures.

Ineffective bidding strategies resulting from lack of data confidence and project misalignment can often put EPC companies at risk. A major cause is the lack of convergence on the project scope during the FEED (Front-End Engineering Design) stage. With the majority of large projects going over budget or behind schedule (as reported in a Fall 2014 study of 365 one-billion-plus energy projects), engineering is moving towards modularisation and standardisation. However, mergers and acquisitions in the industry have created larger companies with less agility and many still suffer from a shortfall of resources, constraining projects still further.

The process flow diagram (PFD) is an important communication point between the engineer and client. Often changes in owner-operator's project criteria results in the need for the conceptual design to be amended and the PFD altered. At this stage, financial, business, schedule and engineering resource pressures can cause engineering teams to begin detailed design before the FEED has been completed or the scope truly defined. This results in wasted engineering and time delays.

### Best practice

Projects that typically achieve superior cost results generally have specific characteristics:

- Better predictability and accuracy during FEED to reduce risk

- Greater alignment and standardisation between EPC estimators and owner-operators' project representatives
- The adoption of scalable, intelligent 'out-of-the-box' estimating and FEED software that captures knowledge during each phase of the project lifecycle
- Capability for estimators to 'tune or calibrate' estimates by self-improvements and benchmarking data, giving the EPC intellectual property and competitive advantage
- Saving time and money with faster estimates overcoming resource shortages

Capital cost estimates are needed early in the business planning and feasibility assessment stages of a project to evaluate viability and compare the economics of alternative processes and operating conditions being considered for the plant. Typically, there is limited information about a new plant at this stage, but more accurate cost estimates are vital to prevent incorrect decisions being made. This could be the difference between whether or not a capex investment is deemed economically viable.

By using one economic evaluation software platform throughout the entire engineering cycle, the EPC can progress the estimate from feasibility to conceptual to detailed cost estimates. The value of the model-based approach is that the estimator can focus on the major equipment items that contribute significantly to the costs rather than spend time enumerating bulk quantities at the FEED stage (a point at which those quantities are not known accurately anyway). Model-based estimates grow more detailed and precise as project engineering advances. The costs are based on data specific to the project as the information is developed. This helps ensure that project managers base all project decisions on consistent economic and engineering assumptions while streamlining the transparent sharing of information among enterprise and business partners. Also, when the same software is used transparently by both engineer and owner-operator, communication on project scope and control is much clearer and more consistent.

There is a level of uncertainty in any cost estimate. Capital projects are subject to change. Therefore, the more detailed and flexible the information available to estimators, the more accuracy is built into the project scope, which will enhance the economic analysis of the process, improve the agility to analyse changes and dramatically reduce errors.

### **Make better decisions**

Determining the capital cost of a plant is complex. It defines whether a construction project is feasible dependent upon all financial constraints. Project change is inevitable, so estimators need to establish robust capital cost estimations that provide the most accurate forecasts to enable effective decision-making. EPC companies face intense competition in the proposals and bidding phase. Hence, turning around proposals faster and being more assertive in the bidding process will increase the chances of winning projects. Above all, executives need to have total confidence in the consistency of the cost data and risk envelope being presented to them.

For EPC companies that provide strategic ways to reduce capital costs and use the same transparent software as the owner-operator, communication on project scope and control is much clearer and consistent. A model-based approach allows the estimator to focus on major equipment items that contribute significantly to costs rather than spending time enumerating bulk quantities at the FEED stage.

Using one economic evaluation software platform manages engineering throughout the project lifecycle significantly reducing capital and operating costs, increasing engineering efficiency and quality, and accelerating time-to-market with faster payback. In summary, this powerful engine helps EPC companies reduce capital risk, gain an economically-viable competitive advantage and improve their long-term relationship with their most important clients.

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