The mining and oil and gas industries are well aware of the need for accurate estimating of project cost prior to sanction. However, what is often not well understood is the extent of the difference between actual costs on project completion and the original sanction estimate, and what drives the variance. Overestimating or underestimating the cost when approaching final investment decision can have serious consequences for both the project and operator. *In this article, we identify five common mistakes in estimating and advise five strategies to avoid setting unrealistic targets and improve confidence in the results.*

While overestimating the cost of a project and approving this estimate to execute usually has minimal impact on the corporation or project team, the true impact is an opportunity cost – the lost opportunity of allocating capital where funds were not required. The project team may even be rewarded for delivering the project under budget, when in reality they may have delivered a poor result against an unnecessarily inflated budget. The more common characteristic, however, is underestimating the scope and cost of a project. This situation creates many more consequences such as:

- Insufficient funds to complete the project, with further knock-on effects
- Lost time interrogating and explaining variance
- Additional cost for assurance reviews

"Successful delivery of a project must be measured against an accurate and independent estimate of cost and schedule at final investment decision."

### Underestimating is the new norm

Turner & Townsend experience indicates that as many as two thirds of natural resources projects completed recently (or currently in execution) faced cost overruns and schedule delays. This is a global phenomenon, but with regional variations due to specific issues such as remote site location, local content regulations, availability of labor and productivity.

There can be a multitude of reasons for projects to overrun during the execution phase, but we believe the major root causes can be simplified to:

**Scope**

- Poor scope definition/scope growth
- Equipment count/quantity omissions
- Misaligned contract strategy
Schedule

- Poor execution strategy
- Material/equipment delays
- Reduced labor productivity

Price

- Equipment/material/commodity price changes
- Cost of doing business in location/owners cost
- Qualified labor availability

However, even a well-executed project can fail to meet targets if the original estimate was not realistic. There are a number of factors that can influence the quality of the estimate prior to project sanction. These often include the motivation of the various stakeholders involved in the original development process. Examples of this can include:

- **Owner** – who is keen to deliver the project as quickly and cost effectively as possible to book reserves and maximize ROI. This can lead to pressure from management on the project team to reduce the cost estimate to aid the final investment decision process.

- **The project team** - who have a vested interest in the project being approved for job security may be willing to accept a lower cost estimate than practical with the belief that, once the projects passes into execution, the cost is expected to rise anyway.

- **Design engineering** – who may, with the best intentions, deliver an estimate that is incomplete or understated to try and meet the expectation of the client with a view to securing engineering hours in the FEED stage. Typically this stakeholder does not have a financial consequence of getting the estimate wrong, but benefits from the project progressing to FEED.

“**The owner ultimately bears the burden of getting an estimate wrong, but can be so committed to doing the project that the proper checks and balances can sometimes be side-lined.**”

While owners have independent assurance teams review projects, these reviews can sometimes be too short in duration with limited time to truly quantify and quality assure the estimate. Often, they are designed to assure compliance with an internal corporate process rather than validate or confirm accuracy of an estimate against a scope of work. These reviews also tend to be very broad and encompass many more technical aspects associated with the project rather than focus exclusively on the estimate scope, schedule and cost. As a result, low estimates are often sanctioned which are unachievable.

**Five common mistakes in estimating**

Our experience in providing both estimates and independent estimate assurance reviews has shown that the five most common estimating mistakes are:

1. **The omission of undefined scope of work from the estimate**
2. **Over optimistic performance is assumed**
3. **Possible risk is omitted**
4. **Inexperienced or biased estimator used for the type of estimate or project**
5. **Inadequate duration allowed for estimate development**

In our opinion, the most effective way to avoid these five common mistakes is to ensure that the estimator chosen for the project has sufficient experience for the type of project, as well as the right tools, data and processes for the required level of detail of the estimate. The estimator should ideally be independent of any project bias which may affect the quality of the estimate, particularly when they assume no financial responsibility for getting the estimate.
wrong. In practical terms, this would mean engaging an estimator who would not be invited to tender for the FEED.

Having unrealistic expectations of project performance and risk, as well as poor scope definition can represent up to 75 percent of cost growth.”

Five strategies using tools, processes and data to provide confidence in your estimate

i. **Methodology**: Establish an appropriate estimate methodology to ensure a reliable estimate

The estimate needs to be aligned to the project Work Breakdown Structure and schedule, and, depending on the operator, may need to meet any internal governance/approval processes. Adhering to recognized industry standards of good practice for estimating e.g. the Association for the Advancement of Cost Engineering (AACE) International is also advised, as well as the application of industry standard practices, tools and systems.

ii. **Scope**: Verify the level of scope definition and understand the cost drivers

Cost drivers are the key aspects that are most likely to influence the cost outcome of the project. A robust estimating process will include reviewing the engineering deliverables for completeness of the design scope. Verifications against the heat and material balance, PFDs, P&IDs, and other major engineering deliverables should identify inconsistencies.

Validating unit rates for labor, plant equipment, marine equipment and materials captures whether appropriate pricing has been applied; taking into account market conditions, geographical locations and the proposed procurement strategy. It is critical that the location, nature of the site access and working conditions are accurately assessed with regards to productivity.

iii. **Assure**: Quality assure the estimate

Assurance services can be carried out either by an independent owner team or consultant.

Diagram 1: Key factors to consider when assuring an estimate

iv. **Risk**: Use industry recognized risk analysis processes

Further improve confidence in the results by assessing if the risks, opportunities and contingency allowances are proportional to the stage of design, basis of estimate information and schedule of the project.

v. **Benchmark**: Use data from similar projects

Benchmarking the estimate cost and schedule against similar projects which have already been completed can identify any final areas of concern.

Turner & Townsend’s framework for estimating excellence

In the current economic climate, the challenge to the natural resources industries to deliver projects safely, on time and on budget is more important than ever. In our opinion, it is essential to systematically address the five common errors and follow our framework to have confidence the estimate has been produced using professional standards and
methodologies, industry tools, and current data reflective of project and market conditions.

Successful delivery of projects requires a new level of understanding of the risks and consequences of underestimating budgets prior to sanction which could ultimately lead to severe financial implications for operators in the longer term.

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**About Turner & Townsend**
Turner & Townsend is an independent professional services company specializing in program management, project management, cost management and consulting across the property, infrastructure and natural resources sectors.

With 90 offices in 38 countries, we draw on our extensive global and industry experience to manage risk while maximizing value and performance during the construction and operation of our clients’ assets.

We have invested in a global estimating service, “EstimaTTor” that has the tools, processes and data to support owner clients with independent estimating and estimate assurance services designed to deliver outputs that are unbiased, free of stakeholder influence and intended to be a single source of truth for projects, project managers and company decision makers.

EstimaTTor brings together a unique combination of our onshore and offshore experience, estimating expertise and data management and tools to deliver increased estimating accuracy, reducing your project risks. Benefits include:

- Independent assessments
- Standard approach and estimating methodologies
- Global team of experienced and skilled estimators
- Industry leading tools, compatible with most cost estimating systems
- Database containing historical global project data

We’d be happy to discuss your needs in more detail and how Turner & Townsend can help with conceptual or detailed estimating and independent assurance.

For further information on any of our services visit our website  
www.turnerandtownsend.com